BUILD Grant 2020

City of
TUSCALOOSA

TUSCALOOSA LANDING AREA PROJECT

BUILD Transportation Grant Proposal

Contents

Project Description

The City of Tuscaloosa requests $20 million from the U.S. Department of Transportation (DOT) for a BUILD grant for the *Tuscaloosa Landing Area Project*. The purpose of this multimodal project is to provide safer and more connected access to various modes of transportation, including river, pedestrian, and automobile. Funding through the DOT BUILD program will allow for increased modes of transportation to further citizen safety, the further development of the Riverwalk and improve the potential economic development for the largest underserved geographical area within the City of Tuscaloosa.

The existing Riverwalk cost under $6 million to build and has resulted in nearly $100 million of private development adjacent to it, north of Jack Warner parkway. The Riverwalk is currently a 4.5-mile paved pedestrian pathway along the south edge of the Black Warrior River. The Riverwalk uses include lodging, mixed use developments, offices, and restaurants as well as the Riverwalk itself and River Market, uses include an event venue and weekly farmer's markets, and the 7400 seat Amphitheater. In addition, there has been significant public development south of Jack Warner Parkway.

The *Tuscaloosa Landing Area Project* consists of four components. The elements are part of the longer term Elevate Tuscaloosa plans, and can stand alone as individual projects.

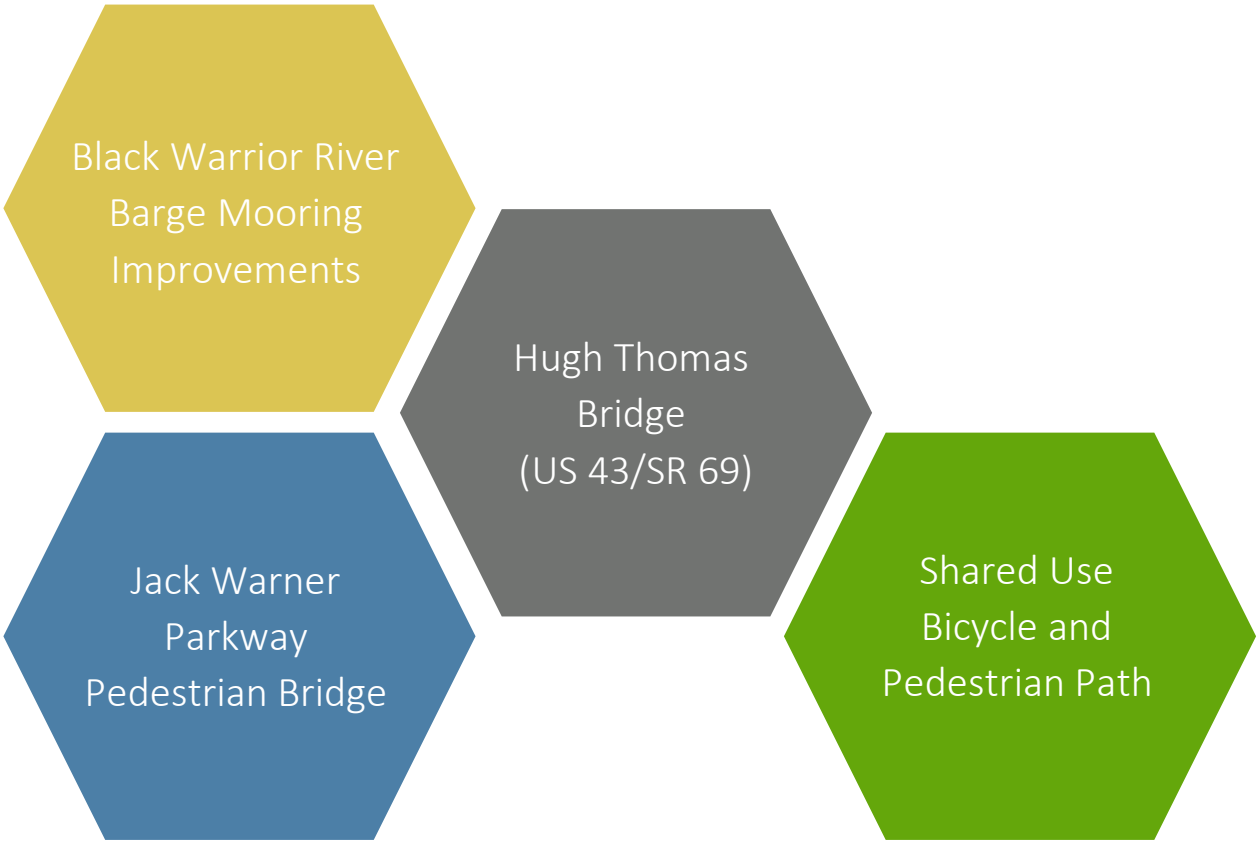


Figure 1: Proposed Renderings of Tuscaloosa Landing Area

Project Area

The Black Warrior River's scenic beauty, history, cultural significance, and proximity to several of Tuscaloosa's major features creates a very distinctive palette for a public greenspace. The natural amenities along the Black Warrior River offer the anatomy of a park, offering residents and visitors the opportunity to engage in both passive and active outdoor activities.

The project area on the South side of the Black Warrior River has a western boundary of 43rd Avenue and extends east (upstream) to Woolsey Finnell Bridge. On the North side of the Black Warrior River, the project's western boundary is the connection to the Northport Riverwalk at the Northport city limits and extends east terminating at two locations. The first is near the Paul Bryant Bridge and the second terminus is at the Lake Tuscaloosa/Rock Quarry Schools/Phelps Activity Center area.

The project's study area is much larger. Stronger connections to other important land uses were identified and studied. These included local industry, Stillman College (a small historical black college), additional connections to the University of Alabama and City Walk, a shared use path.

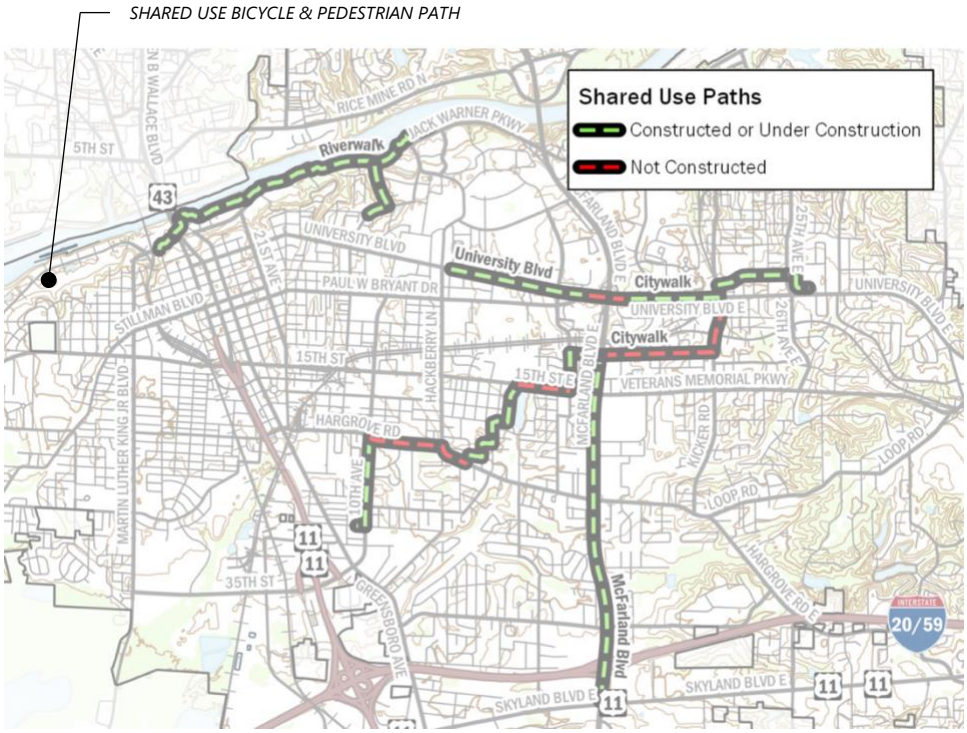


Figure 2: Shared Use Paths, City of Tuscaloosa, UA Campus, Master Plan 2017

The West Tuscaloosa Community was developed around and associated with the railroads and local industries. The planning study area initially was bounded on the north by the Black Warrior River, on the east by Martin Luther King Boulevard with 10th Avenue in the center, on the south by Moody Swamp and on the southwest and west by ragged edges of existing development.

The density of man-made features varies considerably across West Tuscaloosa, in part because of its history, and who owned—and now owns—the land and when it was developed. Major institutions such as schools and hospitals, industrial properties and shopping centers are easy to locate by their large size and the considerable open space around them. The patterns of smaller commercial properties and buildings along the larger streets are apparent, as are those of the various types of housing, especially the apartments and single-family, detached forms.

Elevate Tuscaloosa

If chosen for award, the *Tuscaloosa Landing Area Project* will be funded in part by Elevate Tuscaloosa. Elevate Tuscaloosa was adopted by the City Council, specific initiatives were included for immediate funding, future construction, or additional study to determine feasibility. The Advisory Council engages with the community, city staff, and technical experts to provide input, ideas, feedback, and guidance for the process. This approach ensures the investments made with Elevate Tuscaloosa will be impactful in the city for years to come.

Elevate Tuscaloosa is a community-driven plan and process for strategically investing in education, cultural arts, tourism, parks, recreation, and connectivity. A 30-member volunteer advisory council is led by two co-chairs, who together represent a wide swath of the local economy and community. This body is divided into three subcommittees: Connectivity; Cultural Arts and Tourism; and Parks and Recreation. From each subcommittee, two members also serve on the Financial Analysis Subcommittee, a group charged with considering accountability, transparency, economic impact, and financial sustainability of Elevate initiatives.

Elevate is currently proposing to invest $127,500,000 over the next 10 years in Tuscaloosa's experience economy. These projected investments include experience venues, outdoor and recreational facilities, and events. The decision to invest in an experience-based economy through Elevate was based on Tuscaloosa's unique demographics. Three local colleges and universities afford Tuscaloosa with a student enrollment of nearly 40,000, resulting in a noticeably younger population. Currently, nearly three-quarters of graduates choose where to live based on quality-of-life. A major goal of Elevate Tuscaloosa is to expand offerings to residents, to increase retention through high-quality experiences, including performing arts, sporting events, parks and recreation through projects like the *Tuscaloosa Landing Area*.

