Grant Application

for USDOT National Infrastructure Investments
2019 BUILD Discretionary Grants

REUNION PARKWAY PHASE II

from Bozeman Road to Parkway East
Madison County

July 15, 2019

Submitted by Madison County Board of Supervisors in cooperation with the Mississippi Department of Transportation

TABLE OF CONTENTS

FIGURES

TABLES

APPENDIX

Project at a Glance

The Madison County Board of Supervisors is requesting $17 million in Fiscal Year (FY) 2019 BUILD Transportation Discretionary Grant Capital Investment funds for the design, Right-of-Way (ROW) acquisition, utility relocation, construction, and construction engineering and inspection (CE&I) of a new rural four (4) lane multimodal roadway connection in Madison County, Mississippi. The new roadway connection, **Reunion Parkway Phase II**, is proposed to extend 1.2-miles from Bozeman Road to Parkway East, including a bridge over US Interstate 55 (I-55). The project includes four (4) travel lanes, bike lanes, sidewalk, and fiber optic cable placement along the extent of the project.

The project, **Reunion Parkway Phase II**, is the second of a three-phase Reunion Parkway long range plan to connect MS 463 to US 51. The first phase of Reunion Parkway has been completed and is open to traffic and the third phase is currently in the final design and ROW acquisition phase. Access across I-55 is limited within the Madison County area and the **Reunion Parkway Phase II** project will provide a critical link in a continually growing area by creating a new east-west corridor. The project will reduce traffic on adjacent east-west corridors in the area, such as MS 463 and Gluckstadt Road, which are currently over capacity. The project will also provide much needed access to undeveloped land creating potential for critical jobs and economic growth for Madison County. Additionally, the new Reunion Parkway connection provides for the possibility of a future interchange at Reunion Parkway and I-55.

If funded, the project will relieve congestion along the existing roadway network, improve roadway capacity and safety, create opportunities for jobs and development, and enable increased access to residential, commercial, institutional, business, and recreational and tourism destinations in the area - including the historic Natchez Trace Parkway and National Scenic Trail.

SAFETY

Enhances safety by significantly lowering the probability of accidents for all modes and reduces congestion by providing alternative routes

STATE OF GOOD REPAIR

Peak hour traffic diversion reduces wear and tear on the roads and alternative modes provide new recreational and commuting access

ECONOMIC COMPETITIVENESS

Significant reductions in transportation costs by infrastructure users, short-term employment by way of project construction and long-term economic impacts of new development

ENVIRONMENTAL SUSTAINABILITY

Reduces greenhouse gas emissions through providing congestion relief and a multimodal network connection for current and future users. Incorporates best practices for stormwater management and for long-term maintenance.

QUALITY OF LIFE

Improves connectivity, provides mobility choices, and reduces travel times which can be a foundation for an enhanced quality of life within Madison County and can be a factor in the attraction as well as retention of residents and a talented workforce.

INNOVATION

Incorporates innovative design elements and technologies such as Safety Edge, Warm Mix Asphalt, and Rumble Stripe to address the long-term safety and usefulness of the roadway and provide fiber optic cable connectivity across I-55.

PARTNERSHIP

Builds upon an existing partnership among the Madison County Board of Supervisors, the State of Mississippi, the Central Mississippi Planning and Development District (CMPDD), and the Mississippi Department of Transportation (MDOT) and expands the project partners with the participation of The Madison County Economic Development Authority and the Madison County Business League and Foundation in support of this project. The Madison County Economic Development Authority and the Madison County Business League and Foundation have voiced their support for the project in letters that are attached to this BUILD Grant application.

Project Description

Background

Reunion Parkway was included in the *2020 Jackson Urbanized Area Transportation Plan* completed by Central Mississippi Planning and Development District (CMPDD) in 1997. The CMPDD is the regional Metropolitan Planning Organization (MPO) for central Mississippi (MS) which includes partially or wholly seven (7) counties, one of which is Madison County.

The **Reunion Parkway Phase II** project is the second of a three-phase Reunion Parkway long range plan to connect MS Highway 463 to US 51. Phase I of Reunion Parkway was opened to traffic in 2006 to connect MS Highway 463 with Bozeman Road. Reunion Parkway Phase I, a four (4) lane divided roadway extending 2.6 miles from MS Highway 463 to Bozeman Road, was constructed at a cost of $14 million and funded entirely by Madison County. The posted speed limit is 45 mph with reduced speeds within the school zone when children are present. Reunion Parkway Phase III extends 1.5 miles from Parkway East to US 51 and currently is in the final design and Right-Of-Way (ROW) acquisition phase.

The **Reunion Parkway Phase II** project is located in central Mississippi in Madison County and just outside the U.S. Census Designated Jackson Urban Area. Madison County is one of the fastest growing counties in the state having experienced significant growth in the past 20 years as suburban and exurban growth has increased the demand for residential development. With a population of 105,630 in 2018, Madison County's population has grown over 10% since 2010. Population projections estimate the County will grow by an additional 18,000 in the next 10 years, representing a robust 17% increase.

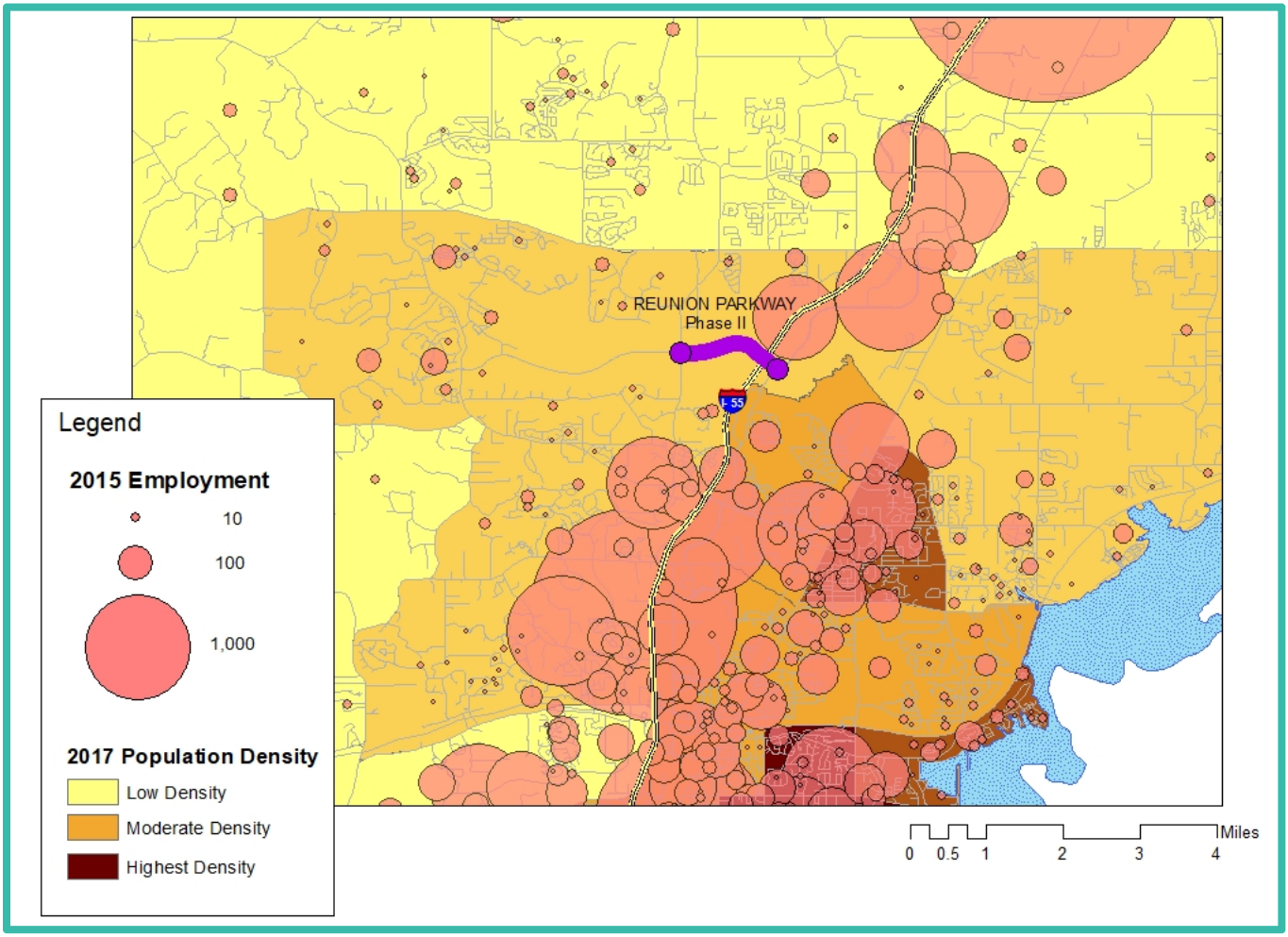
Correspondingly, demand has significantly increased for retail development, residential housing, and schools. This growth has included the development of more industry, particularly related to the Nissan North America manufacturing plant and its suppliers within the US Interstate 55 (I-55) corridor between Gluckstadt and Canton. The growth essentially extends from MS Highway 22 to the north to MS Highway 463 to the south and west, and US Highway 51 to the east. Figure 1 illustrates the concentration of population and employment around the project area.

Population and development growth within Madison County have put a major strain on the existing roadways and intersections and has resulted in traffic congestion on many of the major routes. The 2016 South Madison County Transportation Study commissioned by the Madison County Board of Supervisors noted multiple congestion and safety needs; commuters along the study area's corridors experience extended traffic queues and delays associated with peak hour travel. Elementary and middle school traffic adds to the congestion and safety issues. Traffic data collected on area arterials shows volumes are increasing an average of 6% per year, meaning traffic volumes will double in 12 years.

Design and ROW plans were developed for a **Reunion Parkway Phase II** and III extension, including the I-55 interchange, in 2008/2009. The project did not move forward due to budget shortfalls. The 2016 South Madison County Transportation Study revalidated the critical need for the project and efforts to push the project forward have been underway since 2016.

The extension of Reunion Parkway from the eastern terminus of Phase I (Bozeman Road) to Parkway East will provide an alternate route for traffic moving between the zone bisected by the I-55 corridor. The need for the connecting route is intensified by two of existing east/west Principal Arterial routes (MS Highway 463 and

Figure 1: Population and Employment Distribution in Madison County, MS (2016)



Source: US Census

Gluckstadt Road) being over capacity and experiencing extended traffic queues and significant delays at signalized intersections on these commuting/school routes during peak hours.

Proposed Project

The **Reunion Parkway Phase II** project map and the connection to existing and future roadways are shown in Figure 2. The construction of **Reunion Parkway Phase II** between Bozeman Road and Parkway East is a critical east-west link to the section of Reunion Parkway from MS Highway 463 and Parkway East. Reunion Parkway Phase II will help reduce traffic on adjacent east-west corridors by providing additional access across I-55. The current east-west connections over I-55, MS Highway 463 and Gluckstadt Road, are approximately four (4) miles apart. Due to rapid population and commercial growth in the area – both roadways are currently over capacity. The new 1.2-mile roadway connection and bridge over I-55 would split this difference creating better connectivity in the area, adding much needed capacity, and providing improved emergency service response times in the area. The need for additional east/west capacity on the west side of I-55 in Madison County is paramount, as evidenced by the significant traffic volumes on both MS Highway 463 and Gluckstadt Road, high crash frequency, and daily traffic queues/delays. The capacity restrictions on Gluckstadt Road with its three-lane curb and gutter section have limited the ultimate east/west capacity, west of I-55.

Based on the availability of undeveloped land in the area and the recent rate of new housing construction, future year traffic forecasts anticipate that volumes will continue to increase at accelerated rates. Based on the 2016 traffic volumes, the construction of **Reunion Parkway Phase II** is anticipated to divert approximately 20% of the eastbound AM Peak hour traffic currently using Gluckstadt Road and MS Highway 463 during the peak hours to Reunion Parkway. This diversion is anticipated to significantly improve traffic congestion issues that are currently being experienced during peak hours on Gluckstadt Road and MS Highway 463. It is significant to note that planned improvements to both Gluckstadt Road and Bozeman Road do not solve the long-term capacity problem, without the construction of **Reunion Parkway Phase II**.

The **Reunion Parkway Phase II** project is anticipated to create critical jobs and tax revenue by providing access to over 880 acres of land for development.

Figure 2: Project Map

The **Reunion Parkway Phase II** project proposes a new rural four (4) lane roadway connection beginning at the intersection of Reunion Parkway Phase I at Bozeman Road and extends eastward to Parkway East connecting to Reunion Parkway Phase III project.

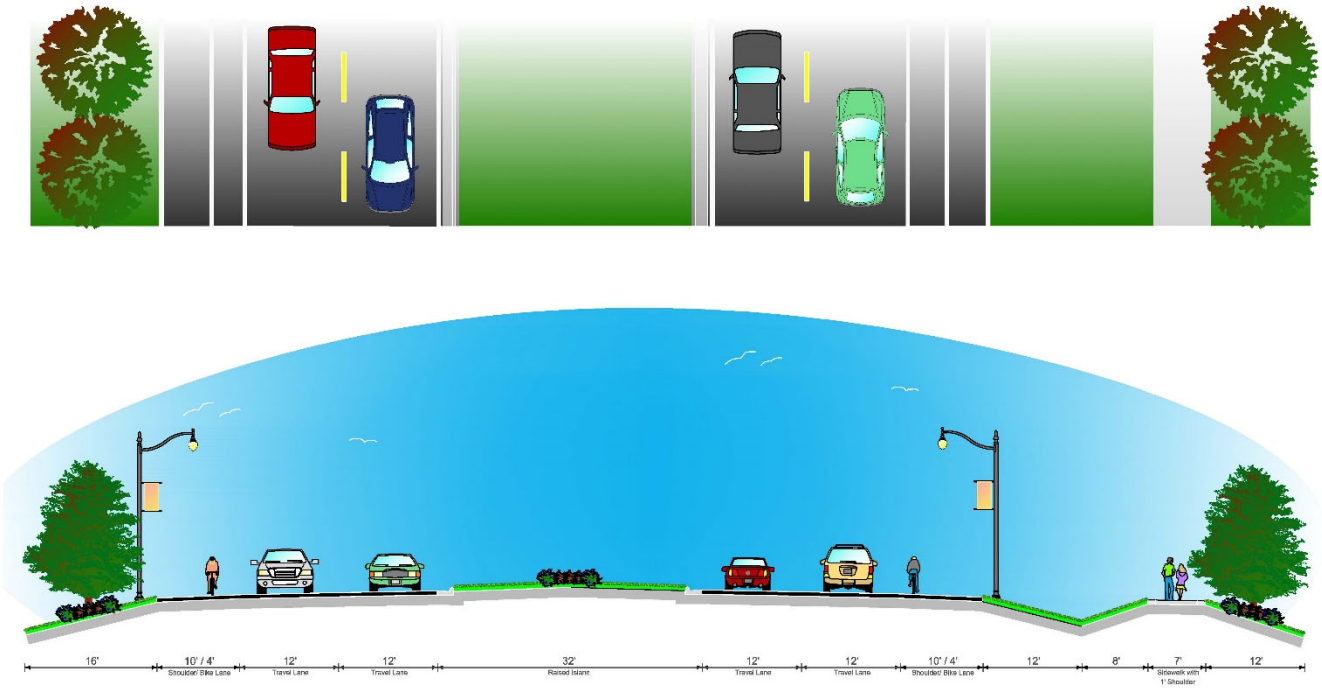
The **Reunion Parkway Phase II** four (4) lane roadway will include a raised median in the center. As shown in Figure 3 the **Reunion Parkway Phase II** project will feature a sidewalk on the south side and paved shoulders to accommodate bicycles. The sidewalk and bike lanes will connect to a multiuse trial system currently being designed for Bozeman Road and Highland Colony Parkway. The trail system connects to the Natchez Trace trail system and City of Ridgeland. The multiuse trail along Bozeman Road is planned to be constructed in 2022.

