

Appendix B – Benefit-Cost Analysis
Memorandum

Re-BUILDING University Avenue: Gateway to Our Future

Phases 2 and 3

Benefit – Cost Analysis

Supplementary Documentation

Lafayette Consolidated Government

FY2020 BUILD Discretionary Grant Program

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1 INTRODUCTION

A benefit-cost analysis (BCA) was conducted for the ReBUILDing University Avenue: Gateway to Our Future project for submission to the U.S. Department (US DOT) as a requirement of a discretionary grant application for the FY2020 BUILD discretionary grant program. The following section describes the BCA framework, evaluation metrics, and report contents.

1.1 BCA FRAMEWORK

A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms to the extent possible. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs from a national perspective. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and increases in welfare (benefits), as well as dis-benefits where costs can be identified (e.g., project capital costs), and welfare reductions where some groups are expected to be made worse off as a result of the proposed project.

The BCA framework involves defining a Base Case or “No Build” Case, which is compared to the “Build” Case, where the grant request is awarded and the project is built as proposed. The BCA assesses the incremental difference between the No Build Case and the Build Case, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project life-cycle. The importance of future welfare changes are determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by the U.S. DOT in the 2020 TIGER Benefit-Cost Analysis Guidance. This methodology includes the following analytical assumptions:

- Assessing benefits with respect to each of the five long-term outcomes defined by the U.S. DOT;
- Defining existing and future conditions under a No Build Case as well as under the Build Case;
- Estimating benefits and costs during project construction and operation, including at least 20 years of operations beyond the Project completion when benefits accrue;
- Using U.S. DOT recommended monetized values for reduced fatalities, injuries, property damage, travel time savings, and emissions, while relying on best practices for monetization of other benefits;
- Presenting dollar values in real 2018 dollars. In instances where cost estimates and benefits valuations are expressed in historical dollar years, using an appropriate Consumer Price Index (CPI) to adjust the values; and,
- Discounting future benefits and costs with a real discount rate of 7 percent (sensitivity analysis) consistent with U.S. DOT guidance.

1.2 LADOTD STAGE 0 FEASIBILITY STUDY

LCG has completed a LaDOTD Stage 0 feasibility study for the entire University Avenue Corridor. The study includes all phases of this project. LCG contracted with CSRS, Inc. a planning and engineering firm based in Baton Rouge, LA. The scope of the Stage 0 study is to examine existing conditions (traffic, land use, condition, and environment) and analyze alternatives to improve the corridor. Then, test the alternatives for feasibility via traffic demand model and Synchro simulations as well as evaluating safety components (crash reductions). The Stage 0 study began in January 2018 with a final draft presented in December 2018.

The Stage 0 indicated roadway improvements, especially with roundabouts replacing currently signalized intersections, dramatically improves the level of service, reduces congestion, and provides safer travel with less crashes and reduced severity of crashes. Also, there are few environmental concerns (one small wetlands area, not in ROW) and very little additional ROW needed for the University Avenue Corridor project.

Many of the benefits and related variables were taken from components of the Stage 0 study and applied as appropriate in this BCA.

1.3 REPORT CONTENTS

The remainder of this report provides an overview of the methodology and assumptions used to guide the Benefit-Cost Analysis for the ReBUILDing University Avenue: Gateway to Our Future project. It is organized into the following sections:

- Section 2 contains an overview of the project, including any general assumptions and a summary of the total costs and benefits.
 - Section 3 contains a description of the data and assumptions, providing a basis for the demand projections and benefit monetization.
 - Section 4 concludes with a summary of the results and a sensitivity analysis.
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2 PROJECT OVERVIEW

The Re-BUILDing University Avenue: Gateway to Our Future project will impact not only the city and parish of Lafayette, but will have dramatic improvements from current conditions for the neighboring residents by facilitating more safe and efficient travel through the University Avenue corridor, while also revitalizing a currently underutilized and somewhat vacant corridor. This Benefit-Cost Analysis was prepared by the Lafayette Consolidated Government's Department of Development and Planning.