History of Tuscaloosa

The site of the future City of Tuscaloosa on the "Fall Line" of the Black Warrior River had long been well known to the various Native American tribes whose shifting fortunes brought them to West Alabama. The river shoals at Tuscaloosa represented the southernmost site on the river which could be forded under most conditions. Inevitably, a network of Native American trails converged upon the place, the same network which, in the first years of the 19th Century began to lead a few intrepid frontiersmen to the area. The pace of new settlement increased greatly after the War of 1812, and a small assortment of log cabins soon arose near the large Creek Native American village at the Fall Line of the river. In honor of the legendary "Black Warrior", the settlers named the place Tuscaloosa (from the Choctaw words "tushka" meaning warrior and "lusa" meaning black). In 1817, Alabama became a territory, and on December 13, 1819, the territorial legislature incorporated the town of Tuscaloosa, exactly one day before Congress admitted Alabama to the Union as a state. Thus, the City of Tuscaloosa is one day older than the State of Alabama.

Throughout the history of Tuscaloosa, the Black Warrior River has played a critical role in Tuscaloosa's growth and development. The construction of a system of locks and dams on the Black Warrior River by the U.S. Army Corps of Engineers in the 1890's created a more navigable connection to the Gulf seaport of Mobile, stimulating industry, particularly the mining and metallurgical industries of the region. Today, the Black Warrior River continues to operate as a vital commercial waterway, but also offers recreational opportunities.

Tuscaloosa is currently the fifth-largest city in Alabama and has experienced tremendous growth in the last ten years. The growth is attributed to the rapid enrollment increase at the University of Alabama, growth and expansion at the Mercedes-Benz manufacturing facility and the continued investment by the City to improve quality of life. One of those quality of life projects has been the Riverwalk which has been an extremely popular addition to the City's park system.

History of the Riverwalk

A Riverwalk Master Plan was completed in 2003. The 2003 master plan had a similar project area and scope of work but focused more on the areas closest to downtown and the University of Alabama. Since completing the plan in 2003, the City of Tuscaloosa has constructed the Amphitheater and four (4) phases of the Riverwalk, creating vibrant greenspaces and activity nodes serving and complimenting the Black Warrior River, City of Tuscaloosa, University of Alabama and the many other adjacent land uses.

The Tuscaloosa Amphitheater was completed and opened on April 2, 2011. It hosts numerous concerts and events throughout the year, with roughly 81,000 people in attendance each year. The Amphitheater also serves as a Riverwalk gateway, offering trail access and daily use of available parking.

All told, there are a variety of park areas along the existing 4.5 miles of trail. The primary pathway and secondary paths offer benches, gazebos & hammock-friendly trees for quick breaks and picnics. The four (4) completed phases also provide a playground near the Public Library and a splash pad for children near a centrally accessible river cruise boat dock. The trail is well lit, secure, and a staple for recreation and access in the community.

Project Location

Tuscaloosa is a regional center for education, employment, and health care opportunities. Key among these are the University of Alabama (UA), Mercedes Benz USI (MBUSI, the North American factory for Daimler), the DCH Health System, the Alabama Department of Mental Health Bryce Hospital (ADMH), and KCS & Norfolk Southern. Table 1 shows some of their key characteristics.

Table 1: Key Characteristics

Key Facilities	Facility Characteristics		
University of Alabama	13,200 Employees	38,500 Students (Tuscaloosa Campus)	
Mercedes Benz USI	7,000 Employees	8,000,000 Square Feet	
Alabama Dept. of Mental Health	539 Employees	268 Beds	300 Patients
DCH Health System	3,500 Employees	568 Beds	600 Patients (per day)
KCS & Norfolk Southern	Operates 21,500 Route Miles of Tracks		

The site of the *Tuscaloosa Landing Area Project* is in an area that has always been a transportation hub. As noted above, a network of Native American trails converged on this area of Tuscaloosa. The modern transportation network echoes this same pattern, and there is a natural convergence of pedestrian, river, vehicular and bicycle traffic in this location. While the network is largely in place, there are gaps; filling these gaps is critically important to ensure safety and provide an accessible and appealing transportation ecosystem that can provide a backdrop for further economic development while also meeting the infrastructure demands of the growing population. This project fills the gaps by providing safe and connected access among these various modes of transportation.

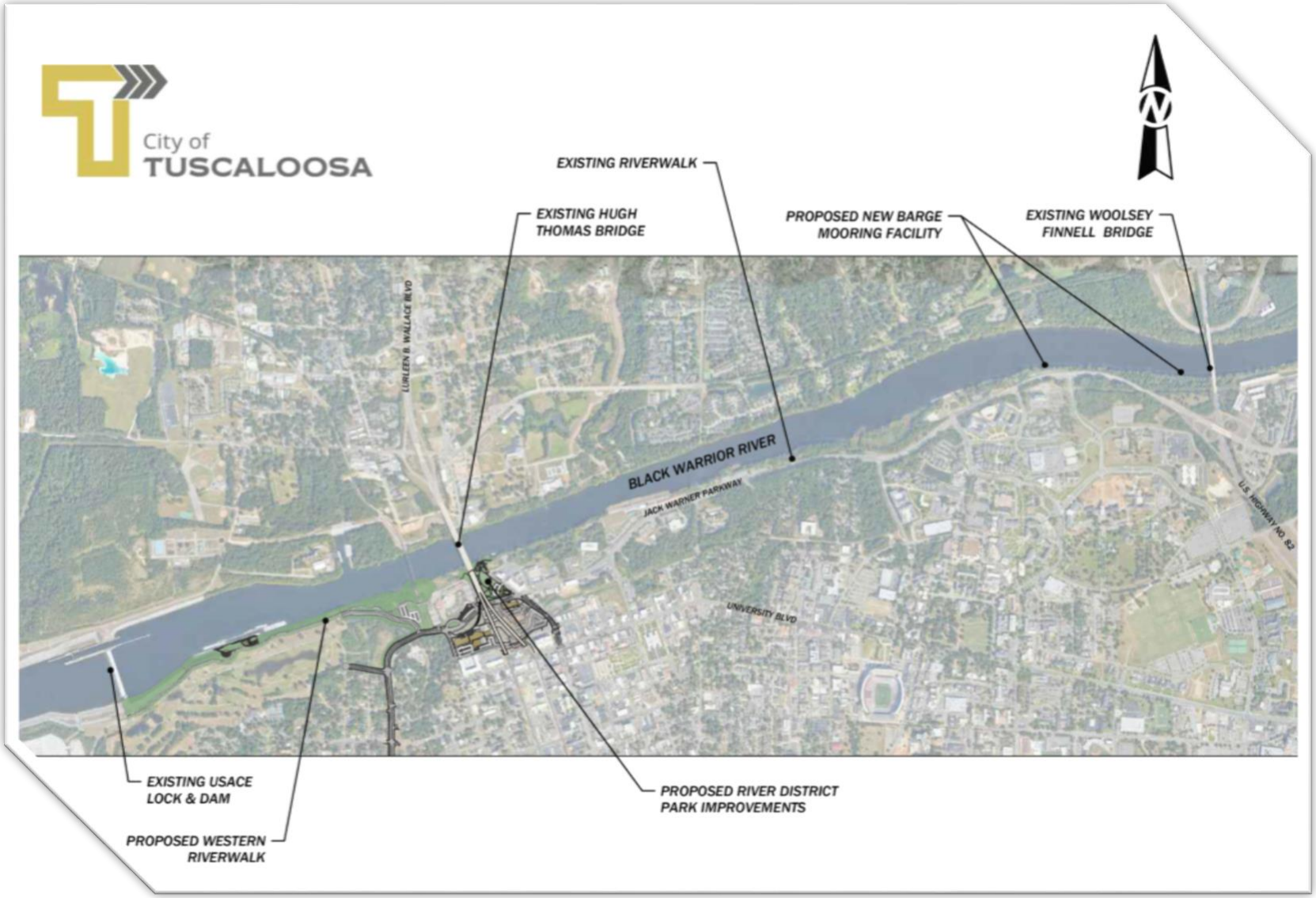
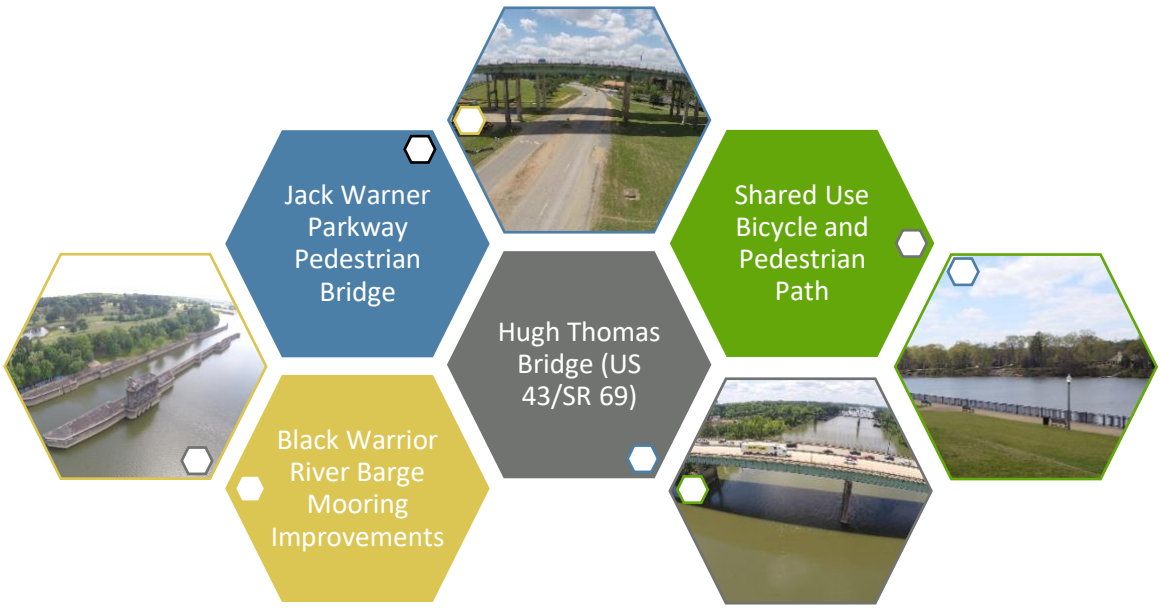


Figure 3: Project Components

Project Components



Black Warrior River Barge Mooring Improvements

The expansion of industry serviced by barges along the Black Warrior River has been vital to West Alabama for over 100 years. To continue to provide adequate service for the numerous industries and manufacturing companies located along the river, adequate barge storage is required. The existing Oliver Pool of the river does not include enough dedicated mooring facilities to meet current needs. The abandoned lock walls of the former Oliver Lock and Dam, decommissioned in 1994, are used for overflow barge mooring. This location is on the far southwest end of the Oliver Pool located just upstream of the current Oliver Dam.