The **Reunion Parkway Phase II** project will also include a bridge over I-55. The bridge will feature a sidewalk on the south side and paved shoulders to accommodate bicycles. The bridge will also have a raised median in the center.

The long-range plan for Reunion Parkway includes an interchange with I-55. Though the **Reunion Parkway Phase II** project does not include the interchange ramps or interchange connection with the interstate, the Reunion Parkway bridge will be designed and constructed to accommodate the proposed interchange and future widening of I-55.

The Reunion Parkway Phase III and the proposed Reunion Parkway/I-55 Interchange projects are described in greater detail below.

Figure 3: Typical Proposed Project Section and Plan View for Reunion Parkway Phase II



Future Connected Projects

As shown in Figure 4, the Reunion Parkway Phase III project connects the planned **Reunion Parkway Phase II** project at Parkway East and extends eastward to terminate at US 51. Madison County has completed preliminary design and in the ROW acquisition phase for the 1.5-mile Reunion Parkway Phase III project. Phase III is projected to cost $11 million. Madison County has secured a commitment for $4.4 million in Federal Surface Transportation Program funds through CMPDD for the design and construction of the Reunion Parkway Phase III project. Madison County will cover the remaining cost of the project.

The Reunion Parkway Phase III project will also provide a grade separated crossing over the CNIC Railroad tracks and will bridge over Bear Creek as well. The design includes a two-lane roadway with wide shoulders that accommodate bike lanes on each side of the road.

Figure 4: Connections to Existing and Future Transportation Infrastructure

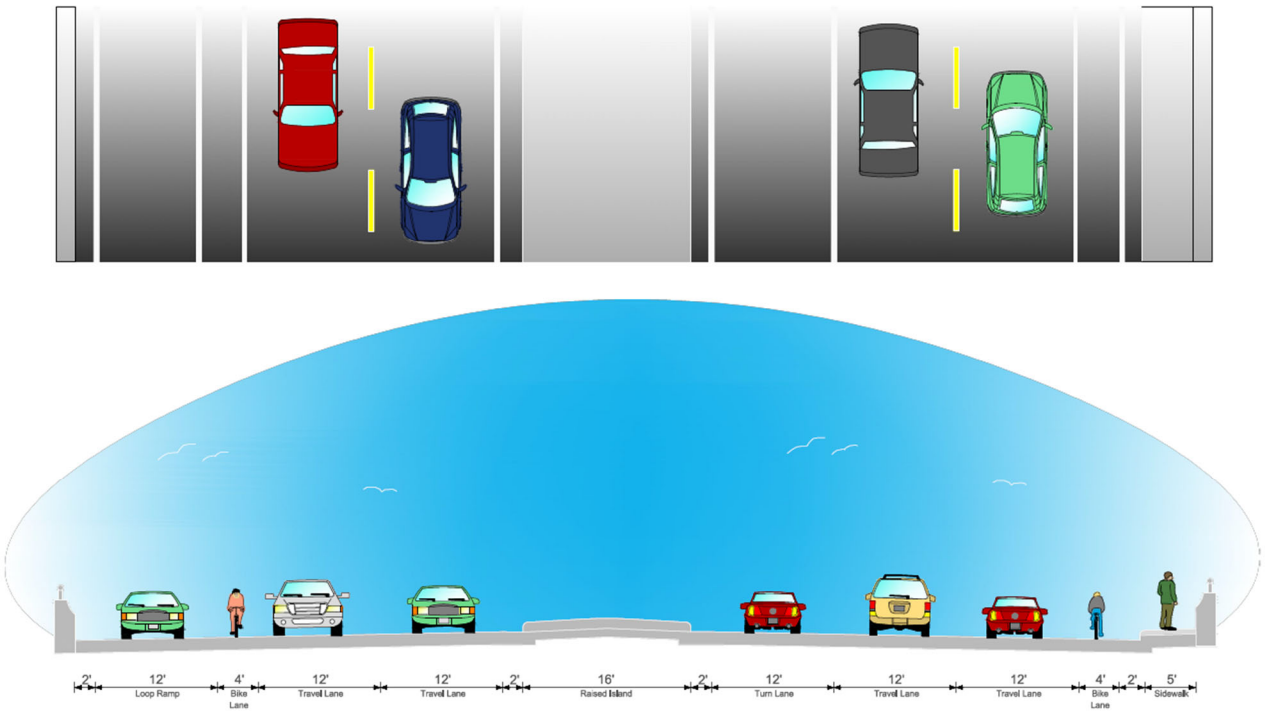
Two additional projects are currently committed for the project area. One being the Bozeman Road widening project, which is designed and planned for construction in 2022. The project will widen Bozeman Road from a 2-lane roadway to a 4-lane roadway. The other project is the Gluckstadt Road widening project, which is also designed and planned for construction this year, 2019.

There is a long-range plan for widening I-55 from MS Highway 463 to Gluckstadt Road and connect Reunion Parkway to I-55 with interstate ramps. In 2008, Federal Highway Administration (FHWA) issued a Finding of No Significant Impact (FONSI) on the EA (Environmental Assessment) for **Reunion Parkway Phase II** with a proposed interchange at I-55, but the project never advanced to development due to the economic downturn. The 2016 South Madison County Transportation Study again identified the critical need for the completion of Reunion Parkway with access to I-55.

A reevaluation of the EA for **Reunion Parkway Phase II** project with an interchange at Reunion Parkway and I-55 commenced in October 2018 and is anticipated to be completed in August 2019. The Interchange Access Request (IAR) for the interchange at Reunion Parkway and I-55 has received conditional approval from the FHWA, pending final approval of the EA.

The **Reunion Parkway Phase II** project is designed to accommodate the proposed interchange and future widening of I-55. The IAR for Reunion Parkway was approved as a standard diamond interchange with a loop ramp in the northwest quadrant. The **Reunion Parkway Phase II** bridge will be built to accommodate the future interchange but striped to match the existing cross section along Reunion Parkway until the interchange is built. Figure 5 shows the proposed typical section for the bridge when the interchange is built. It should be noted that although the I-55 widening and interchange plans are needed, near-term Mississippi Department of Transportation (MDOT) budgets do not include funds for the I-55 lane widening and new interchange project.

Figure 5: Proposed Bridge Typical Section and Plan View for Reunion Parkway Phase II



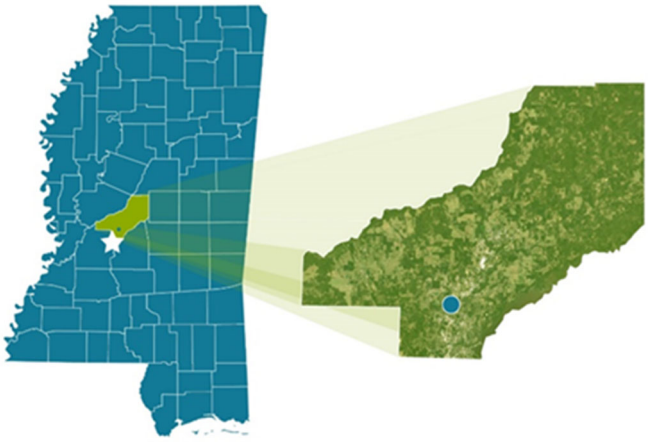
Project Location

The **Reunion Parkway Phase II** project is located within Madison County and lies just north of the Hind County/Madison County line (Figure 6) in central Mississippi. The **Reunion Parkway Phase II** project is in Madison county, just outside of the Jackson statistical urbanized area as designated by the 2010 US Census.

The project crosses over and anticipates a future connection to I-55. I- 55 extends through the middle of Madison County and connects the county to Memphis, St. Louis and Chicago to the north and near New Orleans to the south, where it ends and connects with I-10.

The geographic location of the project is 32°29'50"N latitude and 90°07'21"W longitude.

Figure 6: Project Location



Grant Funds, Sources, and Uses

Sources of Funds

The Madison County Board of Supervisors is seeking a BUILD discretionary grant in the amount of $17,000,000. The total cost of the construction of the **Reunion Parkway Phase II** project is $25,000,000. The State of Mississippi has provided $8,000,000 to Madison County in State Grant Funds specifically for the **Reunion Parkway Phase II** project. As shown in Table 1, the Federal BUILD share of the project will be 68% and the State of Mississippi covering 32% of the costs. Documents demonstrating the financial commitments the State of Mississippi can be found in Appendix B. All funds will be available upon receipt of the BUILD Transportation Discretionary Grant Capital Investment funds.

Figure 7: Project Cost Sharing

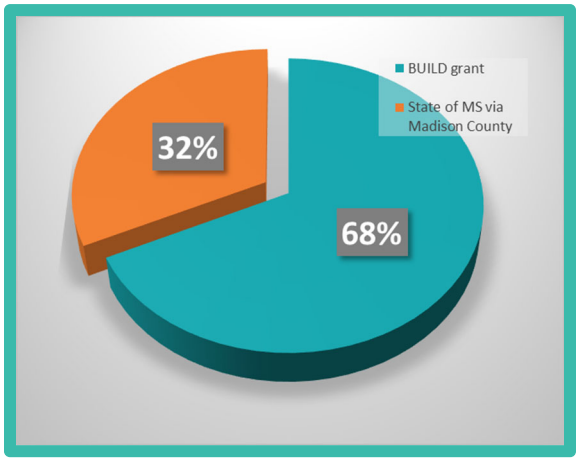


Table 1: Sources of Funding

Sources	Amount	Percent of Project
BUILD grant	$ 17,000,000	68%
State of MS via Madison County	$ 8,000,000	32%
Total	**$ 25,000,000**	**100%**

Use of Funds

The project funds will be used for final design, ROW acquisition, utility adjustments, construction and construction engineering and inspection (CE&I). Table 2 below delineates the allocation of funds and the projected cost sharing within each expenditure category.

Previous Project Expenditures

A total of $770,000 has been expended/obligated or planned for the Reunion Parkway Phase II project. The EA reevaluation is currently underway and is planned for completion in August of this year, 2019. The conceptual engineering design was prepared to ensure the project was feasible, and to determine the cost and construction schedule. Madison County has paid the $260,000 in project expenditures. Estimated preliminary design fees are expected to be approved and obligated by Madison County in August of 2019. Table 3 below provides a breakdown of expended and planned pre-grant expenditures.

Related Project Expenditures and Obligations

Reunion Parkway Phase I was completed in 2006 at a cost of $14 million. Madison County covered the entire cost of design and construction of the Phase I project.

Phase III of Reunion Parkway project is currently in the final design and ROW acquisition phase, and construction authorization is anticipated in 2020. The total budget for Phase III is $11 million, of which Madison County has secured a commitment of $4.4 in Federal Surface Transportation Program funds through the CMPDD.

Project Parties

The Madison County Board of Supervisors will serve as the lead entity on the design and construction of the **Reunion Parkway Phase II** project. The County has substantial experience in roadway funding and construction management and delivery.

Table 2: The Reunion Parkway Phase II Future Project Budget/Uses of Funds

Category	Federal		Non Federal		Subtotal
	Source: BUILD Grant	Percent of Expenditure Category	Non Federal: State via. Madison County	Percent of Expenditure Category	
Engineering Design	$ 550,000	100%	-	-	$ 550,000
ROW Acquisition	-	-	$ 1,500,000	100%	$ 1,500,000
Utility Adjustments	-	-	$ 500,000	100%	$ 500,000
Construction	$ 15,200,000	75%	$ 5,000,000	25%	$ 20,200,000
CE&I	$ 1,250,000	56%	$ 1,000,000	44%	$ 2,250,000
Total	**$ 17,000,000**	**68%**	**$ 8,000,000**	**32%**	**$ 25,000,000**

Table 3: Previous and 2019/2020 Pre-Grant Planned Expenditures for Reunion Parkway

Description	Source	Year			Previous & Planned Expenditures
		2018	2019		
			To Date	Planned	
Reunion EA	Madison County	$46,350	$213,650	-	$260,000
Engineering Design	Madison County	-	-	$450,000	$450,000
BUILD Grant Preparation	MDOT	-	$60,000	-	$60,000
	Total	**$46,350**	**$273,650**	**$450,000**	**$770,000**

The State of Mississippi has provided $8,000,000 to Madison County in grant funds for the **Reunion Parkway Phase II** project. The State of Mississippi and the MDOT will work as key partners with Madison County on the Reunion Parkway project.

Additionally, the CMPDD has collaborated on the project and supports the project through the TIP and MPO Long-Range Transportation Plan.

Selection Criteria

Safety

The **Reunion Parkway Phase II** project will significantly improve traffic safety within the southern area of Madison County. The main area east/west corridors, MS Highway 463 and Gluckstadt Road, are extremely over capacity. Higher capacities and denser vehicle ratios increase conflicts and create smaller gaps resulting in more aggressive drivers and additional vehicle maneuvers.

Table 4 below indicates that within a five (5) year timeframe there were an alarming 4,325 crashes in which 7 people died and 5 were severely injured. Nearly 3,700 crashes involved property damage only and given the high congestion in the area it is reasonable to conclude that these types of crashes would be reduced significantly with the increased capacity from the new roadway.

The **Reunion Parkway Phase II** project will connect Phase I and III creating a full connection between MS Highway 463 and US 51. The new connection is expected to reduce traffic volumes on parallel routes by 20%, potentially reducing intersection crashes. With traffic flow improving on Reunion Parkway and less overall congestion in the area other types of crashes such as rear-end crashes could see a significant decline. The project is anticipated to reduce vehicle miles traveled (VMT) by 9,000,000 miles over the thirty (30) year life of the project. The decrease in VMT results in an estimated reduction of 0.2 fatalities, nine (9) fewer injuries, and thirty-six (36) fewer property damage only incidents over the life of the project. This does not consider the safety improvements resulting from newer, improved design standards relative to older roadways. Though the project is only expected to reduce fatalities by less than one a year, as the state of Mississippi has the second highest roadway fatality rate in the country any efforts to make safety improvements will have a more profound effect than areas with lower crash rates.