2.1 DETAILED PROJECT IMPROVEMENTS

The requested FY20 BUILD Grant funding focuses on converting a signalized, 5-Lane major arterial with two way left turn lane into a 4-Lane with raised median and replacing the signals at three intersections with multilane roundabouts. Additionally, sidewalks, which are absent or disconnected, will be installed along the length of the project providing a safe travel alternative and additional mode for adjacent neighborhoods. The funding will permit the construction and conversion of the present University Avenue to a better functioning and urban street that incorporates "complete street" tenets such as: planted medians, street trees between curb and sidewalk, wide sidewalks, dedicated bicycle lanes, and pedestrian crossing improvements (countdown timers and refuge islands) to facilitate safety across the roadway.

2.2 GENERAL ASSUMPTIONS

The evaluation period is twenty (20) years, beginning with the current no-build year (2020) and the years the project phases are scheduled to be fully operational in 2027 and analysis of the benefits through 2045. For project costs and benefits, dollar figures in this analysis are expressed in constant 2018 dollars (\$2018), using a discount rate of 7%, as recommended by the U.S. DOT Guidance.

2.3 NO BUILD BASE CASE AND BUILD CASE

For the purposes of this BCA, the No Build Case assumes that none of the contemplated project phases would be completed, and that the existing conditions on University Avenue would remain as is today.

The proposed project represents the Build Case. The Build Case represents a multi-phase project in which all phases are built over time and includes the completion of Phases 2 and 3. This BUILD Grant application is for Phases 2 and 3 of the project.

2.4 PROJECT BASELINE

At present, University Avenue (LA 182) is a 5-lane roadway with a continuous two way left turn lane serving as major arterial and is a mix of single-family homes (some converted to business or office), aging store-fronts, industrial warehouses and significant vacant land. It is a north/south corridor linking Lafayette to Carencro to the north and the Lafayette Regional Airport to the south. University Avenue hosts several community institutions and civic assets connecting to the extent of this project such as the Lafayette Consolidated Government

Complex, the University of Louisiana at Lafayette (the road’s namesake), Downtown Lafayette, Lafayette City Police Headquarters, Lafayette Regional Airport, and numerous businesses.

2.4.1 PROJECT FUNDING

The University Avenue project is multi-phased (total of two (2) phases) with Phases 2 and 3 being the focus of this funding request.

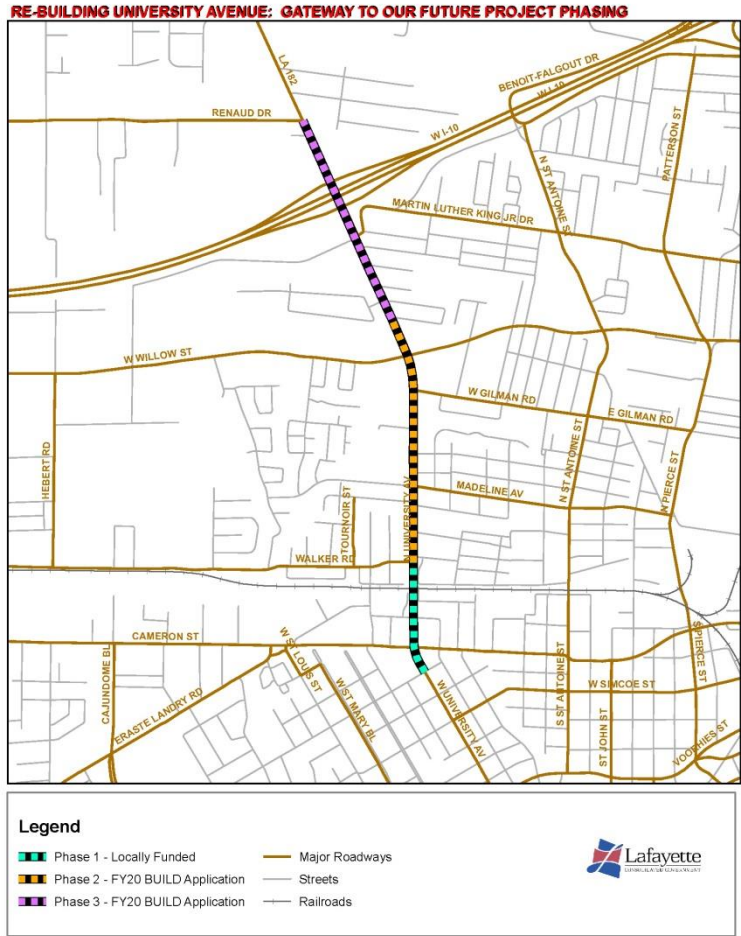
The baseline assumption is that Phases 2 and 3 of the University Avenue project will be funded by the Lafayette Consolidated Government and this grant application (if successful), with Phase1 already being approved and funded by a mixture of federal and state transportation grants and local capital improvement funds.