Figure 4: Current Mooring Location

Numerous possible locations for an improved mooring facility were evaluated along the Oliver Pool. Options included sites on both the north and south banks of the river that would not have an impact on navigability or adjacent riverfront residential areas. Three sites along the southern bank were identified and further evaluated. The site selected is the only location on the river that is

adjacent to property owned by the City of Tuscaloosa, along a wider area of the river on this pool, and with the needed 1,600 feet of length needed for the barge storing area. This site is located just south of the Woolsey Finnell Bridge and just north of the University of Alabama's Manderson Landing Park. It is a location with old timber mooring infrastructure and an acceptable location for the City of Tuscaloosa and The University of Alabama. By the nature of its location on the Black Warrior River, barge traffic from this area has direct access to the Port of Mobile. The Port of Mobile is the largest break bulk forest products port in the United States, and the Alabama State Port Authority's McDuffie Terminal is one of the largest coal terminals in the United States and largest import coal terminal.

Hugh Thomas Bridge (US 43/SR 69) Pier Protection

Along with river transportation, one of the most critical components of economic vitality for West Alabama is the existing roadway system. The roadway with the highest Average Daily Traffic (ADT) Count in West Alabama is Lurleen Wallace Boulevard (U.S. Highway No. 43 and Alabama Highway No. 69) that crosses the Black Warrior River and connects the cities of Tuscaloosa and Northport. This bridge carries over 70,000 vehicles per day with a high percentage of trucks. The bridge that connects the two cities and provides vital river crossing is the Hugh Thomas Bridge. Completed around 1970, the bridge is in need of much improved infrastructure. Loss of this bridge would be crippling to the West Alabama and Tuscaloosa economies and have major impacts to vehicular traffic in the region.

Figure 5: Proposed location of Pier Protection

The City of Tuscaloosa and Alabama Department of Transportation have invested over $20,000,000 in the last year in improvements to Lurleen Wallace Boulevard to provide higher traffic capacity and safer intersections throughout the corridor just north of the bridge. The main exposure to possible loss of service to this bridge is the potential for significant structural damage to one of the bridge piers in the river. An accident on the water could potentially be catastrophic to the community. Protection of these piers via development of upstream coffer cells would ensure safe use of the bridge for years to come.

Jack Warner Parkway Pedestrian Bridge

The need for a pedestrian bridge at the Jack Warner Parkway is imperative for the continued growth of West Tuscaloosa. The Jack Warner Parkway Pedestrian Bridge will provide connectivity to the River District Park and the Riverwalk. At this location, several transportation elements and a significantly expanding entertainment district are coming together.

Figure 6: Proposed Location of Pedestrian Bridge

Just south of the banks of the river and just west and below the Hugh Thomas Bridge is a pending roadway project by the City of Tuscaloosa. The +/- $30,000,000 four lane extension of Jack Warner Parkway to Martin Luther King, Jr. Boulevard (JWP/MLK) is scheduled to begin construction in late 2020. The project is being developed as an improvement to a major east / west transportation corridor in an area with other significant City investment. Just to the north of the roadway is the 7,400 seat Tuscaloosa Amphitheater. Other than a few onsite parking spaces, many of the event attendees are pedestrians coming from the south and the downtown area.

A recently announced project on the south side of the proposed JWP/MLK project is the redevelopment of the Tuscaloosa News building into what will become the Saban Center. The new center will be home to the Tuscaloosa County Public Library, the Tuscaloosa Children's Theater, and the Children's' Hands on Museum (CHOM). With these experience venues ramping up, existing parks and downtown within walking distance, and emerging housing and hotels in the area, there is going to be a significant increase in pedestrian activity in the area. With increased pedestrian access in this area, there is much more opportunity for residents to live, work, and play without the need of a vehicle. The significant increase in pedestrian traffic, history of vehicular/pedestrian accidents, and increased vehicular volumes with the JWP /MLK project, a grade separation for pedestrian traffic is needed.

Shared Use Bicycle and Pedestrian Path

As previously noted, the City of Tuscaloosa developed a masterplan for a shared use path that would run from the Holt community in the east to the West End community on the western end. Much of the path has already been developed to the east but lacks a connection to the low- and moderate-income areas to the West. The proposed project will include development of the shared use path from the proposed Jack Warner Parkway pedestrian bridge to the existing U.S. Army Corps of Engineers riverfront park to the west. The route will include several shared use pedestrian and bicycle bridges along with lighting and security elements. The project will also include redevelopment of the previously abandoned lock wall that will no longer serve as a temporary mooring structure with development of the proposed improved facilities. This area will serve as a major trail head for the overall Riverwalk.

Figure 7: Current Pedestrian Path

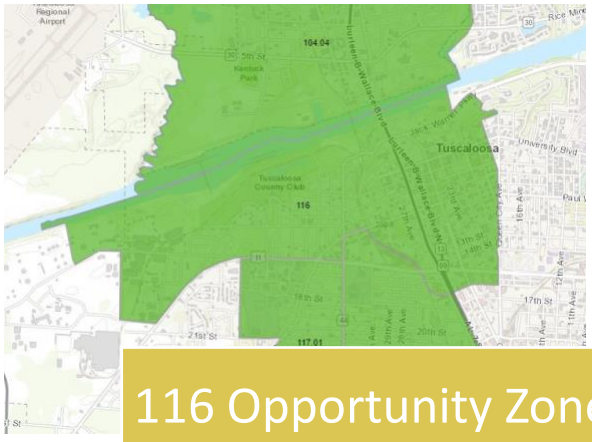
Opportunity Zone

Tuscaloosa County has ten (10) geographic areas certified by the United States Treasury as economic Opportunity Zones. These zones were created by the Federal Tax Cut and Jobs Act of 2017 and are designed to stimulate private, long-term investment in economically distressed areas.

The *Tuscaloosa Landing Area Project* is in one of the geographic areas certified as an Opportunity Zones.

Projects In the 116 Opportunity Zone

- Census Tract 01125011600
- Area: Downtown Tuscaloosa and west Tuscaloosa north of Stillman Blvd.
- Total Population: 2,844 (-26.9%)
- Total Housing Units: 1,221 (-17.5%)
- Median Age: 35.7
- More Data: http://www.usboundary.com/Areas/432357



116 Opportunity Zone

Grant Funds, Sources and Uses of Project Funds

The City of Tuscaloosa is requesting $20 million in BUILD Grant Funding with a match of $5 million from Elevate Tuscaloosa for the construction of the proposed *Tuscaloosa Landing Area Project*. The breakdown of funding offered as a match to the BUILD Grant funds has been provided in the Benefit Cost Analysis section of this grant application. Evidence of funding commitment is provided as an appendix. These matching dollars are non-Federal funds that will be used to design and construct the project. There currently are no other federal funds designated to this project. This project represents an excellent example of how private/public partnerships can come together to construct a much-needed infrastructure project to enhance the community on multiple levels. This project has community support and financial support from not only local governments, but also the private sector. Additionally, the Alabama Department of Transportation has been instrumental in providing funding and technical support to improve this infrastructure. In 2019, the City was awarded $400,000.00 for the Expansion of the Riverwalk from Alabama Department of Economic and

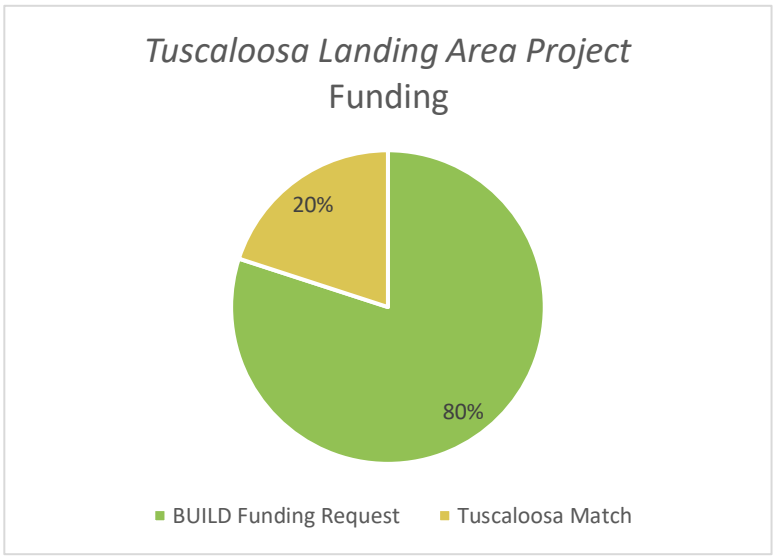


Figure 8: Sources of Funding

Community Affairs (ADECA) as part of the Recreational Trails Program Grant. That expansion is a standalone project from the *Tuscaloosa Landing Area Project.*

Project Costs

The following information provides a breakdown of the capital costs associated with the construction of the proposed *Tuscaloosa Landing Area Project*. These capital costs were estimated based on quantities developed from the preliminary design of the project, while applying a bid price to each item based on local historic bid information and Alabama Department of Transportation bid tabs. To plan for risk mitigation, the project includes a contingency of 5% to account for unanticipated expense during the design and construction phases.

Table 2: Project Costs

Tuscaloosa Landing Area Project Components	**Estimated Cost**
Black Warrior River Barge Mooring Improvements	$ 3,200,000
Hugh Thomas Bridge (US 43/SR 69) Pier Protection	$ 2,600,000
Jack Warner Parkway Pedestrian Bridge	$ 5,800,000
Shared Use Bicycle and Pedestrian Path	$13,400,000
Total	**$25,000,000**

The *Tuscaloosa Landing Area Project* intends to utilize the former southern lock wall landing area. The former lock wall that is serving as the riverside foundation of the shared use path trail head represents significant reuse of existing infrastructure. The proposed improvements could not feasibly be developed without this in place. The cost to develop a similar structure today could approach $10,000,000 and present considerable construction phase challenges associated with the river.

Each of the items listed above will be funded with the non-Federal and BUILD Grant Funds based on the percentage of dollars contributed to the project.