Crashes also present a significant cost to drivers in terms of delays. With the potential to decrease the average daily traffic by over 9,000 vehicles on other major arterials which are experiencing these high numbers of crashes, the new roadway would reduce travel delay costs due to crashes. The June 2017 report Mississippi Transportation by the Numbers stated that congestion in the Jackson region costs each driver $23.11 per hour or $0.39 per minute. A fifteen-minute delay due to a crash during the peak period (K=15) could cost drivers roughly $7,800 per accident. For the 4,325 crashes that have occurred this means that drivers have lost over $33.7 million in this study area.

The 2016 South Madison County Transportation Study included an evaluation of the arterial link

Table 4: 2014-2018 Crash Data

	Total Crashes	Fatal	Severe	Moderate	Complaint	PDO	Truck Crashes	Fatal	Severe	Moderate	Complaint	PDO
Jackson MPA	82,776	310	229	3,032	14,232	64,973	1,198	6	2	31	185	974
Madison County	17,261	52	37	496	2,419	14,257	177	1	1	6	23	146
Area Limits	4,325	7	5	94	522	3,697	40	0	0	0	3	37

Source: Mississippi Department of Transportation

volumes on the west side of I-55 (from a planning level capacity analysis of link volumes) that revealed that existing traffic volumes exceeded link capacity during both the AM and PM peak hours on:

- MS Highway 463 from Reunion Parkway to Park Place Boulevard
- Gluckstadt Road from Bozeman Road to Calhoun Station Parkway, and
- Bozeman Road from Reunion Parkway to MS Highway 463.

Signalized intersections were shown to be over capacity on MS Highway 463 at Reunion Parkway (AM), MS Highway 463 at Park Place Boulevard (AM & PM), and MS Highway 463 at I-55 Ramps (PM). Approaches are over capacity on the intersection of Grandview Boulevard (SB - AM & PM) at MS Highway 463, Calhoun Station Parkway/Gluckstadt Road (AM) and US Hwy 51/Yandell Road-Weisenberger Road. These intersections are key commuting corridors with few alternatives for residents. MS Highway 463, Gluckstadt Road and Yandell Road experience significant AM Peak hour traffic queues for commuting traffic.

State of Good Repair

The Madison County Road Department will be responsible for maintenance of the **Reunion Parkway Phase II** project. Innovative quality assurance practices, materials, and asset management practices will be used during construction of the road to reduce future onsite repairs, rehabilitation and reconstruction.

Reunion Parkway Phase II will be classified as an arterial; therefore, it will be eligible for future Surface Transportation Block Grant (STBG) Pavement Management funding through the CMPDD.

The bridge over I-55 will be designed to meet current AASHTO standards, specifications and loading ratings. Under these standards, the bridge should provide a service life of *75* years.

Overall Life Cycle Costs

As each vehicle travels, it causes a certain amount of wear on the roadway. The heavier a vehicle, the more damage it causes. While each vehicle may only cause a negligible amount of damage itself, the overall impact of thousands of vehicles can add up to significant wear and tear. In particular, trucks are a much more significant source of pavement damage than passenger cars. The **Reunion Parkway Phase II** project is anticipated to reduce truck VMT by one (1) million miles over the thirty (30) year life of the project. This result in a decrease in pavement damage of $0.4 million over the 30-year project life.

Economic Competitiveness

The **Reunion Parkway Phase II** project will to boost the area's economic competitiveness in several ways. The project will improve the flow of people and goods on the major arterials around Reunion Parkway. It has the potential to create critical jobs and tax revenue for Madison County by providing access to over 880 acres of land for development resulting in the attraction of private investment. Additionally, the project will provide mobility choices that are critical in attracting and retaining a talented and growing workforce.

Area Population and Job Growth

Population projections estimate that Madison County's population will increase by 18,000 in the next 10 years. The current population boom has pushed residential development, which has in turn propelled commercial development. The residential and commercial growth has led to the congestion and access problems that the **Reunion Parkway Phase II** project is designed to alleviate. The peak hour congestion issues have made morning and afternoon travel unpredictable and arduous.

The I-55 corridor is part of the economic lifeline of the Jackson metropolitan area and runs straight through Madison County. Employment is clustered along the interstate, making access to and around I-55 critical to the long-term success of the economy in the region.

Madison County is the fastest-growing county in central Mississippi. According to the *Madison County Economic Indicators 2018 Overview* report, Madison County has the highest growth rate among the five counties in the Jackson Metropolitan Area. Madison County is outpacing the state and nation with 4% job growth over the last year, adding over 2,182 jobs, compared to Mississippi's 1.1% and the nation's 1.7% rate of change.

The *Overview* report also noted that Madison County's workforce is close to 60-40 in percentage of residents commuting into the county versus those commuting out for daily work. Over 38,000 workers commute into the county for work which could be partially reflective of a higher cost of living in Madison County compared to the surrounding areas. Madison County has 17,437 residents who both live and work in the county.

Access to Existing and New Employment Centers

Healthcare is one of Madison County's strongest industries. The **Reunion Parkway Phase II** project will provide access to land that is owned by St. Dominic's Health Services, a non-profit hospital and healthcare company. The roadway project will create access that will allow for the future development of a proposed regional healthcare facility.

The **Reunion Parkway Phase II** project allows for reliable and timely access to existing employment centers and creates the needed access to development parcels along the corridor. This access will result in improved productivity of people and land in southern Madison County.

Furthermore, the project will result in significant reductions in transportation costs by infrastructure users, short-term employment by way of project construction, and long-term economic impacts related to expected retail, healthcare, and education.

Job Creation

The total proposed project development and construction for the **Reunion Parkway Phase II** project is anticipated to create approximately 325 total job-years. Of these, roughly 73% percent, or 237 total job-years, will be classified as economic

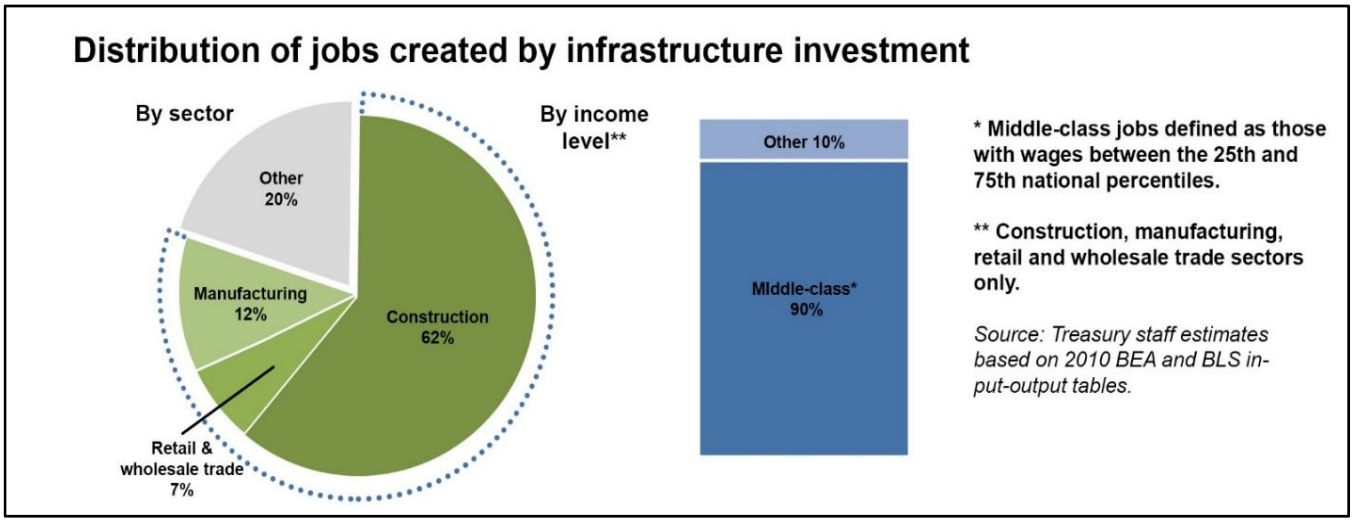
middle-class jobs.[1] A job-year is defined as the number of fulltime jobs contained within a year over the course of the project.

Construction industry job creation projections are based on the project's total estimated construction cost of $25 million. The projections represent the aggregate of all direct, indirect and induced jobs resulting from the project. Direct and indirect employment includes all jobs that are created by the construction firms and contractors working directly on the project, or by suppliers who make the materials used in the project. Induced jobs include those created elsewhere in the economy as increases in income from the direct and indirect jobs lead to additional increases in spending by workers and firms. Figure 8 shows the distribution of anticipated jobs created by industry, along with the percentage of anticipated middle-class jobs.

Construction of all project phases is estimated to take approximately 24 months to complete. Table 5 shows the aggregate number of direct, on-project job-years for each quarter of the life of the project as well as the expected number of middle-class jobs created. In addition to the travel cost savings documented in the Benefit Cost Analysis and the economic benefit of the jobs created during construction shown above, the new Reunion Parkway will provide access to property that will result in the construction of new residential housing west of I-55 and will provide more direct access to commercial property east of the interstate.

Significant interest has been shown by a number of retail developers as well as a metro area hospital expecting to expand into this area east of I-55. Based on projects of similar size in the state, a $50 million hospital could create as many as 500 new direct jobs, as well as an additional 210 indirect and induced jobs, generating more than $50 million in annual wages. Likewise, a $75 million retail project could generate 750 new direct jobs and 206 indirect and induced jobs, with annual compensation of $34 million.[2]

Figure 8: Middle Class Job Creation



[1] Based on September 2011, The Executive Office of the President, Council of Economic Advisers (CEA) analysis of actual job-creation experience from transportation projects under the Recovery Act, that recommends estimating one job-year per $76,923 of government spending.

[2] Estimates of Middle-Class Job Creation from Infrastructure Investment; U.S. Department of the Treasury, Council of Economic Advisers (CEA), March 2012.

[4] Indirect and induced jobs as well as compensation estimates calculated using JOBSEQ.

It is also important to note that Madison is very much a regional draw. With more than 3,700 employees traveling in from other counties each day. Due to the rural nature of many of the surrounding counties, this workforce not only commutes to the area, many also shop, enjoy recreational activities and access healthcare in Madison County – all leading employment sectors in the county. Opening an additional east/west corridor will improve the infrastructure condition, congestion and reliability while creating better accessibility to employment, education and healthcare for residents and visitors alike.

Table 5: Direct and On-Project Job-Year Creation

	Quarter	Approximate Amount Spent	Aggregate On-project Construction Jobs[1]	Aggregate On-project Middle-class Jobs[2]
2019	Q3	$ 100,000	1.3	0.9
	Q4	$ 100,000	2.6	1.9
2020	Q1	$ 200,000	5.2	3.8
	Q2	$ 200,000	7.8	5.7
	Q3	$ 500,000	14.3	10.4
	Q4	$ 1,000,000	27.3	19.9
2021	Q1	$ 250,000	30.6	22.3
	Q2	$ 150,000	32.5	23.7
	Q3	$ 100,000	33.8	24.7
	Q4	$ -	33.8	24.7
2022	Q1	$ 2,000,000	59.8	43.7
	Q2	$ 3,000,000	98.8	72.1
	Q3	$ 3,000,000	137.8	100.6
	Q4	$ 4,000,000	189.8	138.6
2023	Q1	$ 3,000,000	228.8	167.0
	Q2	$ 3,000,000	267.8	195.5
	Q3	$ 1,200,000	283.4	206.9
	Q4	$ 1,000,000	296.4	216.4
2024	Q3	$ 2,000,000	322.4	235.4
	Q4	$ 200,000	325.0	237.3

Environmental Sustainability

The **Reunion Parkway Phase II** project will be designed and built as a long-term part of the community and multi-modal transportation network. From the materials to the cross section, the project will be designed to meet the needs of current and future users as well as be economically maintained for its lifetime.

Congestion Relief

The project will reduce greenhouse gas emissions and fuel comsumption by providing a more direct route for commuter and school traffic, as well as an alternative route across I-55. The congestion relief will result in decreased stops and starts and lower Carbon Dioxide emissions.

As noted in the BCA, the following emissions were reduced as a result of the project: Carbon Dioxide (CO_2), Nitrogen Oxides (NO_x), Particulate Matter ($PM_{2.5}$), Sulfur Dioxide (SO_x), and Volatile Organic Compounds (VOCs). Since emission rates vary by year, speed, and vehicle type, the calculations were computed separately for passenger cars and trucks for each year. Based on the decrease in VMT for this project, emissions of each type are found to decrease, with the greatest reduction in tonnage from carbon dioxide. The project is anticipated to save 27,405 short tons of carbon dioxide during its lifetime.

In 2008, FHWA issues a FONSI on the EA for **Reunion Parkway Phase II** and the proposed interchange with I-55.

Drainage and Stormwater Management

Drainage and stormwater runoff will be accommodated by cross drains and piping and will be supplemented by grass and vegetation establishment along the roadway. Stormwater control will use the MDOT Best Management Practice which includes silt basins, check dams, silt fence and wattles. Construction plans will include strategies to assist with sediment control during construction. Additionally, Polyacrylamide (PAM) will be used to reduce erosion before grass and vegetation is planted and established. During construction the contractors will be required by the permit to control chemical runoff, such as oil, gas and concrete truck washout, along with entrance and exit mitigation for tracking sediment from the project.

Life Cycle Costs

The project is anticipated to reduce truck VMT by one (1) million miles over the thirty (30) year life of the project. This result is a decrease in pavement damage of $0.4 million over the 30-year project life.

Quality of Life

One of the primary benefits of the **Reunion Parkway Phase II** project is improved connectivity. This area of Madison County is clogged with traffic during peak hour periods and the lack of connectivity and access is hindering new economic activity and the growth of business and jobs. The project will provide mobility choices that are critical in attracting and retaining the residential population and talented workforce that are central to Madison County's quality of life. Additionally, the project will allow for the development of future health care facilities, provide access to an area that is otherwise inaccessible, allow for creation of future jobs, and better access to education, healthcare, and needed amenities.

Multi-Modal Character/Transportation Choice

With the inclusion of sidewalk and bike lanes as part of **Reunion Parkway Phase II** project, the Reunion Parkway connection is consistent with the environmental sustainability strategies in the Department of Transportation (USDOT) Strategic Plan including the promotion of bike/pedestrian modalities. The project will reduce emissions by encouraging the use of alternative modes of transportation, such as walking and biking.

Reunion Parkway Phase II will be a four (4) lane roadway, with a raised median in the center. Reunion Parkway will feature a sidewalk on the south side and paved shoulders to accommodate bicycles on each side of the road.