Funding Source	Phases 2 and 3 Total Project Cost	Percent by Source
FY20 BUILD Grant	\$23,298,964	80.00%
LCG Capital Outlay	\$5,824,741	20.00%
TOTAL	\$29,123,705	100%

2.4.2 PROJECT PHASING AND SCHEDULE

Re-BUILDING University Avenue Project Phasing and Construction Schedule

	Phase 2	Phase 3
Begin Year	2021	2021
End Environmental	2021	2023
Engineering	2022	2023
Begin Construction	2023	2024
End Construction	2025	2027



Phases 2 and 3 includes the following elements: environmental, survey, and development of program specification and design for the remaining segments of University Avenue; construction and retrofit to a four-lane street with channelized left turns, installation of J-Turns, raised and, in some cases, planted median; and, a sidewalk with associated landscaping and canopy tree plantings. A bike lane is planned as part of Phase 3 including dedicated access under the Interstate 10 overpass where LADOTD does not currently allow pedestrian or bike access. Phase 2 extents are along University Avenue from Walker Road northward to Wilshire Lane. Phase 3 extents are along University Avenue from Wilshire Lane to Renaud Drive.

Phase 2 of the project focuses on completing program specification and engineering from Gilman Road to Wilshire Lane. In addition, this phase includes the construction of a multilane roundabout at the University Avenue and Willow Street intersection. Additional activities include retrofit construction from Walker Road to Gilman Road from a five-lane to four-lane street with raised and, in some cases, planted median, as well as a pedestrian zone with sidewalks, landscaping, and canopy tree plantings.