Selection Criteria

Primary Selection Criteria:

Safety

There have been numerous vessel collision accidents with bridges which caused damage that varied from minor to significant but did not necessarily result in collapse of the structure or loss of life. According to a recent study by Michael Knott and Mikele Winters, between the years 1960 and 2015, there have been 35 major incidents of bridge collapse due to barge or ship collision worldwide.[1] This just accounts for major incidents, with 342 total fatalities.

Value of Improved Safety	
$294,715,221	**Total Safety Cost Savings**
$785,884	Hugh Thomas Bridge Pier Protection
$282,245,762	Barge Mooring & Shared Use Path
$11,683,575	Jack Warner Parkway Pedestrian Bridge

[1] Knott, Michael, and Winters, Mikele (2018). Ship and barge collisions with bridges over navigable waterways. *PIANC-World Congress Panama City*. [Online]. Accessed on 1 May 2020.

This only accounts for major incidents of bridge collapse due to collision, and one occurred near Mobile, Alabama in 1993 when a barge tow got lost in a dense fog and collided with a CSX Railroad Bridge, resulting in 47 fatalities. Collisions that do not result in complete bridge collapse are far more common in inland waterways, particularly in the event of poor visibility and floodwater conditions. In January of 2016, in the span of just two weeks, six separate barge collisions with railway and highway bridges over the Mississippi River resulted in closures and costly structural repairs, interrupting regional and national transportation and freight arteries.

Safety benefits for the Hugh Thomas Bridge Pier Protection Project results from the reduction in the vehicle miles traveled (VMT) required to detour from a bridge closure in the no-build scenario compared to the open access in the build scenario. A national crash rate for fatalities and injuries per 100 million VMT was applied to the forecasted AADT values.

Safety benefits for the Black Warrior River Barge Mooring and Shared Use Path Project and the Jack Warner Parkway Pedestrian Bridge Project resulted from the application of a crash modification factor (CMF). The CMF was used to determine the reduction in pedestrian related crashes. Crashes were reduced by 45 percent for the pedestrian bridge and 25 percent for the shared used path installation.

Finally, the number of reduced crashes by type was multiplied by the cost of that crash type, to determine the total safety cost reduction. The cost reductions for each crash type were then summed to generate the total safety benefit.

State of Good Repair

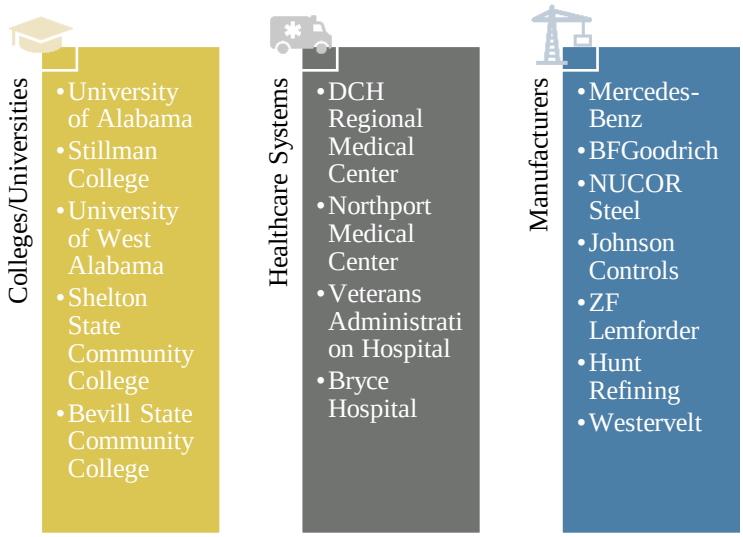
The City of Tuscaloosa is committed to maintaining the *Tuscaloosa Landing Area Project* as it will become a critical part of the community infrastructure. The investment made to improve the project components will only improve the potential for continued economic development, which will in turn continue to provide additional tax revenue for the City of Tuscaloosa. This increased revenue will provide additional opportunities to increase the maintenance budgets for future maintenance needs.

One of the principal challenges faced by the City of Tuscaloosa, and common to many local governments around the country, is maintaining existing infrastructure with current resources. The Elevate Tuscaloosa plan helps the City of Tuscaloosa to complete and maintain the existing Riverwalk along the south bank of the Black Warrior River.

Economic Competitiveness

The City of Tuscaloosa and the greater West Alabama region are poised for rapid economic growth, provided the area can keep up with infrastructural demands. Business sources including *Forbes* and *Kiplinger's Personal Finance* magazines, rank the Tuscaloosa/Birmingham region as among the best locations in the nation to start and grow a business. The region offers a variety of colleges, universities and trade schools for undergraduate and graduate study and provides training and education for skilled professionals in a wide range of industries. Healthcare and medicine play significant roles in employment, economic growth, and innovation with four major hospitals in the region. Approximately 30 percent of the non-agricultural workforce of over 95,000 is

employed in government, healthcare, and education, and 16 percent is employed in manufacturing.



Automotive, electronics, plastic injection molding, steel, wood products, food products and chemicals are just some of the many industries that make up West Alabama's manufacturing core. Quality of life and livability are essential to attracting new businesses, growing lucrative industries, and attracting bright students and skilled workers. In addition, dependable infrastructure helps to ensure supply chain and distribution system security which are needed to attract, retain, and grow industries.

Tuscaloosa County and its surrounding economic base features so many of the components necessary for success. Continued improvement and modernization of the infrastructure is an essential component to accommodate a growing population. Both the Jack Warner Parkway Pedestrian Bridge and shared use trail expansion address ease of pedestrian traffic associated with work and college campus movement while in turn decreasing vehicular traffic.

The Hugh Thomas Bridge which connects the cities of Northport and Tuscaloosa is essential for the region. It assists with the ease of commute into the region's main hub of employment, education, and economic productivity. Protecting and upgrading the bridge provides security for industries throughout the region as the bridge is a main artery for movement of products and people and protecting supply chains and distribution systems.

Environmental Sustainability

The *Tuscaloosa Landing Area Project* has numerous natural resources that contribute to the social, economic, environmental, and aesthetic qualities of the area. The City of Tuscaloosa has consulted with its team of in-house environmental experts to further develop a better understanding of the environmental issues related to the construction of this project. The review from both the consultant and our in-house experts provided no significant environmental concerns pertaining to construction of this new roadway. A more comprehensive environmental review of the project is expected as the design of the project advances.

Tuscaloosa intends to protect, preserve, and enhance important and fragile ecosystems within developed portions of the community. It will strive to use its natural and open lands for parks and for passive and active recreation.

The citywide Future Land Use Plan has five major themes:

a. *Protect Tuscaloosa's Green Infrastructure*. Tuscaloosa will protect, preserve, and enhance fragile ecosystems within the Study Area. It will strive to protect, preserve for future generations, and use its natural and open lands for conservation areas, parks and for active and passive recreation.
b. *Maintain Gateways to the City and Enhance Community Character.* The City will preserve its special qualities, including its green infrastructure, historic buildings, pedestrian scale, university settings, high-quality architecture, and beautiful streets and parks. Maintaining gateways to the City and enhancing the physical qualities of the City is an overarching consideration, incorporated in all parts of the Plan.
c. *Build a City of Neighborhoods.* Tuscaloosa will grow by replicating the best characteristics of historical Tuscaloosa in selected locations throughout and around the City. Generally, this means that Tuscaloosa will: 1) support, maintain and enhance Downtown Tuscaloosa as the heart of the City; and 2) focus people toward low to medium density neighborhoods and high-density housing in mixed use areas at strategic locations. Tuscaloosa envisions population growth organized into compact neighborhoods that focus upon and complement a green infrastructure—with mixed use cores supported by a diverse population that reflects the human scale and pedestrian orientation of the community.
d. *Expand Transportation and Accessibility Opportunities.* Tuscaloosa will strive to reduce the dominance of the automobile in development decisions and reduce the impacts of vehicles on the environment through development of integrated, mixed uses of land that will improve accessibility options for pedestrians, bicyclists, boaters and transit-users. Over time, Tuscaloosa will place greater emphasis on improving multimodal transit options, and on improvements to its pedestrian, bicycle and boating facilities.
e. *Protect and Reinvest in Older Neighborhoods and Commercial Corridors and Centers.* Tuscaloosa will reinvest in older traditional neighborhoods, primary commercial arterial corridors, and commercial activities that are not up to the standards of the community.

The West Tuscaloosa Community has major entries from most every direction. These gateways and the corridors they introduce to the visitor form a major part of the image of the community and should be treated as scarce assets to be protected and preserved.

Community identity is strengthened by good gateways, which help establish strong edges, foster a sense of pride of place and sense of arrival. By taking appropriate care with development along these corridors and adjacent to its major gateways, the city can help to further the community's marketability by helping to attract business, visitors, residents and investors.

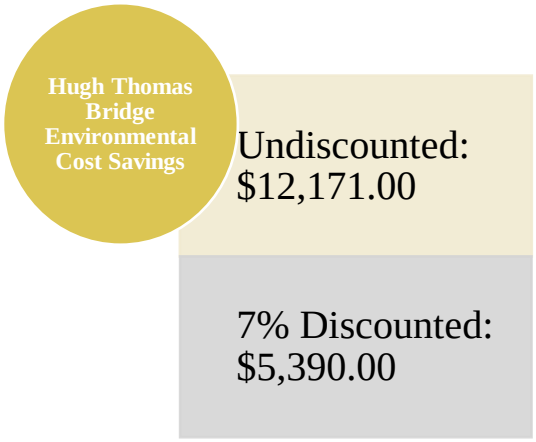
The community's major streets are the gateways to its development focus areas and neighborhoods, and consequently they tend to convey a lasting image to residents, business and industry, and passersby. They should be safe, comfortable, shaded, calm, connected and interesting. This is not simply a matter of aesthetics; the community's economy is tightly linked to its physical character, and everyone must continually strive to enhance West Tuscaloosa's image for it to remain competitive.

Trails and greenways provide a variety of benefits that ultimately affect the sustainability of a region's economic, environmental, and social health. These benefits include:

- Creating Value and Generating Economic Activity
- Improving Bicycle and Pedestrian Transportation
- Improving Health through Active Living
- Clear Skies, Clean Rivers, and Protected Wildlife
- Protecting People and Property from Flood Damage
- Enhancing Cultural Awareness and Community Identity

Linear greenspaces, including trails and greenways, have all the traditional conservation benefits of preserving green space, but also have additional benefits by way of their linear nature. As tools for ecology and conservation, greenways and trails help preserve important natural landscapes, provide needed links between fragmented habitats and offer tremendous opportunities for protecting plant and animal species. They also can be useful tools for wetland preservation and the improvement of air and water quality. In addition, they can allow humans to experience nature with minimal environmental impact.