Improved Connectivity

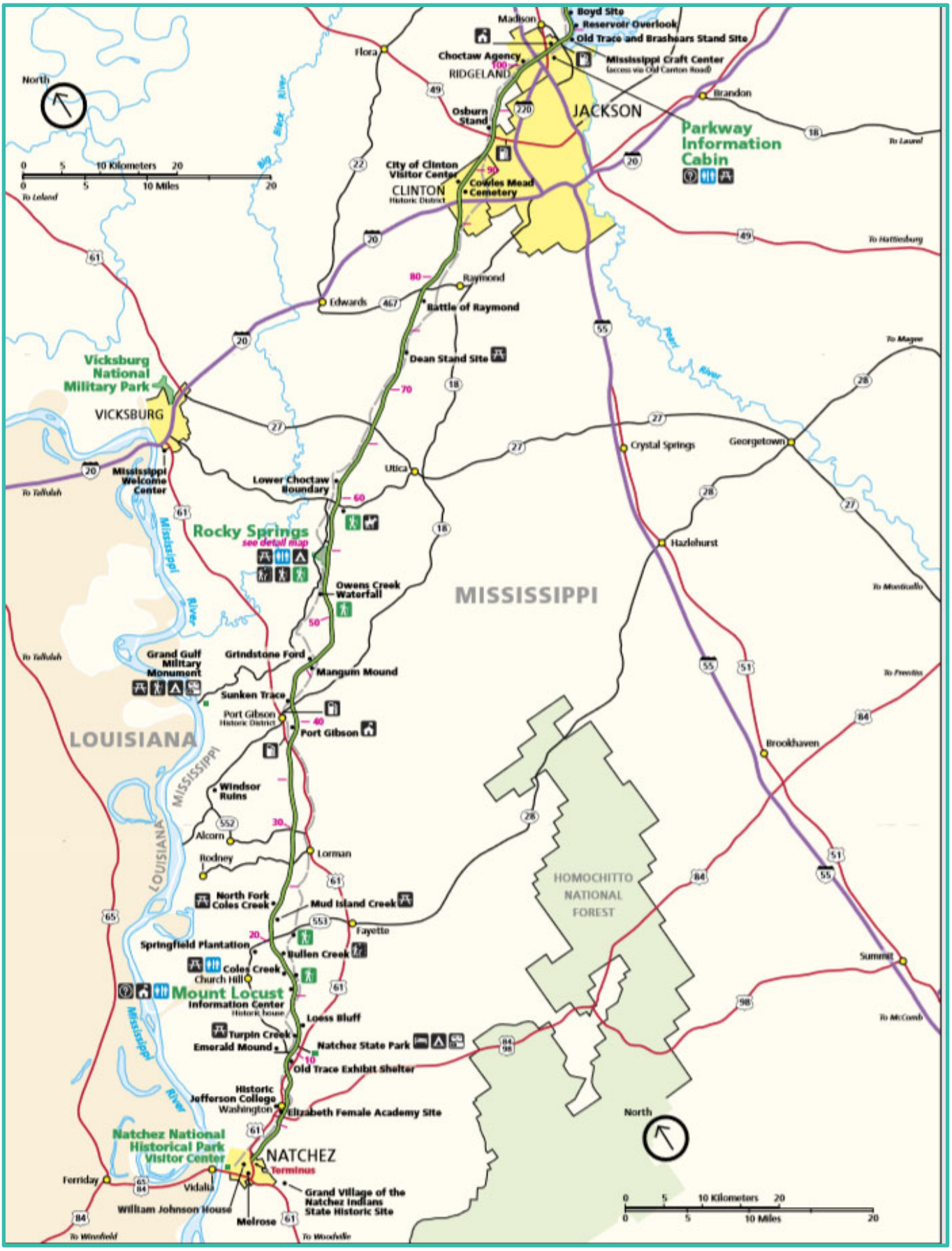
The **Reunion Parkway Phase II** project will create both improved and new access to residential development and commercial services in southern Madison County. The current east-west connections over I-55, MS Highway 463 and Gluckstadt Road, are approximately four (4) miles apart; this new connection would split this difference creating better connectivity in the area. By providing additionally connectivity and alleviating congestion, emergency services response times will also be improved for the entire area.

The sidewalk and bicycle lanes will connect the project to the system of regional trails that are being developed along Bozeman Road and Highland Colony Parkway, extending south to the Natchez Trace Parkway and the Natchez Trace National Scenic Trail.

The Natchez Trace Parkway is a 444-mile recreational road and scenic drive that runs through three states, and starts in Natchez, MS, just a little over 100 miles south of Jackson, MS Madison County is building upon the Scenic Trail's national attraction by adding connecting bike trails and promoting the area as a local and regional recreational destination. Figure 10 shows a map of the Natchez Trace Parkway from Natchez, MS to Jackson, MS.

The **Reunion Parkway Phase II** project will include the installation of fiber optic cable to enable future Intelligent Transportation System applications for traffic management, emergency response and incident management.

Figure 9: National Park Service Map of Natchez Trace Parkway – Natchez, MS to Jackson, MS



Secondary Selection Criteria

Innovation

The **Reunion Parkway Phase II** project will incorporate many innovative design elements and technologies to address the long-term safety and usefulness of the roadway.

Safety Edge

Safety Edge is an innovation technique from the first round of FHWA's Every Day Counts (EDC) Program. The edges of the pavement are angled to eliminate vertical drop-off. Safety Edge will be used in the project as a safety countermeasure to mitigate pavement edge related crashes. This treatment has been shown in studies around the country to reduce rural run-off crashes by up to 25%.

Warm Mix Asphalt

Warm Mix Asphalt (WMA), also an innovation element from the first round of FHWA's EDC Program, will be used on **Reunion Parkway Phase II** project. WMA is produced at lower temperature than conventional asphalt and results in lower emissions and less fuel consumption during its production, and improved compaction and portability during construction. Using WMA will reduce time and labor in construction.

Rumble Striping

Rumble stripes will be incorporated into the construction of **Reunion Parkway Phase II** project. Rumble striping uses audible rumble strips with a raised profile reflective pavement marker to increase nighttime visibility and alert drivers and reduce roadway departure crashes.

Fiber Optic Cable

The **Reunion Parkway Phase II** project will incorporate fiber optic cable to enable connectivity to various public uses including incident management, traffic management, emergency response, and parallel route detour asset management systems. The fiber will run the length of the project and provide a backbone connection across the interstate for future connectivity to future interstate access management and messaging systems.

Partnership

Project Parties

The Madison County Board of Supervisors will serve as the lead contracting entity for the **Reunion Parkway Phase II** project. Madison County has conducted public engagement around the planning of all phases of Reunion Parkway and will continue these efforts on the Phase II project. The State of Mississippi and the MDOT are key partners in the project. The State contributed $8 million to the project. The State has transferred these funds to Madison County specifically for use on the **Reunion Parkway Phase II** project. The funding commitment from the State of Mississippi can be found in Appendix B.

Project Partners

The **Reunion Parkway Phase II** project has broad support in the state of Mississippi and in the communities around Madison County and the Jackson metropolitan area. From an economic development perspective, the **Reunion Parkway Phase II** project is part of the critical infrastructure needed to support the existing and future growth of the area. The **Reunion Phase II** project has received support letters from state and local leadership, state and local entities, and community organizations. The following is a list of letters of support:

- **Honorable Phil Bryant, Governor**
- **Senator Roger Wicker**
- **Senator Cindy Hyde-Smith**
- **Congressman Bernie Thompson, District 2**
- **Congressman Michael Guest, District 3**
- **Mississippi Department of Transportation**
- **Central Mississippi Planning and Development District**
- **Madison County Economic Authority**
- **Madison County Business League and Foundation**

The letters themselves can be found in Appendix A.

PROJECT READINESS

Planning for the completion of Reunion Parkway has been underway for some time. The **Reunion Parkway Phase II** project fills a critical gap in the vision for the Reunion Parkway and the regional transportation system.

Madison County is financially and technically committed and prepared to deliver **Reunion Parkway Phase II**. Local and state funds for the project are in hand and the needed regulatory approvals are in order. The project schedule is sound and potential risks and mitigation measures has been addressed.

In 2008, FHWA issued FONSI on the EA for **Reunion Parkway Phase II** and the proposed interchange with I-55, but the project was delayed by budget shortfalls. The 2016 South Madison County Transportation Study revalidated the critical need for the project and efforts to push the project forward have been underway since that time.

Technical Feasibility

Madison County funded and started the required reevaluation of the EA for **Reunion Parkway Phase II** in October of 2018. The EA reevaluation is anticipated to be completed and approved in August of 2019. Preliminarily designs will be initiated immediately following the approval of the EA reevaluation.

While some roadway standards have changed since the original project design of 2008, the proposed footprint for the **Reunion Parkway Phase II** project has not.

Basis of Cost Estimate

The roadway and bridge construction cost for the **Reunion Parkway Phase II** project was developed using the MDOT's cost estimating spreadsheet system. The system was developed and is managed by the MDOT. The spreadsheet computes an estimated total major construction cost required for a specified type of construction project from quantities and unit costs based on work type, pavement type, roadway features, and bridges. The quantities and unit costs are derived from historical construction quantities and unit costs from similar project types. The cost estimator spreadsheet is updated regularly as new projects are let and real-world pricing is

obtained. The spreadsheet allows for varying statistical confidence levels based on the status of design. The farther along the project is in design the higher the applied confidence interval. The varying confidence intervals are used so cost estimates do not underestimate the total cost of the project and can account for unknown variables based on the project's phase or level of design. The spreadsheet also accounts for item markups, lump sum costs (i.e. mobilizations, staking, MOT), letting costs, and engineering and contingencies. Costs that typically vary with project type and size (i.e. engineering and contingencies) are adjusted according to project size and cost estimate. The spreadsheet also forecasts future project cost estimates. Future project cost estimates are assumed to have an inflation rate of 3.2% per a year which can be manually adjusted if more localized information is known.

The cost estimate for the **Reunion Parkway Phase II** project was calculated by inputting each individual roadway section, along with bridge length and widths into MDOT's cost estimating spreadsheet. The spreadsheet computed all the major item quantities and unit costs required for construction of the **Reunion Parkway Phase II** project**.** The bridge type used to compute the bridge costs was assumed as a standard grade separated bridge. The contingency applied in the spreadsheet is consistent with the level of design. A confidence interval of 50% was used to account for the level of conceptual design.

Basis of the Roadway Design

The **Reunion Parkway Phase II** project is being designed as a multi-modal arterial to provide connectivity across and eventually to the Interstate for both residential and commercial properties in Madison County. The **Reunion Parkway Phase II** project will provide connectivity between Bozeman Road and Parkway East over I-55. The **Reunion Parkway Phase II** project does not include the interchange ramps or interchange connection with the interstate, the **Reunion Parkway Phase II** bridge will be designed and constructed to accommodate the proposed interchange and future widening of I-55. The design speed for **Reunion Parkway Phase II** is 45 mph, which is consistent for an arterial with multi-modal access. The design year for forecasted traffic volumes for the project is 2045, which will require four travel lanes. The roadway section consists of the following elements of design.

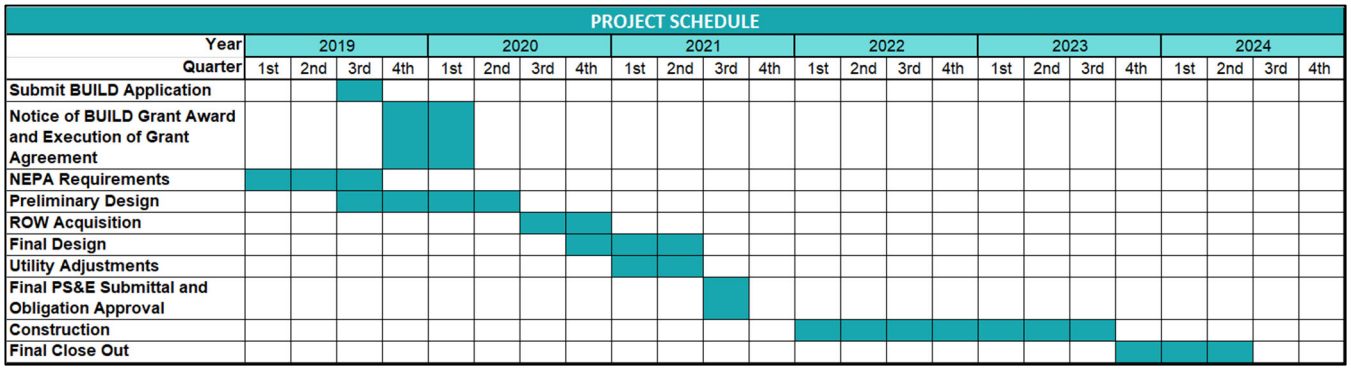
1. The roadway is designed to accommodate primarily vehicles with respect to horizontal and vertical geometry consistent with the design speed and level of terrain.
2. The roadway will have a raised median dividing 4 lanes of traffic in order to provide safe and effective access management along the urban corridor.
3. The roadway includes paved outside shoulders which will be designated as a one-way bike path in each direction along the corridor. The paved shoulder will serve a dual purpose for bicycles as well as for a vehicle emergency area.
4. The exterior of the corridor will consist of an open shoulders and open ditches. Pedestrian access will be provided by a paved sidewalk separated by an open ditch from the roadway section along one side of the route.
5. The bridge over the Interstate will include the continuation of the dual use shoulders as described above. The bridge will accommodate pedestrians by way of a raised sidewalk on one side of the bridge.
6. The primary design vehicle used is a passenger car but all intersections are designed to allow WB-65 truck accessibility in order to accommodate future Interstate access.

Project Schedule

The Project Schedule delineated below (Figure 10) identifies and incorporates all major project milestones and approval requirements. As detailed below in the Required Approvals section, the project is ready to go in terms of state and local planning approvals. The project schedule assumes the receipt of the US Department of Transportation BUILD Transportation Discretionary Grant Capital Investment funding and execution of the grant agreement by March 31, 2020.

The project schedule assumes the bridge placement will be conducted at night. Coordination with the MDOT and FHWA will be required for traffic control, lane closures, and during the bridge construction.

Figure 10: Project Schedule



The schedule assumes that NEPA requirements will be complete prior to the notice of award on the BUILD grant.

The needed ROW acquisition will be completed in a timely manner in accordance with 49 Code of Federal Regulations (CFR) part 24, 23 CFR part 710, and other applicable legal requirements. The project includes acquisition of ROW from only three (3) property owners with no relocations of structures required.

As a new roadway and overpass which will be located on new roadway alignment, the project can be built continuously, with minimal traffic management and control requirements. Intersections with Bozeman Road and Parkway East will require traffic control modifications.