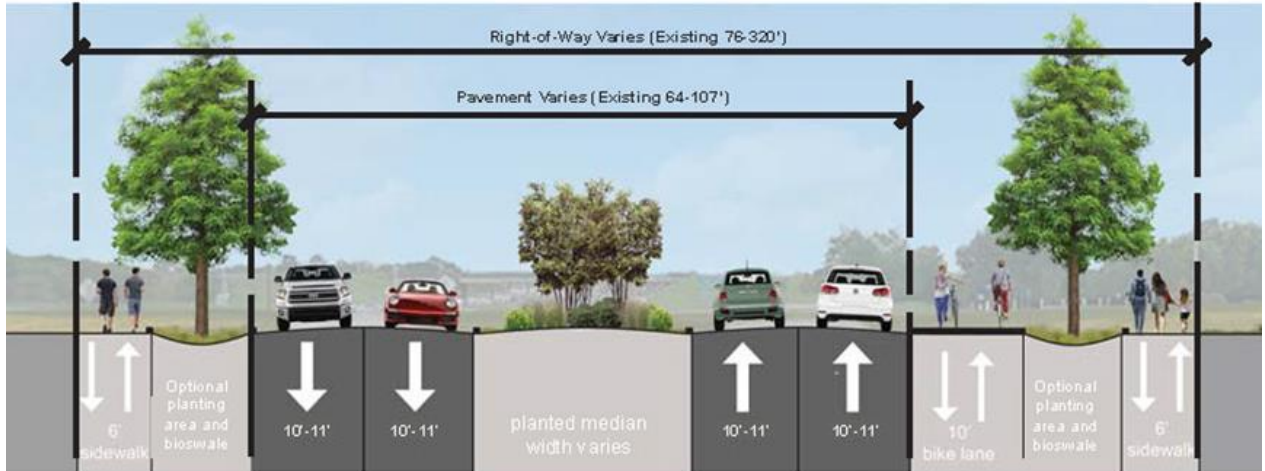


FIGURE A: Rendering of University Avenue Cross-Section and Improvements in Phase 2

Phase 3 includes adding a raised median to the current roadway section including a ten (10) ft. bike lane and six (6) ft. sidewalk with landscaping and canopy tree plantings. The raised median could be up to twenty (20) ft. wide in this section. Extents are along University Avenue from Walker Road northward to just south of Renaud Drive. Additional improvements include the construction of two multilane roundabouts – at the intersections of Willow Street and University Avenue and Alcide Dominique and University Avenue.

For portions of Phase 3 along University Avenue southward from Alcide Dominique to just south of Renaud Street that traverses beneath Interstate 10 and has exit/entrance ramps on both the east and west approaches, improvements include multilane roundabouts at the I-10 intersections to replace the signalization and tie the exit/entrance ramp together, six (6) ft. sidewalks, a ten (10) ft. bike lane, and a raised median.

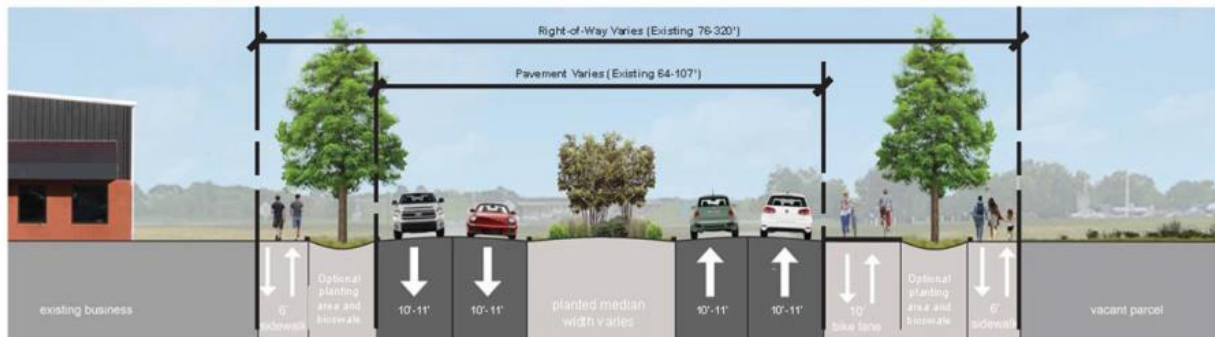


FIGURE B: Rendering of University Avenue Cross-Section and Improvements in Phase 3

2.5 PROJECT JUSTIFICATION AND ECONOMIC BENEFITS

The University Avenue retrofit and conversion will impact not only the city and parish of Lafayette, but will have dramatic improvements from current conditions for the neighboring residents by facilitating more safe, efficient and attractive travel through the University Avenue corridor, while also revitalizing a currently underutilized corridor. The proposed improvements will dramatically decrease accidents and related severity in the area with the installation of a

raised median and roundabouts, increase landscaping and added trees to provide relief from heat-island effects, and provide additional modal transportation choices with improved quality of life through the re-connection of neighborhoods to the project corridor.