Environmental Cost Savings: Net change in environmental costs is the change in environmental costs from the build to no-build scenario. This cost includes Volatile Organic Compounds (VOCs), Nitrogen Oxides (NOx), Particulate Matter (PM), and Sulfur Dioxide (SO2). Cost per ton of each of these emission types were obtained from USDOT, while emission rates were obtained from TREDIS. The environmental cost per hour was calculated by multiplying each hourly emission rate by the emission cost, then summing each type of emission cost per hour to calculate a total environmental cost per hour.



A detailed description of the calculation and methodology for estimating Environmental Sustainability benefits is provided in the Benefit-Cost Analysis.

Quality of Life

This project improves the quality of life of area residents and employees by supporting five of the six "Livability Principles" developed by USDOT, along with the Department of Housing and Urban Development (HUD) and the Economic Protection Agency (EPA) as part of the Partnership for Sustainable communities.

Livability Principles

- Provide more transportation choices;
- Enhance Economic Competitiveness;
- Support Existing Communities;
- Coordinate Policies and Leverage Development;
- Value Communities & Neighborhoods

Development's impact on the quality of life for a community should be a primary cornerstone of the why, how and what of a project. Quality of life impact is often an intangible, but ultimately it is reflected in the faces of the citizens and the statistics that are too often used to define a community. To better understand the impact of the built environment the Community Guide has extensively researched this relationship and demonstrated the clear benefit between design elements, connected services, and the quality of life in a community and then documented project characteristics that enhance them through the principles of evidence-based design.

Figure 9: Proposed Pedestrian Area

This recipe of what creates great communities and place may appear formulaic, but it works. We know it intuitively when we think of places we want to visit and live – it's the tree lined hometown street with people on the sidewalk, a great river walk, or the "go to" park in a community. It is a

place that is comfortable, safe, beautiful, convenient, and, in today's world, connected. It is a place that encourages, supports, and provides access to the functions necessary for a quality human experience – the place we live.

The *Tuscaloosa Landing Area Project*, located in the heart of Tuscaloosa, and the surrounding rural region, serves as the epicenter for jobs, healthcare and wellness services, recreation and sports, commerce, and education and is the key connective corridor for access to these services.

The project will incorporate these proven elements to provide a cohesive experience throughout the Tuscaloosa Community. Tuscaloosa is poised to be a major player in the experiential economy and place making will be a key element in the success of that. We have a diverse population with students from across the geographic and demographic spectrum, a high percentage of minorities, and great historic neighborhoods. We are beginning to see a level of connection and positive interaction between these communities that has not been seen before. This is enhancing social interaction and reinforcing the social fabric of the community. Tuscaloosa has the bones, and this project will strengthen and connect them!

Figure 10: Proposed Mooring Improvements

The *Tuscaloosa Landing Area Project* will improve the perception of an unsafe condition, dealing with a known hazard, or uncertainty that you cannot get to where you need to go. The *Tuscaloosa Landing Area Project* flood mitigation components will eliminate the stress that permeates the emergency response providers and community every time a major storm event takes place. The flooding that currently takes place along the project's corridors is extremely challenging to deal with from an emergency response and planning perspective. Furthermore, the concern about the railroads and their resiliency is a major concern not only for public safety, but for the economic

vitality of the region. Loss of the rail corridor, even temporarily, would result in tremendous economic impact up and down the supply chain. Eliminating these hazards will allow the community to move forward with confidence and to focus on other, more positive economic and social development opportunities. The incorporation of transportation technology elements (preemption) will also help ensure emergency vehicle access to the community and hospital.

Secondary Selection Criteria:

Innovation

Innovative Technologies

The BUILD grant initiative will incorporate many innovative intelligent transportation system components, including advanced traffic signals, dedicated short-range communications, dynamic message signs, and deep-learning algorithms for cameras. All these technologies will be integrated into Tuscaloosa Infrastructure Department and ALDOT's central systems and common application platforms that are usable by travelers and transportation system operators. The *Tuscaloosa Landing Area Project* aligns with the US Green Building Council's commitment to a sustainable, prosperous future through LEED, the leading program for green buildings and communities.

The *Tuscaloosa Landing Area Project* will implement the following innovative technologies throughout each project component.

Intellistreets

LED pedestrian path lighting system – each pole has its own microprocessor. Leverages existing power supply and can even use your same lighting poles. Microprocessors communicate with each other through a wireless mesh system. The connected system optimizes traffic flow and safety and helps guide first responders and keep crowds safe in disaster areas. This system uses 25% less energy and 25% less heat, it also does not require underground construction costs. It includes: integrated multimedia system, LED street signs, and digital banners that can be modified to preview event promotions, parking directions, traffic warnings, Amber alerts, etc.
https://intellistreets.com/

Motorist Warning Systems

Bridge damage or collapse in the event of a ship colliding with the bridge, which can cause injury or death to motorists. Potential exists for drivers to be unaware of the danger and drive off the damaged bridge before warning devices and barricades can be erected. These accidents are likely to occur at night or in periods of poor visibility. This kind of collision is not common, but they occur enough to warrant a warning system, and when they do occur the resulting harm is significant. An electrical conductor attached to a part of the bridge that activates a warning system and gates when the continuity of the bridge is disrupted. Federal Highway Administration and Department of Transportation suggestions are included here:
https://www.fhwa.dot.gov/engineering/hydraulics/policymemo/t514019a.cfm

Free Broadband/WiFi Along Pedestrian Bridge

Including free public WiFi along the pedestrian bridge optimizes safety and rapid response in case of emergency. Offering free public WiFi ensures that pedestrians with a wide range of cellular and data plans will be able to use mobile devices to call for help in case of emergency, report an accident or disaster, alert authorities to suspicious or dangerous activity, and alert friends and family of safety status, all in real-time. In addition to safety, providing free WiFi leverages technology to cultivate social cohesion through access to social media and provides the ability for friends and families to coordinate in real time using a variety of messaging apps.

Electric Charging Stations for Cars

The Union of Concerned Scientists projects that by the year 2025, 10% of all car sales will be electric vehicles, and the National Renewable Energy lab predicts that 20% of all light duty car sales will be electric vehicles by the year 2030. In a geographical area, over 40 public or workplace Level 2 charging stations are needed for every 1,000 electric vehicles, and an additional three to four fast chargers are needed. The City of Tuscaloosa must adapt infrastructure to meet this demand and become an electronic vehicle-ready community. Furthermore, providing charging stations encourages residents to make the decision to buy electric vehicles, reducing overall local carbon dioxide emissions and improving air quality.

The overall design will include elements of prevention, detection, and warning.

Innovative Project Delivery

The proposed mooring facility and bridge pier protection projects have been identified for potential design-build delivery due to the nature of the construction scope. The elements of work for these are similar and can be narrowly specified in contractor specifications to include specific locations, dimension, and performance requirements. The projects can be procured in a single package that will provide an expedited schedule and the most cost-effective means to develop this infrastructure.

Innovative Financing

$5 million in Elevate Tuscaloosa funds will be used as matching funds for BUILD grant projects. Elevate Tuscaloosa funds are generated by a 1% sales tax increase, effective October 1, 2019, dedicated to strategic investment in connectivity, parks, recreation, cultural arts, education, and tourism in the Tuscaloosa community. In addition to initial funding, an annual percentage of Elevate Tuscaloosa funds will be used for maintenance and upkeep of projects funded by Elevate, including BUILD projects. While this is currently a flat dollar amount, beginning in the 2022 fiscal year of the tax initiative, 10% of the revenues generated are projected to be set aside for this purpose. Doing so provides an innovative vehicle to leverage Elevate funding to optimize the impact and long-term effectiveness of BUILD projects.

Partnership

The development of the *Tuscaloosa Landing Area Project* is an excellent example of how private and public partnerships can succeed. Financial support has been provided by Elevate Tuscaloosa with a commitment to providing up to $5.0 million for the construction of this project. In addition to the financial support provided for the project, this project has received overwhelming

community support. Over 20 letters of support have been submitted as an appendix to the BUILD Grant Application, including letters from United States Representatives and Senators, State and City Legislators, adjacent property owners, businesses, and various stakeholders.

Table 3: Formal Letters of Support for Tuscaloosa Landing Area Project	
Mayor Walt Maddox (City of Tuscaloosa)	Senator Richard Shelby
Senator Doug Jones	Representative Robert Aderholt
Governor Kay Ivey	Representative Chris England
Senator Gerald Allen	Representative Rodney Sullivan
Judge Rob Robertson	Representative Artis McCampbell
Representative Terri Sewell	Stuart Bell (University of Alabama, President)
Mark Crews (Alabama Power)	Alabama Trails Commission
Bryan Chandler (Tuscaloosa County Industrial Development Authority)	Dr. Cynthia Warrick (Stillman College, President)
Jim Page (Chamber of Commerce of West Alabama)	Thomas Schmitt (Hunt Refining Company)
Randy Skagen (NUCOR Steel Tuscaloosa, Inc)	Finis St. John (University of Alabama System)
Tim Parker (Parker Towing Company)	Bryan Kindred (DCH Health System)
Alex Flachsbart (Opportunity Alabama)	Senator Bobby Singleton
Kenneth Boswell (ADECA)	Andy Hilton (GAF)

Environmental Risk

Preparations have been made by ALDOT and Tuscaloosa to prepare stakeholders for the studies to be undertaken as part of the *Tuscaloosa Landing Area Project*. No formal approvals, however, are required to execute the planning project. ALDOT and Tuscaloosa will seek the following approvals to advance capital projects identified as long-term solutions through further studies that will follow the *Tuscaloosa Landing Area Project*:

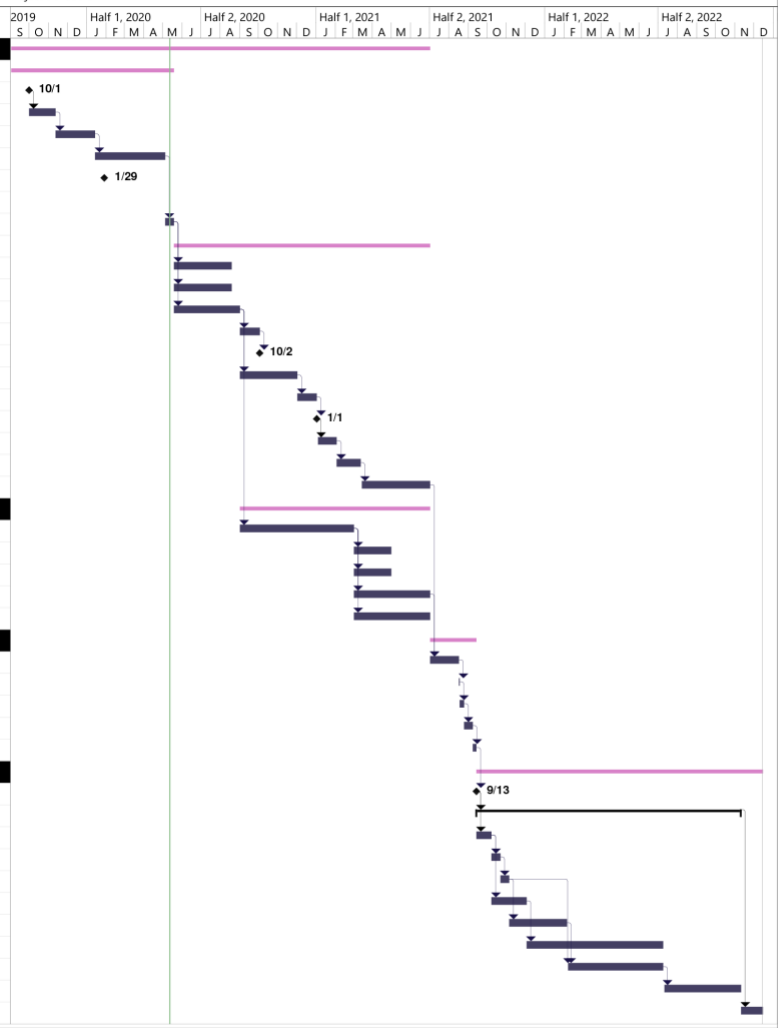
National Environmental Policy Act (NEPA)	• ALDOT and Tuscaloosa will be securing NEPA approvals following completion of studies that will precede the *Tuscaloosa Landing Area Project*. These future planning efforts will inform the purpose, need, and scope of any environmental work to follow.
Legislative Approvals	• The Alabama State Legislature and Tuscaloosa City Council's approvals will be obtained to secure funding and support for the *Tuscaloosa Landing Area Project*.
State and Local Planning	• The *Tuscaloosa Landing Area Project* conforms with the goals and objectives of Elevate Tuscaloosa, which includes their Transportation Improvement Programs (TIP).

Project Schedule

The project schedule provides enough time to ensure that unexpected delays will not put BUILD grant funds at risk of expiring before they are obligated. The *Tuscaloosa Land Area Project* can begin construction quickly upon receipt of the BUILD grant. The grant funds will be spent steadily, and expeditiously once construction starts.

BUILD 2020 CITY OF TUSCALOOSA
Project Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	**1 PRECONSTRUCTION PHASE**				
2	**1.1 Project Concept Development**				
3	1.1.1 Begin	0 days	Tue 10/1/19	Tue 10/1/19	
4	1.1.2 Project Survey	30 days	Tue 10/1/19	Mon 11/11/19	3
5	1.1.3 Begin Environmental and Geotechnical Studies	45 days	Tue 11/12/19	Mon 1/13/20	4
6	1.1.4 Preliminary Design	80 days	Tue 1/14/20	Mon 5/4/20	5
7	1.1.5 City ELEVATE Subcommittee Public Presentation	0 days	Wed 1/29/20	Wed 1/29/20	
8	1.1.6 Community Partner Comments	23 days	Tue 4/15/14	Thu 5/15/14	
9	1.1.7 Preliminary Design Review	10 days	Tue 5/5/20	Mon 5/18/20	6
10	**1.2 Environmental Documentation**				
11	1.2.1 Follow up on Early Agency Coordination	66 days	Tue 5/19/20	Tue 8/18/20	9
12	1.2.2 Detailed Environmental Studies	66 days	Tue 5/19/20	Tue 8/18/20	9
13	1.2.3 Concept Refinement	75 days	Tue 5/19/20	Mon 8/31/20	9
14	1.2.4 Public Involvement Meeting Advertisement	24 days	Tue 9/1/20	Fri 10/2/20	13
15	1.2.5 Public Involvement Meeting	0 days	Fri 10/2/20	Fri 10/2/20	14
16	1.2.6 Draft Environmental Document	66 days	Tue 9/1/20	Tue 12/1/20	13
17	1.2.7 Public Hearing Advertisement	23 days	Wed 12/2/20	Fri 1/1/21	16
18	1.2.8 Public Hearing	0 days	Fri 1/1/21	Fri 1/1/21	17
19	1.2.9 Final Environmental Document - Environmental Assessme	22 days	Mon 1/4/21	Tue 2/2/21	18
20	1.2.10 Finding of No Significant Impact	28 days	Wed 2/3/21	Fri 3/12/21	19
21	1.2.11 Right-of-Way Acquisition (One Parcel Remaining)	79 days	Mon 3/15/21	Thu 7/1/21	20
22	**2 DESIGN PHASE**				
23	2.1 Final Design	130 days	Tue 9/1/20	Mon 3/1/21	13
24	2.2 Coordination with Alabama Dept. of Transportation	44 days	Tue 3/2/21	Fri 4/30/21	23
25	2.3 Coordination with U.S. Army Corps of Engineers	44 days	Tue 3/2/21	Fri 4/30/21	23
26	2.4 Develop Contract Documents	88 days	Tue 3/2/21	Thu 7/1/21	23
27	2.5 Private Utility Coordination / Relocation	88 days	Tue 3/2/21	Thu 7/1/21	23
28	**3 BID / PROCUREMENT PHASE**				
29	3.1 Advertise for Bids	32 days	Fri 7/2/21	Mon 8/16/21	21,26
30	3.2 Pre-Bid Meeting	1 day	Tue 8/17/21	Tue 8/17/21	29
31	3.3 Bid Letting	5 days	Wed 8/18/21	Tue 8/24/21	30
32	3.4 Contract Award	10 days	Wed 8/25/21	Tue 9/7/21	31
33	3.5 Notice to Proceed	4 days	Wed 9/8/21	Mon 9/13/21	32
34	**4 CONSTRUCTION PHASE**				
35	4.1 Pre-Construction Conference	0 days	Mon 9/13/21	Mon 9/13/21	33
36	**4.2 Construction**	**302 days**	**Tue 9/14/21**	**Wed 11/9/22**	**35**
37	4.2.1 Mobilization for Surface and River Operations	18 days	Tue 9/14/21	Thu 10/7/21	35
38	4.2.2 Traffic Control for Jack Warner Parkway	10 days	Fri 10/8/21	Thu 10/21/21	37
39	4.2.3 Clearing and Grubbing (Path Area & Mooring Bank Areas)	10 days	Fri 10/22/21	Thu 11/4/21	38
40	4.2.4 River Bed Preparation	40 days	Fri 10/8/21	Thu 12/2/21	37
41	4.2.5 Bridge Foundations	66 days	Fri 11/5/21	Fri 2/4/22	39
42	4.2.6 River Structure Construction	156 days	Fri 12/3/21	Fri 7/8/22	40
43	4.2.7 Linear Path and Bridge Approach Construction	110 days	Mon 2/7/22	Fri 7/8/22	39,41
44	4.2.8 Project Lighting and Security Elements Installed	88 days	Mon 7/11/22	Wed 11/9/22	43
45	4.3 Project Closeout	25 days	Thu 11/10/22	Wed 12/14/22	36



ELEVATE TUSCALOOSA

Task	Project Summary	Manual Task	Start-only	Deadline	Progress
Split	Inactive Task	Duration-only	Finish-only	Baseline	Manual Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Baseline Milestone	
Summary	Inactive Summary	Manual Summary	External Milestone	Baseline Summary	

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Required Approvals
The City of Tuscaloosa has begun the NEPA documentation process for the project. There has been a broad effort to gather input from federal, state, and local agencies along with private entities. This engagement has been useful in evaluating project element alternatives and determining preferred infrastructure locations. The public has also been engaged with several public committee and council meetings related to the overall Elevate program for infrastructure funding. There have been several baseline studies along the project area to date that have included area river mussel surveys, initial stream and wetland field investigations, traffic studies, etc. Based on the final plan that has been developed and is a part of this application, an Environmental Assessment (EA) can be conducted.

As noted in the project schedule provided and available at www.tuscaloosa.com/build, final detailed studies can be started for the documentation. The City plans to have a Public Involvement Meeting to provide the public with detailed information about the project and receive questions and comments. Upon completion of that public involvement process, a draft environmental assessment will be developed for further public comment and a public hearing. Upon addressing any final issues raised during this phase, a final document will be developed and submitted for approval of a Finding of No Significant Impact (FONSI). It is possible that upon consultation with federal representatives that the document could ultimately be developed as a Categorical Exclusion due to the limited potential impacts anticipated with the project. The project schedule and tasks included assumes some limited non-significant impacts requiring an EA/FONSI to allow for adequate time for project development and completion.

Public Involvement is an important part of any public infrastructure project. Stakeholder meetings were held during the planning process of the Shared Use Bicycle and Pedestrian Path project to discuss the project area and scope of work. Stakeholders included representatives from the Cities of Tuscaloosa and Northport, Tuscaloosa County Park and Recreation Authority (PARA), University of Alabama, United States Army Corps of Engineers, local businesses, adjacent property owners and bicycle enthusiasts. Stakeholders participated in a SWOT exercise discussing strengths, weaknesses, opportunities, and threats of the existing Riverwalk phases as well as the proposed Riverwalk expansion area.