The only known portion of the project that will require maintenance of traffic plans and schedule dependencies is the bridge placement over I-55.

Required Approvals

Madison County has prepared for the receipt of the **Reunion Parkway Phase II** project in a methodical way. The project has planned for the needed Federal, State and local approvals.

NEPA and Environmental Permits

The **Reunion Parkway Phase II** project will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air)

implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205), and with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq).

In 2008, FHWA issued a FONSI on the EA for **Reunion Parkway Phase II** and the proposed interchange at I-55, but the project never went forward into development due to the economic conditions. However, the transportation need did not disappear as growth and traffic congestion increased during the economic recovery which began a few years later. In 2016 the Transportation Plan element for Madison County identified the extension of the Reunion Parkway with an interchange at I-55 as a priority.

A reevaluation of the project EA commenced in October 2018 and is anticipated to be completed in August 2019. Since there is no change to the project footprint or the road alignment, an EA reevaluation is all that is required for the current environmental review. Though the roadway alignment was not changed, the preferred interchange type was changed therefore is included as part of the environmental reevaluation process. The expectation is that a design contract for the **Reunion Parkway Phase II** project should be issued prior to the BUILD grant awarding.

Public Engagement

A public meeting was held on June 25, 2019 to inform the community and stakeholders of the findings of the reevaluation process for the **Reunion Parkway Phase II** project, explain the preferred alternatives, gage community support, and receive public comments. The public meeting was held at the Parkway Church located at 601 Reunion Parkway, Madison MS from four (4) pm to seven (7) pm. The public meeting was advertised in local area newspaper and available for public view both in print and online.

Over 60 area and Mississippi residents attended the public meeting. Overall, the feedback from the meeting was very positive and in support of the project. Two residents left comments at the meeting. One resident stated in a comment sheet they had no issues with the preferred alternative and that the project "needs to happen quickly." Another resident's only concern with the preferred alternative was cost and that the project seemed costlier than the other alternative. This resident also stated the project should "Hurry!" and "When complete it will really enhance traffic in both North-South and East-West directions when completed with the eventual interchange access to I-55." There was no voiced opposition at the meeting to the preferred alternative or the project itself.
Upon completion of the comment period, MDOT will submit the environmental documents including all public comments to FHWA for approval in late July 2019. Approval is anticipated in late August 2019.

Interstate Access Request (IAR)

This project funding request does not include the construction of an interchange but does lay the groundwork for a future interchange to be constructed at I-55. Along with the reevaluation of the project EA, an IAR was initiated in October 2018 and completed in early June 2019. Though the roadway alignment has not changed since the 2008 FONSI, the preferred interchange type was changed therefore is included as part of the reevaluation process.

The IAR was submitted by the MDOT in June 2019 requesting FHWA's determination of safety, operational, and engineering acceptability for the proposed new I-55 interchange at Reunion

Parkway. Conditional approval was given by FHWA on June 10, 2019 for the IAR, pending final approval of the EA. The determination of the FHWA is that the proposed new interchange at I-55 and Reunion Parkway is acceptable from a safety, operational, and engineering standpoint. Upon completion of the EA reevaluation, it is anticipated that FHWA will grant full approval of the Reunion Parkway interchange under the requirement that the widening projects for I-55 from MS Highway 463 to Gluckstadt Road will be completed.

The Reunion Parkway ramps accessing I-55 will not be constructed until capacity improvements along I-55 between MS Highway 463 and Gluckstadt Road are completed.

The letter from FHWA providing determination of acceptable safety, operations, and engineering for the Interstate Access Request can be found in the Appendix C.

Legislative Approvals

This project is located exclusively within Madison County. The Madison County Board of Supervisors has authorized the pursuit of this funding. No legislative approvals are necessary for the development and delivery of the project to extend of Reunion Parkway from Bozeman Road across I-55 and Parkway East to US 51.

State and Local Planning Approvals

The **Reunion Parkway Phase II** project is included in the Long-Range Transportation Plan (LRTP) of CMPDD, and within the Madison County Comprehensive Plan (2012). The development and approval of both plans have included public input. The Reunion Parkway Extension Project (Phase II) has not been identified in the current MPO Transportation Improvement Program (TIP) as a funded project, but upon the award of this grant, the CMPDD has agreed to promptly amend the TIP to include this project.

Links have been provided to both documents below:

- Madison County Comprehensive Plan https://www.madison-co.com/sites/default/files/2011_Madison_Co__Plan.pdf

- Central Mississippi Planning and Development District Long-Range Transportation Plan http://www.cmpdd.org/long-range-transportation-plan-lrtp/

Federal Wage Rate Certification

The County of Madison will comply with Federal Wage Rates.

Assessment of Project Risks and Mitigation Strategies

The **Reunion Parkway Phase II** project is a well-planned and long-awaited undertaking. The project was proposed well over a decade ago – the environmental analysis is underway, and the design of the project will begin concurrent with the submission of the BUILD Grant application.

The required local and State funds required for the project are in hand and no major hurdles are anticipated in the acquisition of the real estate needed for the project. As noted above, only three undeveloped properties will need to be acquired for the construction of **Reunion Parkway Phase II**. Additionally, Reunion Parkway will provide critical access and roadway frontage to the undeveloped land along the new roadway. Because of both the long-term planning for the project and the multiple public engagement sessions held on the project, real estate acquisition for the project is not seen as posing any significant risk of delay.

As noted above, the required Federal, State and local approvals for the project are either complete or well underway.

Because the **Reunion Parkway Phase II** project is a roadway extension project, the construction of the at grade portions of the project can proceed unhindered and will not require construction phasing. Only minimal traffic management will be required at existing intersections. These risks are addressed within the project schedule. The project may require I-55 to be closed while the bridge beams over the interstate are placed. This is to ensure the safety of drivers whom would be traversing under the bridge during construction. A majority of the bridge construction can be completed without impacting traffic patterns.

Benefit-Cost Analysis (BCA) Summary

Primary Selection Criteria

A BCA of **Reunion Parkway Phase II** project was completed to address the primary selection criteria components of Safety, State of Good Repair, Environmental Sustainability, and Economic Competitiveness. This BCA relies on prior analyses conducted in this region to determine the feasibility and benefits associated with this new roadway connection. The Jackson metropolitan area travel demand model was used to assist in compiling the VMT and Vehicle-Hours of Delay (VHD) for each project scenario. Benefits are based on the change in travel patterns created by a more direct route for some trips that will result in improved connectivity, reduced VMT and VHD for residents, employees, and commercial operations (e.g., truck movements).

Benefits were calculated for each of the primary selection criteria based on the forecasted decrease in VMT and VHD over a 30-year timeframe resulting from the new connection. The monetized benefits of these reductions were compared to the capital and maintenance costs associated with this project to calculate the benefit cost ratio (BCR). Note that the project also provides new access to currently undeveloped land; any benefits associated with future developments resulting from this new access has not been included as a benefit, making the benefits associated with this project conservative in nature. The supporting sources and calculations of the BCA, including a detailed description of the methodology is provided in Appendix D.

Safety

One of the foremost benefits for any project should be to provide a safer transportation network for all users, particularly as Mississippi has the second highest fatality rate per mile in the country.[3] Calculated benefits are based on prevented crashes (property damage), injuries, and fatalities. The reduction in VMT decreases the likelihood and overall cost of crashes. Changes in crash rates were determined based on data from the Federal Motor Carrier Safety Administration (FMSCA) for truck traffic and by the National Highway Traffic Safety Administration (NHTSA) and the Bureau of Transportation Statistics (BTS) for passenger traffic. Note that the majority of crash rates were based on national statistics except the Mississippi statewide fatality rate was used due to the high rate seen in the state. Cost estimates for each type of crash provided in the *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*, December 2018 (BCA Guidance) were then applied to these rates. As a result of reduced VMTs from the project, crashes resulting in injuries and property damage only incident are expected to be reduced by 9 and 36, while crashes

[3] National Highway Traffic Safety Administration, Fatality Analysis Reporting System. https://www-fars.nhtsa.dot.gov/States/StatesCrashesAndAllVictims.aspx

resulting in fatalities are expected to be reduced by less than one fatality over the life of the project. The monetized benefits of these reductions over the 30-year project life is approximately $5.5 million. This is a conservative estimate as it only includes benefits from a reduction in VMT and does not include the benefits of improved design standards on the new roadway over the existing older roadways currently being used.

State of Good Repair

The second benefit included as part of this analysis is focused on the state of good repair. As vehicles traverse the roadway network, they create wear and tear on the roadway. Overtime this damage adds up to a significant impact resulting in increased maintenance needs. In particular, trucks have a much greater impact due to the heavier loads that they carry. This benefit category focuses on the impact of truck traffic only, while acknowledging that passenger cars also contribute to roadway wear and tear. Therefore, this calculation based only on truck traffic is a conservative estimate of benefits. Based on the reduction in VMT and pavement impact factors provided in *Pricing Freight Transport to Account for External Costs*, the monetized benefits of a reduction in pavement damage amount to $0.4 million (undiscounted) over the project life.

Economic Competitiveness

The area of project benefits that has the highest overall impact is Economic Competitiveness. This area includes both the change in vehicle operating costs as well as the value of user time.

Vehicle operating costs are determined based on the change in VMT. Similar to how the roadway is slightly worn by each vehicle traveling on it, vehicles also are worn based on usage, or in this case VMT. The net change in this cost is determined by multiplying the change in VMT by vehicle operating costs provided in the BCA Guidance. Overall, vehicle operating costs are expected to be reduced by $4 million.

The value of user time provides the most significant benefit. The completion of Reunion Parkway will provide an addition east-west corridor in the region, resulting in users traveling shorter distances in a shorter length of time. This provides a significant benefit for these users who can then use this time to do other activities besides sitting in a vehicle. This was determined by the change in travel time based on the change in VMT, and the anticipated travel speed, and multiplying it by the value of user time found in the BCA Guidance. The result is a net savings of $126 million (undiscounted) over the life of the project.

Environmental Sustainability

The reduction in VMT as well as increases in travel speeds based on new travel patterns and reduced congestion provides environmental benefits in the form of a reduction in emissions. This creates a healthier environment for all residents in the area of impact, not just those that will use the new roadway connection. Environmental benefits are based on the decrease in emissions resulting from reduced VMT and the lower emission rates based on higher vehicle speeds, as documented in the *California Life-Cycle Benefit-Cost Analysis Model v6.2*. The emissions included in this analysis are CO_2, VOCs, NO_x, $PM_{2.5}$, and SO_x. Of these, the reductions in NO_x have the greatest monetary impact, followed by CO_2. In total, environmental benefits account for about $0.2 million (undiscounted). While this is a significant number, environmental benefits are the lowest benefit category determined as part of this analysis.

Quality of Life

A secondary benefit to the project is quality of life. Additional benefits associated with quality of life improvements are also likely to occur but are unable to be estimated based on available data. These additional benefits include greater

connectivity for emergency services, an increase in quality of life, and property value increased. The inclusion of sidewalk and bike lanes in this project will increase the quality of life for residents. Specifically, a sidewalk will be included on the south side of the roadway and bicycle lanes will be at the shoulder of each side of the road. These will connect the project to the system of regional trails being developed along Bozeman Road and Highland Colony Parkway, extending south to the Natchez Trace Parkway and the Natchez Trace National Scenic Trail.

For emergency services, the completion of Reunion Parkway will create more direct access between Bozeman Road and Parkway East. This will also provide access to land owned by St. Dominic's Health Services allowing for the potential development of a planned regional healthcare facility. This connectivity and resulting improvement of traffic flow can provide critical timesaving route options which may allow patients to be transported to emergency rooms faster or firefighters to arrive on the scene sooner. As the frequency of such events is not known, nor is the impact of time savings available, these benefits were not included in the BCA calculation but are expected.

Lastly, the connectivity of the roadways will afford better access to the surrounding properties which are predominately farmlands at present. This will, in turn, make these properties more attractive for residential or commercial development. Expected increases in property values associated with this increased access has not been included nor has the value of potential economic development, thereby making this BCR much more conservative in nature.

Final Benefit-Cost Ratio

In summary, the total non-discounted benefits of this project are anticipated to be over $136 million, as shown in Table 6. This is well above the non-discounted project cost of $28 million shown in Table 7. Note that the project cost includes additional costs not asked for as part of this grant application including previously expended moneys as well as future potential maintenance costs. This results in a more conservative estimate of the total project cost. Costs have also been adjusted to a 2017 value-year to be consistent with the calculated benefits. The final benefit-cost ratio of 1.9:1 shown in Table 8 signifies that this project provides significant benefits for the community and strengthens the economic prosperity of the nation.

Table 6: Summary of Benefits

Benefit Category	Monetized Benefit ($2017, thousands)
Safety	$5,457
State of Good Repair	$360
Environmental	$193
Economic Competitiveness	$130,675
Total	$136,685
Reduced at a 7% Discount	**$34,582**

Table 7: Summary of Costs

Costs	Monetized Cost ($2017, thousands)
Previously Incurred Costs (2018 – 2019)	$647
Future Project Costs (2020 – 2023)	$24,119
Future Maintenance Costs (2024 – 2053)	$3,715
Total	$28,481
Reduced at a 7% Discount	**$18,455**

Table 8: Final Benefit Cost Ratio

B/C	Dollar Value (7% Discount)
Benefits	$34,582
Costs	$18,455
Benefit Cost Ratio	1.9:1

Supporting Information

The following provide links to supporting documents mentioned in the **Reunion Parkway Phase II** project grant application:

Madison County Economic Indicators 2018 Overview, Southern Mississippi, The Trent Lott National Center for Excellence in Economic Development and Entrepreneurship
http://www.neel-schaffer.com/wp-content/uploads/2019/07/2018-Madison-County-Economic-Indicators-6-25-18.pdf

South Madison County Transportation Study, Madison County, Mississippi, May 2019
http://www.neel-schaffer.com/wp-content/uploads/2019/07/Madison-Traffic-Study-May-2016-Final-w-figures.pdf

Key Project Information

Project Type:	New Capacity
Project Location	Madison County, Mississippi
Urban/Rural Area:	Rural Area – just outside the Jackson, MS Urban Area
Project Length:	1.23 miles/6,500 Linear feet
Project Budget:	$25,000,000
BUILD FY 2019 Funding Amount Requested:	$17,000,000 (68% of Project Budget)
BUILD FY 2019 Funds Obligation Date:	August 31, 2021
Project Completion Date:	September 30, 2024[2]

[2] Assumes award of FY 2019 BUILD funding by December 31, 2019.