2.6 PROJECT COSTS

Capital costs for the Re-BUILDING University Avenue Corridor project are detailed in Table 1 below and include costs for the remaining phases of the project - Phases 2 and 3, which is the request as part of the FY20 Build Grant application. The estimated project improvements total \$11,259,368.66 and \$17,864,335.72 (\$2018), respectively.

Table 1: Phase 1 - 3 - Re-BUILDING University Avenue Project Capital Costs (\$2018) Entire Corridor Based on Opinion of Probable Costs – CSRS, Inc.

Phase 1 - 3 – Re-Building University Avenue Entire Corridor	Cost
Environmental Study	\$126,830
Survey and Engineering	\$2,663,884
Right of Way Acquisitions	\$1,139,439
Utility Relocation	\$5,681,061
Construction	\$15,804,930
Contingency (20%)	\$4,913,518
Construction Related Costs	\$6,119,993
TOTAL PHASE 3 PROJECT COST	\$36,449,655

Table 2: Phases 2 and 3 - Re-BUILDING University Avenue Project Capital Costs (\$2018) Based on Opinion of Probable Costs – CSRS, Inc.

Phases 2 and 3 – Re-Building University Avenue	Cost
Environmental Study	\$76,830
Survey and Engineering	\$1,865,267
Right of Way Acquisitions	\$960,211
Utility Relocation	\$4,758,461
Construction	\$12,515,070
Contingency (20%)	\$4,035,168
Construction Related Costs	\$4,912,698
TOTAL PHASE 3 PROJECT COST	\$29,123,705

Phase 2 of the project is scheduled to start with an environmental study in 2021 followed by survey and plan specification and engineering and construction beginning in 2022 and ending in 2025.

Phase 3 of the project is scheduled to start with an environmental study in 2021 followed by survey and plan specification and engineering and construction beginning in 2023 and ending in 2027.

The entire project corridor is scheduled to be completed by 2027.

Total project costs were compiled by using opinion of probable cost estimates developed by CSRS, Inc. in 2018 in conjunction with a LaDOTD Stage 0 feasibility study.

It requires substantial investment to retrofit the University Avenue corridor into a four-lane with raised median and construct roundabouts to realize a true multimodal corridor and enjoy the benefits as quantified. Although the capital costs for the entire project, inclusive of Phases 2 and 3, are expected to be >\$36 million, the structure will have a significant lifespan reaching well beyond the 20-year evaluation period.

3 Cost-Benefit Analysis Data

3.1 PROJECT BENEFITS

The University Avenue Corridor project generates both monetized and qualitative benefits. The monetized benefits manifest primarily through safety improvements and the addition of bicycle improvements via a fifteen (15) ft. pedestrian and multi-use zone along Phase 1 (not part of the FY19 BUILD Grant application) as well as sidewalks and bike lanes for the entire corridor (Phases 2 and 3). Additionally, the cyclists that will be induced to use the multi-use zone, bike path, and sidewalks are expected to enjoy mobility and health benefits, as well as assisting in congestion reduction as a modest mode-shift from vehicle to bicycling can be made on short outings.

This project is expected to produce other, non-quantifiable benefits that are not accounted for in the BCA, such as quality of life increases by having access to a transportation facility with complete street amenities and restored and/or new neighborhood connections.

The Louisiana Department of Traffic and Transportation (LaDOTD) has produced a detailed 40 year schedule for the costs and cycle of maintaining and replacing both roadways and traffic signals, and related equipment/materials, and was used in this analysis.

It is important to note the University Avenue Corridor project has completed a LaDOTD Phase 0 feasibility study examining road design and geometric alternatives, current and future land uses, other modal alternatives and possibilities, and an opinion of probable cost for feasible improvements. The Stage 0 study involved multiple community/public meetings with public participation on chosen elements and alternatives. The public participation for the Stage 0 was outstanding by any measure and highly localized to business owners and residents of the immediate area. Table 3 below provides an overview of the benefits that will result from the Re-BUILDing University Avenue project.