The following goals were identified during Stakeholder meetings:

- Continue to promote walking and biking
- Increase connectivity to neighborhoods, businesses, industry, university/college/K-12, parks, public buildings, and other trail systems such as City Walk and Northport Riverwalk
- Be sensitive to adjacent land uses such as Bryce Cemetery, Black Warrior River (bank erosion and that the waterway is a functioning commercial waterway with vertical clearance requirements)
- Keep the trail along the Black Warrior River as much as possible
- Ensure new phases maximize compatibility with future development and promote new urban living opportunities for the generations who are interested in a pedestrian oriented lifestyle

- Create a safe environment, particularly in remote areas
- Use more natural landscape elements to minimize maintenance requirements
- Develop a consistent theme with site amenities such as benches, trash receptacles, bike racks, fence, guardrail, bridges, pavilions, restrooms, water fountains, pet waste, etc.
- Increase available information with a way finding system using maps and ¼ mile trail markings
- Create appropriate parking; lots are full at peak use times, Manderson Landing has 1-hour parking
- Maximize funding opportunities by developing a funding plan and improving communication between public and private stakeholders such as City, County, ALDOT, Grant Agencies, Private Developers, Citizens and Businesses Public Involvement

A public meeting was held on April 16, 2018. The public was invited to review the Riverwalk draft master plan document, including all exhibits, graphics, phases, and cost estimates. Attendees provided feedback through discussion with the design team or by leaving comments on the available materials. When applicable, this feedback was analyzed and added to the Riverwalk Master Plan.

Assessment of Project Risks and Mitigation Strategies

As with most major planning projects, there are some risks inherent to meeting the project schedule and budget. Mitigation of schedule and budget risk can be accomplished in the following ways:

- ***Schedule Delays*** – As local and statewide planning entities, ALDOT and the City of Tuscaloosa have gained tremendous experience in the implementation of complex, comprehensive planning projects. Both understand the risks associated with such efforts and consider a wide range of risks in the development of project schedules and budgets, such as those presented in this grant application. We stand ready to have our matching funds and contracts in place to ensure the timely activation of the resources needed to carry out the scope of work.
- ***Cost Overruns*** – As with any large planning project, this project runs the risk of experiencing cost overruns. We have used our extensive combined experience on similar projects to mitigate this risk. The estimated costs included in the application are based on industry and agency standards, as well as similar projects being implemented by ALDOT and Tuscaloosa, and include contingencies. Both our agencies' transportation budgets have sufficient capacity in the unlikely event that the project experiences a cost over-run.
- ***Inter-Agency Disputes*** – Schedule delays and cost overruns may occur due to differing preferences and priorities between ALDOT and the City of Tuscaloosa in carrying out the planning project. We will mitigate this risk by defining roles, responsibilities, and a dispute resolution process in an inter-agency agreement to be executed prior to BUILD grant obligation.

Benefit Cost Analysis

The formal benefit-cost analysis (BCA) was conducted for the *Tuscaloosa Landing Area Projec*t using best practices for transportation planning and reflecting all BUILD FY 2020 grant application guidelines. To the maximum extent possible given available data, the formal BCA prepared in connection with this BUILD grant application reflects quantifiable economic benefits. All analyses contain live formulas, clear documentation of assumptions, and assume 2018 constant dollars.

Table 4. BCA Summary

Current Status and Problem to be Addressed	Change in Baseline	Type of Impacts	Affected Populations	Economic Benefits
Current mooring does not allow for the abandoned lock structure to be used for the shared use path system.	Replacement mooring facility allows for the construction of the shared use path facility using the lock infrastructure.	Installation of shared use path reduces pedestrian involved crashes.	Barges, local cyclist and pedestrians.	**Benefit 1.** Reduction in pedestrian crashes.
Bridge piers are unprotected, allowing for significant damage should a barge collision occur, as well as significant time needed to close the bridge and inspect for possible damage.	Installation of pier protection at the Hugh Thomas Bridge reduces the possibility of a bridge closure.	Traffic not required to detour to other bridges causing decreased vehicle operating costs, passenger and crew time costs, as well as safety and environmental benefits.	Regional residents and businesses.	**Benefit 1.** Vehicle operating cost savings from reduced delay and mileage. **Benefit 2.** Value of time savings from reduced delay. **Benefit 3.** Environmental benefits from reduced delay. **Benefit 4.** Safety benefits from reduced miles traveled.
Pedestrian crashes occurring in the area surrounding the amphitheater.	Installation of pedestrian bridge.	Construction of the pedestrian bridge will reduce pedestrian involved crashes.	Residents and tourists.	**Benefit 1.** Reduction in pedestrian crashes.

Benefit-Cost Analysis

The computed benefit cost ratio for the City of *Tuscaloosa Landing Area Project* was conducted using a seven percent real discount rate recommended by the Benefit-Cost Analysis Guidance for Discretionary Grant Programs. The BCA compares the capital construction costs to the quantifiable benefits of the project for an analysis period of 21 years with construction occurring in the first year. Benefits begin in year 2, or 2021. The residual values of the project are included in the project benefits.

The quantified benefits are:

1. Operating Cost Savings
2. Value of Time Savings
3. Safety Cost Savings
4. Environmental Cost Savings

Discount Rates

Federal guidance recommends that applicants discount future benefits and costs and present discounted rates of both the stream of benefits and the stream of costs. For this analysis, final streams of benefits and costs are presented at a seven percent discounted rate.

Project Description and Cost Estimates

This analysis of the initial build out includes:

- Black Warrior River Barge Mooring Improvements and Shared Use Path
- Hugh Thomas Bridge (US 43/SR 69) Pier Protection
- Jack Warner Parkway Pedestrian Bridge

Total project costs were estimated at $25.0 million. At a seven percent discount rate, the total project cost is $21.8 million. Table 5 below provides a summary of estimated project construction costs for each project used in this analysis.

Table 5: Construction Cost Summary

Project	Undiscounted Cost	Project Cost 7% Discount
Black Warrior River Barge Mooring and Shared Use Path	$16,600,000	$14,499,083
Hugh Thomas Bridge (US 43/SR 69) Pier Protection	$2,600,000	$2,270,941
Jack Warner Parkway Pedestrian Bridge	$5,800,000	$5,065,945

Table 6 summarizes the *Tuscaloosa Landing Area Project* costs and the quantifiable benefits of the program in terms of net present value. The project scenario has a net present value of $280.8 million undiscounted and $109.7 million at a seven percent real discount rate. The benefit cost ratio of the *Tuscaloosa Landing Area Project* is 6.0:1 discounted at seven percent.

Table 6: Tuscaloosa Landing Are Benefit Cost Ratios

Category	Undiscounted	Present Value at 7%
Construction Costs	**$25,000,000**	**$21,835,968**
Evaluated Benefits		
1. Operating Cost Savings	**$1,551,610**	**$687,177**
2. Value of Time Savings	**$4,463,055**	**$1,976,597**
3. Safety Benefits	**$294,715,221**	**$127,723,581**
4. Environmental Benefits	**$12,171**	**$5,390**
5. Residual Value	**$5,040,000**	**$1,137,594**
Total Evaluated Benefits	**$305,782,057**	**$131,530,340**
NPV	**$280,782,057**	**$109,694,372**
B-C Ratio	**12.2**	**6.0**

Project Website

As part of this BUILD Grant Application, the City of Tuscaloosa has developed a community website for this project. This website is located at www.tuscaloosa.com/build. It provides additional information pertaining to the project along with the engineering studies that have been completed to date for the project. The website will include the project narrative, appendices, and supporting documentation.

Appendix

BUILD

FY 2020 Discretionary Grant Application

City of Tuscaloosa Landing Area Project

Benefit-Cost Analysis Technical Memo

May 2020

Contents

City of Tuscaloosa Landing Area Project
BUILD FY 20 Discretionary Grant Application
Benefit Cost Analysis Technical Memo
May 2020

The formal benefit-cost analysis (BCA) was conducted for the City of *Tuscaloosa Landing Area Project* using best practices for transportation planning and reflecting all BUILD FY 2020 grant application guidelines. To the maximum extent possible given available data, the formal BCA prepared in connection with this BUILD grant application reflects quantifiable economic benefits. All analyses contain live formulas, clear documentation of assumptions, and assume 2018 constant dollars.

Table 1. BCA Summary

Current Status and Problem to be Addressed	Change in Baseline	Type of Impacts	Affected Populations	Economic Benefits
Current mooring does not allow for the abandoned lock structure to be used for the shared use path system.	Replacement mooring facility allows for the construction of the shared use path facility using the lock infrastructure.	Installation of shared use path reduces pedestrian involved crashes.	Barges, local cyclists and pedestrians.	**Benefit 1.** Reduction in pedestrian crashes.
Bridge piers are unprotected, allowing for significant damage should a barge collision occur, as well as significant time needed to close the bridge and inspect for possible damage.	Installation of pier protection at the Hugh Thomas Bridge reduces the possibility of a bridge closure.	Traffic not required to detour to other routes causing decreased vehicle operating costs, passenger and crew time costs, as well as safety and environmental benefits.	Regional residents and businesses.	**Benefit 1.** Vehicle operating cost savings from reduced delay and mileage. **Benefit 2.** Value of time savings from reduced delay. **Benefit 3.** Environmental benefits from reduced delay. **Benefit 4.** Safety benefits from reduced miles traveled.

Current Status and Problem to be Addressed	Change in Baseline	Type of Impacts	Affected Populations	Economic Benefits
Pedestrian crashes occurring in the area surrounding the amphitheater.	Installation of pedestrian bridge.	Construction of the pedestrian bridge will reduce pedestrian involved crashes.	Local residents and tourists.	**Benefit 1.** Reduction in pedestrian crashes.

Benefit Cost Analysis
The computed benefit-cost ratio for the City of *Tuscaloosa Landing Area Project* was conducted using a 7 percent real discount rate recommended by the Benefit-Cost Analysis Guidance for Discretionary Grant Programs. The BCA compares the capital construction costs to the quantifiable benefits of the project for an analysis period of 21 years with construction occurring in the first year. Benefits begin in year 2, or 2021. The residual values of the project are included in the project benefits.

The quantified benefits are:

5. Operating Cost Savings
6. Value of Time Savings
7. Safety Cost Savings
8. Environmental Cost Savings

Discount Rates
Federal guidance recommends that applicants discount future benefits and costs and present discounted rates of both the stream of benefits and the stream of costs. For this analysis, final streams of benefits and costs are presented at a seven percent discounted rate.

Project Description and Cost Estimates
This analysis of the initial build out includes:

- Black Warrior River Barge Mooring Improvements and Shared Use Path
- Hugh Thomas Bridge (US 43/SR 69) Pier Protection
- Jack Warner Parkway Pedestrian Bridge

Total project costs were estimated at $25.0 million. At a seven percent discount rate, the total project cost is $21.8 million. Table 2 below provides a brief summary of estimated project construction costs for each project used in this analysis.