Reunion Parkway Phase II Project Funding Summary

Sources	Amount	Percent of Project
BUILD grant	$ 17,000,000	68%
State of MS	$ 8,000,000	32%
Total	**$ 25,000,000**	**100%**

Contact Information

Shelton Vance
County Administrator
Madison County Board of Supervisors
125 West North Street
P. O. Box 608
Canton, MS 39046
601-855-5502

Appendix A

Letters of Commitment and Support

PHIL BRYANT
GOVERNOR

July 13, 2019

The Honorable Elaine L. Chao, Secretary
U.S. Department of Transportation
Office of the Secretary
1200 New Jersey Avenue SE
Washington, DC 20590

Re: 2019 BUILD Grant for Reunion Parkway Phase 2 in Madison County, Mississippi

Dear Secretary Chao:

I am writing in support of a BUILD grant application submitted by the Madison County Board of Supervisors for the design and construction of the Reunion Parkway Phase 2 in Madison County, Mississippi. The Madison County Board will be submitting the BUILD grant application by July 15 of this year.

The proposed project is located in an area of our state that is experiencing very rapid growth, which has significantly increased the transportation demands on the infrastructure of both Madison County and the state as a whole. This project would provide a critical east-west corridor which would connect both sides of Interstate 55 and provide relief to the adjacent east-west corridors to the north and south of Reunion Parkway Phase 2, providing safer and more efficient travel for the public.

Secretary Chao, thank you for your consideration of this project that is so important to one of the fastest growing areas of our state. Please let me know if I can be of further assistance.

Sincerely,

Phil Bryant
Governor

CINDY HYDE-SMITH
MISSISSIPPI

COMMITTEE ON
APPROPRIATIONS

COMMITTEE ON
AGRICULTURE, NUTRITION,
AND FORESTRY

COMMITTEE ON
ENERGY AND
NATURAL RESOURCES

COMMITTEE ON
RULES AND
ADMINISTRATION

United States Senate
WASHINGTON, DC 20510–2405

July 9, 2019

Trey Baxter, President
Madison County Board of Supervisors
P.O. Box 608
Canton, Mississippi 39046

Dear Mr. Baxter:

Thank you for your recent correspondence regarding Madison County's application for a Better Utilizing Investments to Leverage Development (BUILD) grant from the U.S. Department of Transportation.

I will contact the Secretary of Transportation in support of this application, and let you know if any additional information about your submission becomes available.

Thank you for this opportunity to be of service. Please let me know if I can be of further assistance.

Sincerely,

Cindy Hyde-Smith

CINDY HYDE-SMITH
United States Senator

CH/MJ

ROGER F. WICKER
MISSISSIPPI

ARMED SERVICES
COMMERCE, SCIENCE, AND TRANSPORTATION
ENVIRONMENT AND PUBLIC WORKS
RULES AND ADMINISTRATION
COMMISSION ON SECURITY
AND COOPERATION IN EUROPE

United States Senate
WASHINGTON, DC 20510

SUITE 555
DIRKSEN SENATE OFFICE BUILDING
WASHINGTON, DC 20510
(202) 224-6253

www.wicker.senate.gov

July 10, 2019

The Honorable Elaine Chao
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, D.C. 20003-3660

Dear Secretary Chao,

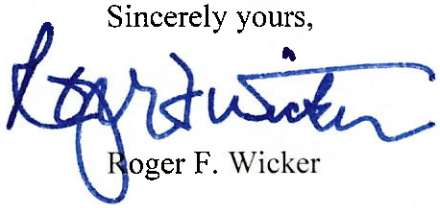
I would like to express my support for Madison County's application for a Better Utilizing Investment to Leverage Development (BUILD) Grant.

With funding from the Department of Transportation, Madison County, Mississippi, intends to complete Phase Two of the Reunion Parkway. This project will provide a critical east-west corridor in a rapidly growing area and will provide relief to the adjacent east-west corridors to the north and south which are significantly over capacity. This important project will enhance traffic safety, improve efficiency, and contribute to a better quality of life for area residents. Madison County and the State of Mississippi have committed a significant local match of 44% to the project should the Department of Transportation provide BUILD funding.

I hope that you will give Madison County's application every consideration. Should additional information be required from my office, please contact Mary Alice Browning of my staff at (601) 965-4644.

With best wishes, I am

Sincerely yours,



Roger F. Wicker

RFW/MAB

BENNIE G. THOMPSON
SECOND DISTRICT, MISSISSIPPI

COMMITTEE ON
HOMELAND SECURITY
CHAIRMAN

WASHINGTON OFFICE:
2466 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–2402
(202) 225–5876
(202) 225–5898: FAX

E-Mail: benniethompson@mail.house.gov
Home Page: http://www.benniethompson.house.gov

Congress of the United States
House of Representatives
Washington, DC 20515–2402

CONGRESSIONAL BLACK CAUCUS
CONGRESSIONAL GAMING CAUCUS
CONGRESSIONAL PROGRESSIVE CAUCUS
CONGRESSIONAL SPORTSMEN'S CAUCUS
CONGRESSIONAL RURAL CAUCUS
HOUSE EDUCATION CAUCUS

July 11, 2019

Elaine Chao
Secretary of Transportation
US Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Dear Ms. Chao:

As U.S. Representative for Mississippi's Second Congressional District, it is with great pleasure that I support the nomination of the 2019 BUILD Grant submitted by the Madison County Board of Supervisors for the design and construction of the Reunion Parkway Phase 2.

I understand their rapid growth in and around Madison County has significantly increased the demand on the State and County's infrastructure. This project would provide a critical east-west corridor that would connect both sides of Interstate 55 and provide relief to the adjacent east-west corridors to the north and south, which would provide safer and more efficient travel for the public.

As always, I encourage and appreciate your consideration of the 2019 BUILD Grant for the Reunion Parkway Phase 2 in Maison County.

Sincerely,

Bennie G. Thompson
Member of Congress

☐ 107 WEST MADISON STREET
P.O. BOX 610
BOLTON, MS 39041
(601) 866–9003
(601) 866–9036: FAX
(800) 355–9003: IN ST.

☐ 728 MAIN STREET, SUITE A
GREENWOOD, MS 38930
(662) 455–9003
(662) 453–0118: FAX

☐ 910 COURTHOUSE LANE
GREENVILLE, MS 38701
(662) 335–9003
(662) 334–1304: FAX

☐ 3607 MEDGAR EVERS BOULEVARD
JACKSON, MS 39213
(601) 946–9003
(601) 982–5337: FAX

☐ 263 EAST MAIN STREET
MARKS, MS 38646
(662) 326–9003

☐ MOUND BAYOU CITY HALL
106 GREEN AVENUE, SUITE 106
MOUND BAYOU, MS 38762
(662) 741–9003
(662) 741–9002: FAX

MICHAEL GUEST
3RD DISTRICT, MISSISSIPPI

230 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-5031

Congress of the United States
House of Representatives
Washington, DC 20515–2403

July 11, 2019

The Honorable Elaine Chao
U.S. Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Dear Secretary Chao:

I am writing in support of the Better Utilizing Investments to Leverage Development (BUILD) Grant application submitted by the Board of Supervisors of Madison County, Mississippi. This application would support the design and construction of the Reunion Parkway Phase 2.

Rapid growth in and around Madison County has significantly increased the demand on the County's infrastructure. The project would provide a critical east-west corridor that would connect both sides of Interstate 55 and provide safer and more efficient travel for the public.

Thank you for your consideration of this project, consistent with applicable rules and regulations. Please let me know if I can be of further assistance.

Sincerely,

Michael Guest
Member of Congress

Melinda L. McGrath
Executive Director

P. O. Box 1850
Jackson, MS 39215-1850
Telephone (601) 359-7249
FAX (601) 359-7050
GoMDOT.com

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

James A. Williams, III
Deputy Executive Director/Chief Engineer
Lisa M. Hancock
Deputy Executive Director/Administration
Willie Huff
Director, Office of Enforcement
Charles R. Carr
Director, Office of Intermodal Planning

May 9, 2019

Ms. Elaine Chao
U.S. Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Subject: **MADISON COUNTY, MISSISSIPPI**
REUNION PARKWAY BUILD GRANT APPLICATION

Dear Secretary Chao,

On behalf of the Mississippi Department of Transportation (MDOT), I would like to convey my support of the Madison County Board of Supervisors' FY 2019 Better Utilizing Investments to Leverage Development (BUILD) grant application for the design and construction of the Reunion Parkway.

Rapid growth in and around Madison County has significantly strained the State's and County's infrastructure. The department has seen tremendous growth and demand for access across and onto Interstate 55 in this area. This project would provide an additional east-west corridor that would connect both sides of the interstate and provide relief to the parallel corridors to the north and south. Additionally, MDOT intends to apply for a future INFRA Grant to widen Interstate 55 from Madison to Gluckstadt (north of the Reunion Parkway) and connect to Reunion Parkway with ramps to create a new and much needed interchange.

The Madison County Board of Supervisors will complete the Environmental Assessment and Interstate Access Request for this project in late summer of this year. If selected, MDOT will work closely with the Madison County Board of Supervisors as they proceed with the project to help ensure it will conform to the required federal standards.

If you have questions or if I can be of assistance, please do not hesitate to call me. Thank you for your consideration of this project that is important to a fast growing area of our state.

Sincerely,

Melinda L. McGrath, P.E.
Executive Director

CMPDD
PROMOTING REGIONAL EXCELLENCE SINCE 1968

CENTRAL MISSISSIPPI PLANNING AND DEVELOPMENT DISTRICT
1170 Lakeland Drive • P.O. Box 4935 • Jackson, Mississippi 39296-4935 • (601) 981-1511 • Fax: (601) 981-1515

May 23, 2019

The Honorable Elaine L. Chao, Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Dear Secretary Chao:

RE: Letter of Support for the Reunion Parkway Project
2019 BUILD Grant Application

On behalf of the Central Mississippi Planning and Development District (CMPDD), the designated Metropolitan Planning Organization (MPO) for the Jackson Mississippi Urbanized Area, I would like to express our support for the Madison County application to the U.S. Department of Transportation's "2019 Better Utilizing Investments to Leverage Development" (2019 BUILD) discretionary grant program for the Reunion Parkway. The proposed project is a much needed component of the regional transportation network, and is identified as a proposed project in the MPO's long-range 2040 Metropolitan Transportation Plan. Since the project has already been identified as a need in the MPO's long-range plan, and funding for phase 3 of Reunion Parkway is already identified in the region's Transportation Improvement Program (TIP) any additional funding can be added promptly to the TIP to advance additional phases of this project quickly.

The transportation improvements associated with Reunion Parkway will greatly enhance the economic vitality and transportation options in the metro-area. We appreciate your consideration of this proposed BUILD application in helping improve the transportation infrastructure in our region.

Sincerely,

Michael Monk
Chief Executive Officer

cc: Trey Baxter, President Madison County Board of Supervisors

Madison County Business League & Foundation

June 20, 2019

Dear Secretary Chao,

The Madison County Business League & Foundation (MCBL&F) fully supports the funding request of $15.6m from the 2019 Federal Build Grant Program to construct the Reunion Parkway Phases II and III. The Community is willing to commit 40% of the total Project cost which by far exceeds the 60/40 funding requirements required by the Federal Build Grant Program by 20%.

Madison County population projections estimate 18,000 new citizens will call Madison County home over the next 10 years. From Madison to Canton, commercial developments are following the influx of people and construction of new residential subdivisions, adding to the already congested network of county arterial roads.

The proposed Reunion Phase II and III Parkway combined with the MDOT supported interchange will open up approximately 880 acres for potential economic development opportunities for Madison County, the Region, and the State of Mississippi.

The anticipated growth will drive new homes construction and more retail growth and could reasonably be expected to result in more than $8,600,000 per year in incremental property taxes for Madison County and more than $30,000,000 in new sales tax revenue for the State of Mississippi.

The growth experienced and anticipated in and around the proposed Reunion Parkway is unsurpassed in the State of Mississippi. Reunion Parkway Phases II and III coupled with the county's A-rated schools, great neighborhoods, and quality of life, will continue to make Madison County a tremendous asset of the State of Mississippi. When Madison County excels and grows so does the State of Mississippi.

We respectfully request the support and assistance of the Mississippi Congressional Delegation as Madison County formally applies to the U.S. Department of Transportation for a 2019 Build grant in the amount of $15.6m.

Cecil Harper, Chairman

CHAIRMAN

135 Mississippi Parkway ◆ Canton, Mississippi 39046
OFFICE (601) 832-5592
collins.jan01@gmail.com

MCEDA
Madison County
ECONOMIC DEVELOPMENT AUTHORITY

Where Success Comes Naturally

June 19th, 2019

Dear Secretary Chao

The Madison County Economic Development Authority (MCEDA) fully supports the funding request of $15.0 million from the 2019 Federal Build Grant Program to construct the Reunion Parkway Phases II and III. The Community is willing to commit 40% of the total Project cost, which exceeds the 80/20 funding requirements required by the Federal Build Grant Program by 20%.

Madison County population projections estimate 18,000 new citizens will call Madison County home over the next 10 years. From Madison to Canton, commercial developments are following the influx of people and construction of new residential subdivisions, adding to the already congested network of county arterial roads.

The proposed Reunion Parkway Phases II and III combined with the MDOT supported interchange will open up approximately 880 acres for potential economic development opportunities for Madison County, the Region, and the State of Mississippi.

The anticipated growth will drive new homes construction, more retail growth, and could reasonably result in more than $8,600,000 per year in incremental property taxes for Madison County and more than $30,000,000 in new sales tax revenue for the State of Mississippi.

The growth experienced and anticipated in and around the proposed Reunion Parkway is unsurpassed in the State of Mississippi. Reunion Parkway Phases II and III coupled with the county's A-rated schools, great neighborhoods, and quality of life, will continue to make Madison County a tremendous asset of the State of Mississippi. When Madison County excels and grows so does the State of Mississippi.

We respectfully request the support and assistance of the Mississippi Congressional Delegation as Madison County formally applies to the United States Department of Transportation for a 2019 Build grant in the amount of $15.0 million.