Table 3: Project Benefit by Long-Term Outcome Category

Long-Term Outcome	Benefit Category	Description	Monetized	Qualitative
Safety	Incident Reduction	Avoided incidents (crashes) for existing pedestrians and vehicles due to implemented countermeasures	<input checked="" type="checkbox"/>	
State of Good Repair	Reduced Road and Traffic Signal Maintenance and Wear	Introduction of raised median and roundabouts eliminates or reduces costs associated with road and signal maintenance	<input checked="" type="checkbox"/>	
Economic Competitiveness	Reduced Congestion and Time Savings	Lower congestion means less time in traffic, less time idling, and less time traveling to a destination.	<input checked="" type="checkbox"/>	
	Real Estate Value Increases	Increases to land values along the project corridor, leading to redevelopment and increased opportunities for local residents	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Livability	Increased Benefits of Cycling	Increased physical activity and improved health reduces medical costs, benefits from time spent performing recreational activity, and reduction in vehicles due to travel modal shift	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Environmental Competitiveness	Reduced Emissions	Lower auto usage results in reduced vehicle emissions	<input checked="" type="checkbox"/>	

3.2 SAFETY

Benefit Type	Phases 2 and 3	
	Benefit	Discounted 7%
Crash and Severity Reduction Value	\$50,485,870	\$21,211,585

The safety benefits assessed in this analysis include a reduction in fatalities, injuries and severity as well as a reduction in other property damage crash costs resulting directly from the project. The analysis utilized the Crash Modification Factors (CMF) Clearinghouse as the primary resource to calculate changes in crash rates due to construction and completion of the proposed design for University Avenue. CMFs are assigned for specific roadway improvements to represent an expected increase or decrease in crashes relative to the No Build Figure. Due to the ability of the LADOTD’s and Louisiana Highway Safety Commission’s CRASH 1 database to

identify crashes by location (X and Y coordinates), the safety analysis was completed for the entire corridor; however, values utilized for the FY20 BUILD grant narrative are derived from Phases 2 and 3 only.

Reduction in Automobile Crashes and Severity. The raised median within Phase 2 of the University Avenue project reduces the number of severe crashes and overall crash frequency significantly providing a CMF of 0.53. The multilane roundabouts replacing signalized intersections in Phases 2 and 3 also provide significant crash reduction and related severity with a CMF of 0.74. Additionally, a roundabout is proposed as a stop controlled intersection, thus providing a CMF of 0.95. The CMFs were applied to the traffic and pedestrian crash data provided by the Acadiana MPO and derived from the Louisiana DOTD for the years 2014-2016. The data was tabulated and valuations were then established according to rates of injury and projected over a twenty year term of the study.

Table 4: Safety Benefits Assumptions and Sources

Variable	Unit	Value
Value of statistical life	\$2018 per incident	\$1,585,589
Monetized value of a severe injury incident	\$2018 per incident	\$410,536
Monetized value of a moderate injury incident	\$2018 per incident	\$120,440
Monetized value of an injury complaint incident	\$2018 per incident	\$26,134
Monetized value of a property damage only incident	\$2018 per incident	\$6,971

*The Louisiana DOTD uses a state-specific cost of crashes that are developed by the Highway Safety Research Group on an annual basis. The Louisiana DOTD crash figures, classification and costs cannot be converted to the crash and injury reporting systems and associated costs that are guidance for FY20 BUILD applications.