Table 2: Construction Cost Summary

Project	Undiscounted Cost	Project Cost 7% Discount
Black Warrior River Barge Mooring and Shared Use Path	$16,600,000	$14,499,083
Hugh Thomas Bridge (US 43/SR 69) Pier Protection	$2,600,000	$2,270,941
Jack Warner Parkway Pedestrian Bridge	$5,800,000	$5,065,945
Program Total	**$25,000,000**	**$21,835,968**

Benefit-Cost Ratios

Table summarizes the *Tuscaloosa Landing Area Project* costs and the quantifiable benefits of the program in terms of net present value. The project scenario has a net present value of $280.8 million undiscounted and $109.7 million at a seven percent real discount rate. The benefit cost ratio of the *Tuscaloosa Landing Area Project* is 6.0:1 discounted at seven percent.

Table 3: Landing Area Benefit Cost Ratios

Category	Undiscounted	Present Value at 7%
Construction Costs	**$25,000,000**	**$21,835,968**
Evaluated Benefits		
6. Operating Cost Savings	**$1,551,610**	**$687,177**
7. Value of Time Savings	**$4,463,055**	**$1,976,597**
8. Safety Benefits	**$294,715,221**	**$127,723,581**
9. Environmental Benefits	**$12,171**	**$5,390**
10. Residual Value	**$5,040,000**	**$1,137,594**
Total Evaluated Benefits	**$305,782,057**	**$131,530,340**
NPV	**$280,782,057**	**$109,694,372**
B-C Ratio	**12.2**	**6.0**

Table **4** summarizes the costs and benefits of the Black Warrior River Barge Mooring and Shared Use Path Project in terms of net present value. The project scenario has a net present value of $265.7 million undiscounted and $107.8 million at a seven percent discount rate. The benefit cost ratio of the project is 8.4:1 discounted at seven percent.

Table 4. Black Warrior River Barge Mooring and Shared Use Path Project BCA

Category	**Undiscounted**	**Present Value at 7%**
Construction Costs	$16,600,000	$14,499,083
Total Benefits	$282,245,762	$122,312,402
NPV	$265,645,762	$107,813,319
B-C Ratio	**17.0**	**8.4**

Table 5 summarizes the costs and benefits of the Hugh Thomas Bridge (US 43/SR 69) Pier Protection Project in terms of net present value. The project scenario has a net present value of $5.8 million undiscounted and $1.1 million at a seven percent discount rate. The benefit cost ratio of the project is 1.5:1 discounted at seven percent.

Table 5. Hugh Thomas Bridge (US 43/SR 69) Pier Protection Project BCA

Category	**Undiscounted**	**Present Value at 7%**
Construction Costs	$2,600,000	$2,270,941
Total Benefits	$8,372,720	$3,369,329
NPV	$5,772,720	$1,098,388
B-C Ratio	**3.2**	**1.5**

Table 6 summarizes the costs and benefits of the Jack Warner Parkway Pedestrian Bridge Project in terms of net present value. The project scenario has a net present value of $9.4 million undiscounted and $0.8 million at a seven percent discount rate. The benefit cost ratio of the project is 1.2:1 discounted at seven percent.

Table 6. Jack Warner Parkway Pedestrian Bridge Project BCA

Category	Undiscounted	Present Value at 7%
Construction Costs	$5,800,000	$5,065,945
Total Benefits	$15,163,575	$5,848,609
NPV	$9,363,575	$782,664
B-C Ratio	**2.6**	**1.2**

Benefit Calculations

The benefits of the project are derived by comparing conditions under a "Build" and "No-Build" scenario. Default parameters used in the calculations are included in the spreadsheet accompanying this document. Benefits will accrue over the 20-year operational period of the analysis. The difference in costs between the baseline and project scenarios is the cost savings or benefits of the project.

The Hugh Thomas Bridge (US 43/SR 69) Pier Protection Project will result in vehicle operating cost savings, value of time savings, as well as safety and environmental benefits resulting from the avoidance of a bridge closure lasting 0.5 days, once a year. Residual value was also calculated based on a 50-year service life.

Both the Black Warrior River Barge Mooring and Shared Use Path Project and the Jack Warner Parkway Pedestrian Bridge Project resulted in significant safety benefits due to the application of crash modification factors from the CMF Clearinghouse.

Benefit 1: Operating Cost Savings

Net change in vehicle operating costs is the change in operating costs from the build to no-build scenario. Vehicle operating cost is the cost per hour of operating a passenger vehicle or commercial truck. The base operating cost includes maintenance, tires, mileage-based depreciation, and insurance. The commercial vehicle base operating cost, obtained from the American Transportation Research Institute (ATRI) is $24.11 per hour. The passenger vehicle base operating cost, obtained from AAA's 2018 Your Driving Cost publication is $4.92 per hour.

The hourly fuel operating cost is also calculated. Using fuel prices per gallon obtained from the Energy Information Administration (EIA) and a vehicle gallons consumed per hour factor obtained from Transportation Economic Development Impact System (TREDIS), these costs are estimated at $27.75 per hour for commercial trucks and $4.30 per hour for passenger vehicles.

A decrease in speed in the no-build scenario will result in a greater number of vehicle hours of travel, leading to increased base operating costs and increased fuel costs. A regional travel demand model was employed to determine the traffic volume changes and speed changes to the three alternative bridge routes available should the Hugh Thomas Bridge experience a closure.

Table 7. High Thomas Bridge Closure Results

	Finnell Bridge	Bryant Bridge	Mallisham Bridge
additional miles of travel	6.6	10.4	7.6
avg speed	48.6	65.0	39.1
AADT split	15,130	20,130	35,229
reduced speed	19.9	59.2	30.5

VHT was calculated based on AADT, vehicle miles traveled (VMT) along each alternative route, average speed, and the project length. A minimal truck percentage of 1 percent was applied. Table 8, below, displays operating cost savings for the pier protection project.

- VMT = Trips x Project Length
- VHT = VMT / Average Speed
- Vehicle Operating Costs
    - Base Operating Cost (Truck and Passenger) = (VHT x Vehicle Operating Cost per Hour)
    - Fuel Operating Cost (Truck and Passenger) = (VHT x Gallons per Hour) x Fuel Cost per Gallon

Table 8: Operating Cost Savings

Project	Undiscounted	7% Discount
Hugh Thomas Bridge Pier Protection Project	$1,551,610	$687,177
Program Total	**$1,551,610**	**$687,177**

Benefit 2: Value of Time Savings

Value of time is the crew cost for trucks and the personal time costs for passenger vehicles. Net value of time-savings result from an increase in build scenario speeds that reduces the number of hours vehicles travel. Time-savings are calculated by multiplying the number of crew or passengers per vehicle by the crew or passenger cost per hour factor for each crew-member/passenger, and then multiplying by the VHT in each scenario. The difference between the two scenario costs is the cost savings. USDOT recommended values were used for crew and personal cost factors, and crew/passengers per vehicle. VHT was determined using the results of Table 7.

Table 9, below, displays value of time savings for the Hugh Thomas Bridge Pier Protection project.

- VMT = Trips x Project Length
- VHT = VMT / Average Speed
- Value of Time
    - Truck Business Time Cost = (Number of Crew per Vehicle x Crew Cost per hour per crew member) x Truck VHT
    - Passenger Time Cost = (Number of Passengers per Vehicle x Passenger Cost per Hour per Passenger) x Passenger VHT

Table 9: Value of Time Savings

Project	Undiscounted	7% Discount
Hugh Thomas Bridge Pier Protection Project	$4,464,055	$1,976,597
Program Total	**$4,464,055**	**$1,976,597**

Benefit 3. Safety Benefits

Safety benefits for the Hugh Thomas Bridge Pier Protection Project result from the reduction in the VMT required to detour from a bridge closure in the no-build scenario compared to the open access in the build scenario. A national crash rate for fatalities and injuries per 100 million VMT was applied to the forecasted AADT values.

Safety benefits for the Black Warrior River Barge Mooring and Shared Use Path Project and the Jack Warner Parkway Pedestrian Bridge Project resulted from the application of a crash modification factor. The CMF was used to determine the reduction in pedestrian related crashes. Crashes were reduced by 45 percent for the pedestrian bridge and 25 percent for the shared used path installation.

Finally, the number of reduced crashes by type was multiplied by the cost of that crash type, to determine the total safety cost reduction. The cost reductions for each crash type were then summed to generate the total safety benefit.

Table 10, below, displays safety cost savings for each project and for the program of projects.

Table 10: Safety Cost Savings

Project	Undiscounted	7% Discount
Hugh Thomas Bridge Pier Protection Project	$785,884	$348,052
Barge Mooring and Shared Use Path Project	$282,245,762	$122,312,402
Jack Warner Parkway Pedestrian Bridge Project	$11,683,575	$5,063,127
Program Total	**$294,715,221**	**$127,723,581**

Benefit 4. Environmental Cost Savings

Net change in environmental costs is the change in environmental costs from the build to no-build scenario. This cost includes Volatile Organic Compounds (VOCs), Nitrogen Oxides (NOx), Particulate Matter (PM), and Sulfur Dioxide (SO2). Cost per ton of each of these emission types were obtained from USDOT, while emission rates were obtained from TREDIS. The environmental cost per hour was calculated by multiplying each hourly emission rate by the emission cost, then summing each type of emission cost per hour to calculate a total environmental cost per hour. This was then multiplied by the baseline and build scenario VHT. Table 11, below, displays environmental cost savings for each project and for the program of projects.

- VMT = Trips x Project Length
- VHT = VMT / Average Speed
- Environmental Costs (Truck and Passenger)
    - Environmental Cost per Hour = Hourly Emission Rate x Emission Cost
    - Environmental cost = VHT x Environmental Cost per Hour

Table 11: Environmental Cost Savings

Project	Undiscounted	7% Discount
Hugh Thomas Bridge Pier Protection Project	$12,171	$5,390
Program Total	**$12,171**	**$5,390**

Benefit 6. Residual Value

City of *Tuscaloosa Landing Area Project* includes a total discounted residual value of $1.1 million over the life of the projects. The Hugh Thomas Bridge Pier Protection Project and the Jack Warner Parkway Pedestrian Bridge Project both have an assumed service life of 50 years.

Table 12: Residual Value

Project	Undiscounted	7% Discount
Hugh Thomas Bridge Pier Protection Project	$1,560,000	$352,113
Jack Warner Parkway Pedestrian Bridge Project	$3,480,000	$785,482
Program Total	**$5,040,000**	**$1,137,595**