Sincerely,

Douglas L. Jones

Chairman, MCEDA Board of Directors

135 Mississippi Parkway, Canton, MS 39046 | www.MadisonCountyEDA.com | 601.605.0368 | FAX 601.407.2835

Appendix B

Financial Commitment

MADISON COUNTY
P O BOX 608
CANTON, MS. 39046

Cash Receipt

Receipt No. 190160 Date 11/07/2018 Transaction 190172
Deposit No. Deposit Date 11/07/2018 Bank 100
Vendor SOM-FINANCE & ADMINISTRATION

		Cash Account 000 001
324-000-270	STATE GRANT-REUNION PARKWAY	8000000.00
	Total	8000000.00

Approved _____

Collector Payment and Remittance Report

Bottomline Technologies

Paymode-X

Company Name: Madison County Board of Supervisors

Collector Account: MADISONCOUNT.RECEIVABLES

Payments Settling On: 07-Nov-2018

DPA	Payment Number	Payment Status	Disburser Account	Vendor Number	Payment Method	Issue Date	Credit/Cleared Date	Expiration Date	Payment Amount	Currency Code	Bank Account Number	Attachment
897741010	301132267	Processed Successfully	StateofMS.1130	3100023040	ACH	N/A	07-Nov-2018		8,000,000.00	USD	*********9214	YES

Remittances:

Remit Number	Vendor #	Vendor Name	Agency Name	Payment Voucher #	Invoice #	Paid Invoice Amount	Currency
1	3100023040	MADISON CTY BD OF SUPERVISORS	Finance & Administration	PV 1130 1902274936	INV. #40	8,000,000.00	USD

Additional Information

PV LN	Line Description	Acct Code	Acct Description	Amount
001	Madison County	0067040000	Grantor Payments On Behalf of Grantee	$ 8,000,000.00

USD Total Count and Sum for 07-Nov-2018	**1 payment(s) for 8,000,000.00 USD**
USD Total Count and Sum for MADISONCOUNT.RECEIVABLES	**1 payment(s) for 8,000,000.00 USD**
USD Number of Remittances	**1 remittance(s) for 8,000,000.00 USD**
USD Grand Totals	**1 payment(s) for 8,000,000.00 USD**

324 270

Appendix C

Relevant Project Documents

U.S. Department
of Transportation
Federal Highway Administration

MISSISSIPPI DIVISION

100 West Capitol Street, Suite 1062
Jackson, Mississippi 39269
(601) 965-4215
(601) 965-4931 FAX

June 10, 2019

In Reply Refer To: HDA-MS

Ms. Melinda L. McGrath
Executive Director
Mississippi Department of Transportation (MDOT)
P. O. Box 1850
Jackson, Mississippi 39215-1850

Dear Ms. McGrath:

Subject: Proposed I-55 Interchange at Reunion Parkway, Madison, County, Mississippi

We have reviewed the June 7, 2019 Interstate Access Request (IAR) submitted by the Mississippi Department of Transportation (MDOT) requesting FHWA's Determination of safety, operational, and engineering acceptability for the proposed new I-55 interchange at Reunion Parkway in Madison County.

Per your submittal, the Reunion Parkway ramps accessing I-55 will not be constructed until capacity improvements (additional lanes) to I-55 between MS 463 and Gluckstadt Road are completed.

We have determined that the IAR is acceptable from a safety, operational, and engineering standpoint. Upon completion of the National Environmental Policy Act (NEPA) Re-evaluation, FHWA may grant full approval of the Reunion Parkway interchange. If additional information is needed, please do not hesitate to contact me.

Sincerely yours,

Donald E. Davis
Division Administrator

Attachment

Cc: Mr. James Williams, Deputy Executive Director/Chief Engineer, 65-01
Mr. Jeff Ely, Assistant Chief Engineer – Preconstruction, 81-01
Mr. Richard Pittman, Roadway Design Division Engineer, 83-01
Ms. Kim Thurman, Environment Division Director, 87-01
Mr. James Sullivan, State Traffic Engineer, 76-01
Mr. Brian Ratliff, District Engineer, 25-01

Melinda L. McGrath
Executive Director

P. O. Box 1850
Jackson, MS 39215-1850
Telephone (601) 359-7001
FAX (601) 359-7110
GoMDOT.com

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

James A. Williams, III
Deputy Executive Director/Chief Engineer
Lisa M. Hancock
Deputy Executive Director/Administration
Willie Huff
Director, Office of Enforcement
Charles R. Carr
Director, Office of Intermodal Planning

June 7, 2019

Mr. Don Davis
Division Administrator
Federal Highway Administration
100 West Capitol Street, Suite 1062
Jackson, MS 39269

Subject: Interstate Access Request at the I-55 and Proposed Reunion Parkway Interchange

Dear Mr. Davis:

We respectfully request your conditional approval for the determination of operational acceptability of the attached Interstate Access Request (IAR) final version dated June 2019 for the proposed I-55 at Reunion Parkway Interchange utilizing either design concept outlined in the IAR. Both concepts are diamond interchanges, however, one has a loop in the northwest quadrant. The analysis for both concepts addresses each of the considerations and requirements of the current Policy on Access to the Interstate System dated May 22, 2017. The analysis concludes that for either concept there is no significant adverse impact on the safety and operation of the Interstate facility and the proposed access connects to a public road only and will provide for all traffic movements. The Planning Division, in conjunction with FHWA representatives, has reviewed and concurs with the attached analysis.

If you have any questions, or require additional information concerning this request or the supporting analysis, please contact Mr. Evan Wright at (601) 359-7685.

Sincerely,

Melinda McGrath, P.E.
Executive Director

MLM:EDW:tbs

Attachment

Cc:

Mr. Jeff Ely, Preconstruction, MDOT
Mr. Brian Ratliff, District 5 Engineer, MDOT
Ms. Kim Thurman, Statewide Environmental Administrator, MDOT
Mr. James Sullivan, State Traffic Engineer
Mr. Richard Pittman, Roadway Design Division Engineer

Appendix D

Benefit-Cost Analysis

Reunion Parkway Phase II

Benefit/Cost Analysis Documentation

This document details the Benefit/Cost Analysis (BCA) performed for the Reunion Parkway Phase II Project in support of a 2019 BUILD Grant Application. This project will provide a critical link between Bozeman Road and Parkway East, providing improved access for residents and businesses for work trips, commutes, and the movement of freight. This project will relieve congestion on the existing roadway network while creating opportunities for new developments on currently undeveloped, inaccessible land parcels. Benefits are calculated based on four main categories: Safety (reduction in vehicle crashes, injuries, and fatalities), State of Good Repair (reduction in pavement damage), Environmental Sustainability (reduction in emissions), and Economic Competitiveness (reduction in travel time costs and vehicle operating costs). Additional benefits associated with quality of life improvements are also likely to occur but are unable to be estimated based on available data. These additional benefits include greater connectivity for emergency services, an increase in quality of life, and property value increases. The benefits in each category are driven by the estimated changes in vehicle miles traveled (VMT), vehicle hours traveled (VHT), and speeds resulting from shifts in traffic due to improved route options with the construction of the Reunion Parkway Phase II Project. Of these, Economic Competitiveness provides the most significant benefits, predominately due to travel time savings for users. Safety is the second highest benefit category. These benefits demonstrate that this project will provide a safer, more reliable transportation network for users.

Overview and Organization of Document

The below technical documentation describes the BCA completed in support of the Reunion Parkway Phase II Project. The documentation is organized around the worksheets provided in the attached MS Excel spreadsheet titled "Reunion Parkway BUILD Grant BCR.xlsx". Specifically, the spreadsheet is organized into distinct sections to guide the analysis. These include:

- Factors Used in Analysis
  - Monetized Values and Factors
  - CPI
  - Value of Carbon
  - Emissions
- Calculated Inputs Necessary for Analysis
  - Project Costs
  - Model Outputs
  - Annual VMT
  - Annual VHT

  - Average Speed
- Benefits Calculation
  - Safety
  - State of Good Repair
  - Environmental Sustainability
  - Economic Competitiveness
- Final Results
  - Summary of Benefits
  - Summary of Costs
  - Final Benefit Cost Ratio

Additional benefits anticipated to occur due to this project affiliated with quality of life, emergency services, and economic benefits are not included in this spreadsheet due to availability of data. An additional discussion regarding these unquantified benefits is included at the end of this technical documentation.

Monetized Values and Factors

The "Monetized Values and Factors" tab contains many of the main factors used in the overall analysis. The majority of these, particularly those related to safety, travel time savings, vehicle operating costs, and emission costs came directly from *Benefit Cost Analysis Guidance for Discretionary Grant Programs* provided in December 2018 by the U.S. Department of Transportation. These factors include: the value of a statistical life, value of injuries, value of property damage only crashes, value of time by user type, truck operating costs, and the value of emissions for five emission types. In addition, these factors were supplemented by the following values:

- Pavement Damage: For truck traffic as defined by the *Pricing Freight Transport to Account for External Costs, Congressional Budget Office Working Paper 2015-03* for measuring the impacts on the State of Good Repair.

- Crash Rates for Passenger Vehicles: Crash rates for fatalities, injuries, and vehicle damage based on available statistics from the National Highway Traffic Safety Administration (NHTSA) and the Bureau of Transportation Statistics (BTS). The majority of these rates are based on national statistics, however, fatality rates are based on the statewide average for Mississippi as the state has the second highest fatality rate in the country.[1]

[1] Note that crash rates for the local area were not utilized as the VMT calculated in this analysis only represents the roadways which are included in the model. Using actual crash frequencies along with the model VMT has the potential to artificially inflate the crash rates and therefore similarly inflate the perceived benefits. National and statewide values were instead used in order to mitigate this issue.

- Crash Rates for Truck Traffic: Crash rates for fatalities, injuries, and vehicle damage based on available statistics from the Federal Highway Administration (FHWA) and the Federal Motor Carrier Safety Administration (FMCSA).[2]

Consumer Price Index (CPI)

The "CPI" tab contains factors used to adjust dollars from one year to the next. Since not all measures are given in same year values, particularly for multi- year projects with benefits accruing over multiple decades, it is necessary to adjust the values to a consistent year to ensure a fair comparison. These factors were provided from the *Benefit Cost Analysis Guidance for Discretionary Grant Programs* and supplemented with values for 2018 and 2019 from the Congressional Budget Office as they were not provided in this guidance. Note that for the purpose of this analysis, expenditures and benefits are computed in 2017 dollars as inflation rates past this year are not provided.

Value of Carbon

The "Value of Carbon" tab contains the value for the social cost of carbon (SCC) per metric ton of CO_2. These factors were provided from the *Benefit Cost Analysis Guidance for Discretionary Grant Programs.* Values were provided in five year increments. Interim years were interpolated based on the years provided.

Emissions

Emission rates were determined for both passenger cars and trucks based on the California Life-Cycle Benefit/Cost Analysis Model (Version 6.2) from Caltrans. This model provides emission factors for 2016 and 2036 for varying rates of speed for seven emission types: CO, CO_2, NO_x, PM_{10}, SO_x, VOC, and $PM_{2.5}$. Given the available values are only for 2016 and 2036, the interim years, and years past 2036 were estimated based on an average annual rate of change calculated from the two given years.

Since emission rates are impacted by speed, values for each average speed were applied to the average speeds calculated for the direction of traffic with and without the project. More details on the calculation of speed are found in the "Model Outputs" sheet.

Costs with Schedule

The "Costs with Schedule" sheet aligns the project costs with the projected construction schedule. The $520,000 spent in 2018 and 2019 to support this project's development has also been included as part of the cost of this project. Future project costs include Right of Way Acquisitions in 2020 and 2021, Utility Adjustments in 2021, and Construction in 2022 and 2023. The values were adjusted to 2017 dollars based on estimated values from the Congressional Budget Office in order

[2] Note that incident rates were reported for both single-unit trucks and combination trucks so an average incident rate was computed based on the vehicle miles traveled (VMT) share of these modes. The VMT values are the latest available from FHWA's *Freight Facts and Figures 2017.*

to compare with the 2017 monetary values provided in the *Benefit Cost Analysis Guidance for Discretionary Grant Programs.*

Model Outputs

A regional travel demand model for the Jackson metropolitan area was used to assist in compiling data for the scenario analysis. The Jackson metropolitan area travel demand model is a traditional four-step model that predicts traffic volumes based on area socioeconomic data, roadway network characteristics, and other relevant area inputs. The original regional model for the Jackson metropolitan area was built by Neel-Schaffer in conjunction with the Central Mississippi Planning & Development District (CMPDD) and the Mississippi Department of Transportation (MDOT) in 1992. Since that time, the model has been updated on a 5-year basis. The Jackson metropolitan model includes four counties (4 County names here) within the Jackson metropolitan area and is used by the CMPDD to predict future traffic conditions for project scenarios. The model used for the analysis within this document has a base year of 2013 and a forecast year of 2040 with 2020 and 2030 as interim years. This model has a feature to run the model for any year between 2013 and 2040 using simple linear interpolation of inputs using the data from the nearest two milestone years of 2013, 2020, 2030 and 2040.

The Jackson metropolitan area model was used to forecast future travel demand and vehicle volumes based on committed roadway network improvements. The No Build scenarios use the existing roadway network and future committed projects, referred to as the E+C network. The Build model scenarios use the E+C network with the addition of the Reunion Parkway Phase II project without the interchange. The Jackson metropolitan area travel demand model was used to assist in compiling the VMT and VHT for each project scenario.

The model was utilized to estimate the impacts of the project in three separate but overlapping analysis areas: one encompassing the project limits, one for the entirety of Madison County, and one for the Jackson Model Area. For this BCA, the project limits output files were utilized, as shown in Table 1. The spreadsheet tool is set up to test the impact of the project on the two larger areas; values for Madison County and the Jackson model area can be used to replace the values in A3:J20 to produce an alternative benefit-cost ratio (BCR). The project limit output is the most conservative of the three scenarios as it encompasses a smaller portion of traffic. Using either of the larger areas results in a higher BCR.

In addition to providing the base numbers for VMT, VHT, and vehicle hours of delay (VHD) for auto and truck, this sheet also contains values for the average rate of change between model years such that benefits for interim years may be interpolated. Average speeds for each year are also calculated based on VMT and VHT.

Table 1: Daily Travel Demand Model Results – Project Limits

Model Outputs for Project Limits									
BASE YEAR									
	AUTO VMT	AUTO VHT	AUTO VHD	TRK VMT	TRK VHT	TRK VHD	TOTAL VMT	TOTAL VHT	TOTAL VHD
2013	647,561	16,473	2,075	51,818	1,117	198	699,379	17,590	2,273
BUILD									
	AUTO VMT	AUTO VHT	AUTO VHD	TRK VMT	TRK VHT	TRK VHD	TOTAL VMT	TOTAL VHT	TOTAL VHD
2020	714,802	18,128	2,209	56,668	1,243	232	771,469	19,371	2,441
2025	777,833	20,134	2,665	60,631	1,367	276	838,464	21,501	2,941
2030	838,837	22,138	3,139	64,523	1,493	322	903,360	23,632	3,461
2035	900,592	24,219	3,701	68,736	1,633	377	969,327	25,851	4,078
2040	958,205	26,166	4,239	72,653	1,764	429	1,030,858	27,930	4,668
NO BUILD (E+C)									
	AUTO VMT	AUTO VHT	AUTO VHD	TRK VMT	TRK VHT	TRK VHD	TOTAL VMT	TOTAL VHT	TOTAL VHD
2020	718,935	18,322	2,328	56,882	1,253	240	775,817	19,575	2,568
2025	781,775	20,375	2,818	60,878	1,380	285	842,653	21,755	3,102
2030	841,448	22,399	3,321	64,740	1,506	331	906,188	23,905	3,652
2035	901,347	24,524	3,904	68,863	1,646	386	970,210	26,170	4,289
2040	958,343	26,566	4,469	72,747	1,781	437	1,031,090	28,347	4,906

Notes: 1. VMT –Vehicle Miles Travelled (Daily)
2. VHT – Vehicle Hours Travelled (Daily)
3. VHD – Vehicle Hours of Delay (VHD)
4. AVG SPEED – VMT/VHT in miles per hour
5. Truck average speed is higher than auto speed because of the distribution of most Truck VMT on higher speed roadways. This is evident by the fact that the truck VMT is 8% of total VMT whereas the truck VHT is 6.7% of total VHT.