3.3 STATE OF GOOD REPAIR

Benefit Type	Phases 2 and 3	
	Benefit	Discounted 7%
Reduced Roadway and Signal Maintenance and Wear	\$2,350,690	\$1,087,613

Maintenance and Repair Savings. The Louisiana DOTD has published maintenance figures and schedules for roads based on road type. Currently, University Avenue consists of jointed concrete pavement in very poor condition. Based on the very poor condition of the roadway, a no build scenario would require maintenance and later an intensive rehabilitation schedule. Constructing a 4-lane roadway with raised median will lead to a decrease in maintenance costs. A Florida Department of Transportation Study published in 2006 (FHWA, 2006) discovered that a median saves 40% per year on maintenance over a 20 year lifespan. This savings is realized by applying it to the Louisiana DOTD road maintenance and rehabilitation cost schedule.

The assumptions used in the estimation of good repair benefits are presented in the following table.

Table 5: State of Good Repair Benefits Assumptions and Sources

Variable	Unit	Value
Roadway Routine Maintenance	2018\$ Annually Per Mile	\$4,676
Roadway Seal Joints / Cracks	2018\$ 10 Years Per Mile	\$87,232
Roadway Major Rehabilitation	2018\$ 20 Years Per Mile	\$1,259,892
Traffic Signal Routine Maintenance	2018\$ Annually Per Mile	\$2,650
Traffic Signal Controller Replacement	2018\$ 10 Years Per Mile	\$33,126

3.4 ECONOMIC COMPETITIVENESS

Benefit Type	Phases 2 and 3	
	Benefit	Discounted 7%
Travel Time Savings	\$340,861,968	\$81,091,743

Travel Time Savings. Improving the operations of the University Avenue project area will create time savings for travelers during both the morning and afternoon peak hours. Using traffic modeling data provided by Vectura Consulting and the Acadiana MPO and projected for growth through 2040, a total time savings calculation could be approximated for project area traffic based on peak hour estimates from on-site counts and the travel demand model for the urbanized area. The average car/truck ratio and valuation of time based on figures provided by the BCA Guide (US DOT, January 2019) was used in this analysis.

Once construction of the project ends and it becomes fully operational there are significant delay reductions and increases in level of service. The roundabouts servicing the project via Phase 3 increase level of service from LOS D/E to LOS A, while the roundabout servicing Phase 2 increased level of service from LOS D to LOS B. The delay reductions are significant (travel time savings), and with the installation of a roundabout at the I-10 Westbound ramp, delay is reduced from a 2040 No Build value of 84.7 (seconds/vehicle) to a 2040 BUILD value of 3.4 (seconds/vehicle)!

With Vectura Consulting providing model data on geometric design alternatives for both 2020 and 2040, a trend line analysis was used providing a linear estimate for traffic in each year of analysis. The trend line analysis utilized delay conditions (vehicle per second) and vehicle counts during peak hour to determine the number of vehicle-hours traveled in a No Build and Build conditions for each year of analysis. The variables utilized for the trend line analysis are in Table 7 of the BCA Calculations spreadsheet for Economic Competitiveness.

It is anticipated that there will be minimal and possibly standard driving delays in the construction zone by carefully phasing the construction plan. We assume that during peak construction periods all currently available lanes will be available except during short intervals for equipment mobilization and delivery of construction materials.

Table 6: Economic Competitiveness Benefits Assumptions and Sources

Variable	Unit	Value
Value of Travel Time Savings – All Purposes	\$2018 Per Hour Per Person	\$16.60
Average Vehicle Occupancy	Persons Per Vehicle	1.68
Value of Time for Average Occupancy	\$2018 Per Hour	\$27.72
Number of Workdays Per Year	Annual	260
Peak Hour Traffic Intersection Delay	Seconds Per Vehicle	Varies by Intersection

3.5 ENVIRONMENTAL COMPETITIVENESS

Benefit Type	Phases 2 and 3	
	Benefit	Discounted 7%
Emissions Reduction	\$712,055	\$200,114

This project will create environmental benefits relating to reduction in air pollution associated with decreased vehicle travel. Five forms of emission were identified, measured and monetized, including: nitrous oxide (NOx) and volatile organic compounds (VOCs).