Annual VMT

VMT is one of the main elements used to determine the benefits associated with this project. In the sheet "Annual VMT", VMT is calculated separately for passenger cars and trucks both with and without the project construction. This is calculated by multiplying daily VMT computed in the model (found in sheet "Model Outputs") by 365 to get annual trips.

Table 2 summarizes the estimated VMT by vehicle type both with and without the project. Overall, this project is expected to result in a reduction of 9.2 million VMT over the 30 year project life, or an average of about 306,000 VMT per year.

Table 2 Change in VMT With and Without Project Construction

	Passenger Cars	Trucks	Total

VMT With Project (in millions)	10,317	784	11,101
VMT Without Project (in millions)	10,325	785	11,110
Net Change in VMT (in millions)	**8**	**1**	**9**

Annual VHT

VHT is another element used to determine the benefits associated with this project. In the sheet "Annual VHT", VHT is calculated separately for passenger cars and trucks both with and without the project. This is computed by multiplying the daily VHT (found in sheet "Model Outputs") by 365 to get annual hours traveled.

Table 3 summarizes the estimated VHT by vehicle type both with and without the project. Overall, this project is expected to result in a reduction of 4.7 million VHT over the 30 year project life, or an average of approximately 155,000 VHT per year.

Table 3 Change in VHT With and Without Project Construction

	Passenger Cars	Trucks	Total
VHT With Project (in millions)	281.0	19.0	300.0
VHT Without Project (in millions)	285.5	19.1	304.6
Net Change in VHT (in millions)	**4.5**	**0.2**	**4.7**

Average Speed

The last element used to determine benefits is the average speed of roadway users. In the sheet "Average Speed", speed is calculated separately for passenger cars and trucks both with and without the project. This is computed by dividing the annual VMT (found in sheet "Annual VMT") by the annual VHT (found in sheet "Annual VHT"). These speeds were utilized later to determine changes in emissions associated with vehicle travel.

Safety

Impacts to safety include the value associated with fatalities, injuries, and property damage only incidents.

The loss of life is a factor of the VMT previously calculated. The VMT for both vehicle types is multiplied by corresponding fatality rates per vehicle-mile found in the "Monetized Values and Factors" sheet. Although the model outputs show an initial drop in VMT with project construction, outer years show an increase in VMT over the scenario without the project. As a result, there is only an estimated change of less than one fatality over the life of the project as shown in Table 4. However, this does not take into account safety improvements on this new roadway over roadways which were built with different design standards. In addition, as the

state of Mississippi has the second highest roadway fatality rate in the country, any efforts to make safety improvements will have a more profound effect than areas with lower crash rates.

Table 4 Loss of Life With and Without Project Construction

	Fatalities
Fatalities With Project	185.1
Fatalities Without Project	185.3
Net Change in Fatalities	**0.2**
Value of Net Change in Safety ($2017, in millions)	**$1.5**

Injuries are calculated in the same manner as fatalities, but instead of using the fatalities per mile factor found in the "Monetized Values and Factors" sheet, the injuries per mile factor is used. The construction of this project will result in 9 fewer injuries over the life of the project. A summary of these benefits is shown in Table 5. To calculate the value of this impact, the net change in injuries was multiplied by the value associated with a "Moderate" injury crash as provided by the *Benefit Cost Analysis Guidance for Discretionary Grant Programs*. This is a conservative estimate versus using a more severe crash type as the higher values associated with more severe crashes would increase the overall net benefits associated with safety for this project. This is also conservative as a national average for injuries is used here, versus a higher rate for the state.

Table 5 Injuries With and Without Project Construction

	Injuries
Injuries With Project	10,609
Injuries Without Project	10,618
Net Change in Injuries	**9**
Value of Net Change ($2017, in millions)	**$3.8**

The property damage due to crashes was also calculated similar to the fatality and injury rates. The VMT was multiplied by the vehicle crash rates found in the "Monetized Values and Factors" sheet. The net change in incidents is approximately 36 fewer property damage only incidents, or about 1 per year. This total was then multiplied by the per vehicle value for property damage only crashes. The value of this change is $0.2 million as shown in Table 6. Again, this is a conservative estimate given that national averages were used.

Table 6 Property Damage Due to Crashes With and Without Project Construction

	Property Damage
Incidents With Project	46,249
Incidents Without Project	46,286
Net Change in Incidents	**36**
Value of Net Change ($2017, in millions)	**$0.2**

State of Good Repair

The State of Good Repair benefits are determined based on the anticipated decrease in pavement damage prevented under with project conditions. As each vehicle travels, it causes a certain amount of wear on the roadway. The heavier a vehicle is, the more damage it causes. While each vehicle may only cause a negligible amount of damage itself, the overall impact of thousands of vehicles can add up to significant wear and tear. In particular, trucks are a much more significant source of pavement damage than passenger cars. Only the impacts of truck VMT are considered for this benefit, resulting in a more conservative value.

The overall impacts on pavement damage are based on the total truck VMT calculated previously. The vehicle miles are first multiplied by an assumed truck weight of 80,000 pounds (the maximum legal weight of a truck) and discounted by 20 percent to account for some trucks making empty movements. This ton-mile value is then multiplied by the value of pavement damage per ton-mile found in the "Monetized Values and Factors" sheet. The summary of these calculations is shown in Table 7. While there will still be wear and tear on the roadways the overall reduction in ton-miles results in less damage. With this project, total pavement damage is estimated at $222.2 million. Without it, pavement damage will be $222.5 million. This results is a decrease in pavement damage of $0.4 million (undiscounted) over the 30 year project life.

Table 7 Pavement Damage Caused With and Without Project Construction

	Pavement Damage
With Project ($2017, in millions)	$222.2
Without Project ($2017, in millions)	$222.5
Net Change ($2017, in millions)	**$0.4**

Environmental Sustainability

The impact on Environmental Sustainability is a result of reductions in five emission types: Carbon Dioxide (CO_2), Nitrogen Oxides (NO_x), Particulate Matter ($PM_{2.5}$), Sulfur Dioxide (SO_x), and Volatile Organic Compounds (VOCs). The environmental sustainability impacts for the five emission types were calculated the same way for each emission. Since emission rates vary by year, speed, and vehicle type, the calculations were computed separately for passenger cars and trucks. Referring back to the "Emissions" sheet, the corresponding emission rates for each vehicle type were utilized based on the determined travel speed from the "Travel Speed" sheet. In short, the calculation is the VMT multiplied by the emission rate found in the "Emissions" sheet based on the estimated speed for the defined route. The final environmental sustainability impacts are shown in Table 8. Based on the decrease in VMT for this project, emissions of each type are found to decrease, with the greatest change in tonnage emitted seen in carbon dioxide.

Table 8 Emissions With and Without Project Construction

	With Project	Without Project	**Net Change**
Carbon Dioxide (CO_2) (short tons)	3,290,190	3,317,595	**27,405**
Nitrogen Oxides (NO_x) (short tons)	928	938	**10**
Particulate Matter ($PM_{2.5}$) (short tons)	13	13	**0**
Sulfur Dioxide (SO_x) (short tons)	32	32	**0**
Volatile Organic Compounds (VOCs) (short tons)	217	221	**3**

These calculated short tonnages were then multiplied by the Value of Emissions provided by the *Benefit Cost Analysis Guidance for Discretionary Grant Programs* which can be found in the "Monetized Values and Factors" sheet. Table 9 shows the total value of emissions in non-discounted dollars.

Table 9 Value of Emissions With and Without Project Construction

	With Project	Without Project	**Net Change**
CO_2 ($2017, in thousands)	$4,841	$4,903	**$62**
NO_x ($2017, in thousands)	$7,704	$7,789	**$85**
$PM_{2.5}$ ($2017, in thousands)	$4,814	$4,844	**$29**
SO_x ($2017, in thousands)	$1,570	$1,580	**$9**
VOCs ($2017, in thousands)	$435	$441	**$7**
Total ($2017, in thousands)	$19,364	$19,557	**$193**

Economic Competitiveness

Economic Competitiveness is based on two factors: Operating Costs and the Value of User Time.

Vehicle operating costs are calculated by multiplying the VMT previously computed by the "Vehicle Operating Costs" factors found in the "Monetized Values and Factors" sheet for each vehicle type. The value of operating costs are summarized in Table 10. The net change between the with and without project scenarios is approximately $4.2 million (undiscounted).

Table 10 Operating Costs With and Without Project Construction

	Operating Costs
With Project ($2017, in millions)	$4,729
Without Project ($2017, in millions)	$4,733
Net Change ($2017, in millions)	**$4.2**

The cost of travel time associated with this project is based on the change in user travel time as determined based on the annual VMT (sheet "Annual VMT") and the affiliated travel speeds

(sheet "Travel Speed") The driver time (in hours) for each vehicle type (auto and truck) was multiplied by the hourly value of time for drivers provided by the *Benefit Cost Analysis Guidance for Discretionary Grant Programs* found in the "Monetized Values and Factors" sheet. Note that for passenger cars the "All Purposes" value was utilized to reflect a typical distribution of local travel by surface modes (88.2 percent personal, 11.8 percent business). The total cost associated with user travel time with this project is estimates at $8.1 billion compared to $8.3 billion without this project. The net impact is a total benefit of $126 million (undiscounted) in travel time cost savings. The results from this calculation are shown in Table 11.

Table 11 Travel Time Cost With and Without Project Construction

	Driver Travel Time Costs
With Project ($2017, in millions)	$8,143
Without Project ($2017, in millions)	$8,269
Net Change ($2017, in millions)	**$126**

Note that this is the most significant benefit associated with this project suggesting that the local community will benefit significantly from the construction of this roadway connection as it provides a significant decrease in the amount of delay experienced while traversing the roadway system. Recalculating these benefits using model results for a broader area suggests even greater benefits for the county and the region.

The total Economic Competitiveness benefits are the summation of benefits from operating costs and travel time costs (Tables 10 and 11). Table 12 shows this summation. The construction of the Reunion Parkway Phase II Project will result in a positive benefit of over $131 million (undiscounted) over a 30 year project lifespan.

Table 12 Total Economic Competitiveness With and Without Project Construction

	Economic Competitiveness
With Project ($2017, in millions)	$12,872
Without Project ($2017, in millions)	$13,003
Net Change ($2017, in millions)	**$131**

Summary of Benefits

The "Summary of Benefits" sheet summarizes the total benefits associated with this project by type of benefit. The total non-discounted benefits is estimated at nearly $137 million over the total 30 year project life. As shown in Table 13, the largest impacts of this comes from Economic Competitiveness, specifically the changes in the value of user time. The second greatest impact is from Safety which is based on reductions in crashes. These benefits were reduced at a 7 percent discount rate for input to the Benefit Cost Ratio discussed below.

Table 13 Summary of Net Change in Benefits

	Net Impacts
Safety ($2017, in millions)	$5.5
State of Good Repair ($2017, in millions)	$0.4
Environmental Sustainability ($2017, in millions)	$0.2
Economic Competitiveness ($2017, in millions)	$130.7
Total, Non-Discounted ($2017, in millions)	$136.7
Total, Discounted 7%	$34.6

Summary of Costs

Project costs were previously shown in more detail for various stages of construction in the "Project Costs" sheet. The "Summary of Costs" shows, at a higher level, spending per year and those expenditures discounted at 7 percent. Table 14 summarizes this information. Note that this also includes an annual maintenance cost estimated at 0.5 percent of the total construction cost beginning in 2024.

Table 14 Summary of Projects Costs

	Non-Discounted Costs ($2017)	Discounted 7%
2018	$45,410	$42,439
2019	$601,665	$525,518
2020	$916,511	$748,146
2021	$1,543,597	$1,177,603
2022	$10,829,297	$7,721,139
2023	$10,829,297	$7,216,018
2024-2053	$123,829	(varies by year based on discount)
Total	**$28,480,644**	**$18,454,763**

Final Benefit Cost Ratio

The final BCR was determined by comparing the benefits and costs at a 7 percent discount rate. The results yielded a BCR of 1.9:1. This represents a conservative number based on model outputs limited to "project limits"; benefits of the county and/or full model area would have resulted in significantly higher BCRs (3.1:1 for Madison County and 3.4:1 for the Jackson Model Area). A summary of these values is shown in Table 15. This project is anticipated to produce a significant benefit to the local and national transportation network.

Table 15 Benefit Cost Ratio

	Discounted 7%
Total Benefits (in millions)	$34.6
Total Costs (in millions)	$18.5
Benefit Cost Ratio	**1.9:1**

Unquantified Quality of Life Benefits

For the majority of this analysis, conservative values have been utilized in order to represent a fair analysis of the BCR without overstating benefits. In addition, other benefit categories have not been included here which would likely further increase the benefits associated with this project. Specifically these include greater connectivity for emergency services, an increase in quality of life, and property value increases. The *Benefit Cost Analysis Guidance for Discretionary Grant Programs* does not provide specific guidance on calculating these so their impacts are only included here as a discussion.

For emergency services, the completion of Reunion Parkway will create more direct access between Bozeman Road and Parkway East. This will also provide access to land owned by St. Dominic's Health services allowing for the potential development of a planned regional healthcare facility. This connectivity and resulting improvement of traffic flow can provide critical timesaving route options which may allow patients to be transported to emergency rooms faster or firefighters to arrive on the scene sooner. As the frequency of such events is not known, nor is the impact of time savings available, these benefits were not included but are expected.

Quality of life is a more concrete benefit due to the inclusion of sidewalks and bike lanes in this project. Specifically, sidewalks will be included on the south side of the roadway and bicycle lanes will be at the shoulder of each side of the road. These will connect the project to the system of regional trails being developed along Bozeman Road and Highland Colony Parkway, extending south to the Natchez Trace Parkway and the Natchez Trace National Scenic Trail. While the addition of these facilities afford the opportunity for users to switch modes (i.e. from car to bicycle) which would increase benefits due to a reduction in emissions and car-vehicle miles traveled and an increase in community health, the frequency of such usage is not known. Therefore, the impacts of these facilities are not included in the benefits calculations.

Lastly, the connectivity of the roadways will afford better access to the surrounding properties which are predominately farmlands at present. This will, in turn, make these properties more attractive for residential or commercial development. Expected increases in property values associated with this increased access has not been included nor has the value of potential economic development, thereby making this BCR much more conservative in nature.