Reductions. Through transportation investments in the University Avenue construction, a reduction of travel time is expected in the study area through reduction of congestion and the increase in level of service at currently congested intersections.

Table 7: Environmental Competitiveness Benefits Assumptions and Sources

Variable	Unit	Value
Peak Hour Traffic Intersection Delay	Seconds Per Vehicle converted to Vehicle Hours Travelled	Varies by Intersection
Value of Emissions	\$2018 Per Metric Ton	NOx - \$9,473 VOC - \$2,313
Idling Pollution Emission by Mode	g/VHT	NOx – 3.515 VOC – 2.683

3.6 QUALITY OF LIFE

Increased Transportation Choices. Existing conditions feature a fragmented and incomplete network of sidewalks. Because sidewalks are generally non-existent and, if available, do not meet ADA specifications, the local transit system suffers from usage in the area as bus stops are not shaded or protected from the environment (sun and rain). After University Avenue is retrofitted, transit users will have safe and accessible platforms to better utilize public transportation and impart more accessibility.

Benefit Type	Phases 2 and 3	
	Benefit	Discounted 7%
Cyclists – Health and Recreation	\$62,691,249	\$32,195,707

Bicycle Facilities and Benefits. Utilizing local population figures in the immediate project area, Census modal commuter data and value of time, an estimate can be derived for benefits to the project area and positive roadway operation effects by increases in the use of a dedicated bicycle facility. Taking into account the working population within the project area that commute to work by bicycle and utilizing estimation tools provided by the Transportation Research Board (NCHRP, 2006), there will be an increase in adults who commute by bicycle. A summation of health benefits due to activity from bicycling, health cost savings, recreation benefits, and reduced auto use (congestion reduction) provides a quantifiable benefit to the project.

Table 8: *Quality of Life Benefits Assumptions and Sources*

Variable	Unit	Value
Project Corridor Population	Number	7,992
Population Over 18 Years Old	Percentage of Population	72.8%
Annual Population Growth	Percentage	0.993%
Commute to Work on Bicycle	Percentage of Working Population	0.8%
Average Trip Length	Miles	8.0
Adults Who Commute	Percentage	50%
Commuting Days Per Year	Number	260

4 Summary of Results

4.1 EVALUATION MEASURES

The benefit-cost analysis converts potential gains (benefits) and losses (costs) from the entire corridor into monetary units and compares them. The following common benefit-cost evaluation measures are included in this BCA.

Net Present Value (NPV)

NPV compares the net benefits (benefits minus costs) after being discounted to present values using the real discount rate assumption. The NPV provides a perspective on the overall dollar magnitude of cash flows over time in today's dollar terms.

Benefit Cost Ratio (BCR)

The evaluation also estimates the benefit-cost ratio; the present value of incremental benefits is divided by the present value of incremental costs to yield the benefit-cost ratio. The BCR expresses the relation of discounted benefits to discounted costs as a measure of the extent to which a project’s benefits either exceed or fall short of the costs.

4.2 BCA RESULTS

An examination of the monetized benefits resulting from the construction of Phases 2 and 3 of the University Avenue project relative to the project’s cost reveals that it yields a benefit-cost ratio of \$17.32 for every \$1.00 invested, undiscounted. The discounted benefit-cost ratio is \$7.35 for every \$1.00 invested. Again, this result is based on a seven-percent (7%) annual discount rate and does not include the significant permanent benefits expected to accrue from the property and private development as well as related increases in sales and property taxes mentioned in the grant narrative. This benefit-cost analysis is grounded in a conservative set of assumptions underlying the project’s benefits and costs. A full accounting of all the projects benefits and costs can be found in the Benefit Cost Analysis spreadsheets in the Appendix C.

BCA Summary	Entire Corridor	
	Undiscounted	Discounted 7%
Total Benefits	\$486,225,537	\$164,910,467
Total Costs	\$29,123,705	\$21,672,047
Benefit-Cost Ratio	16.70	7.61