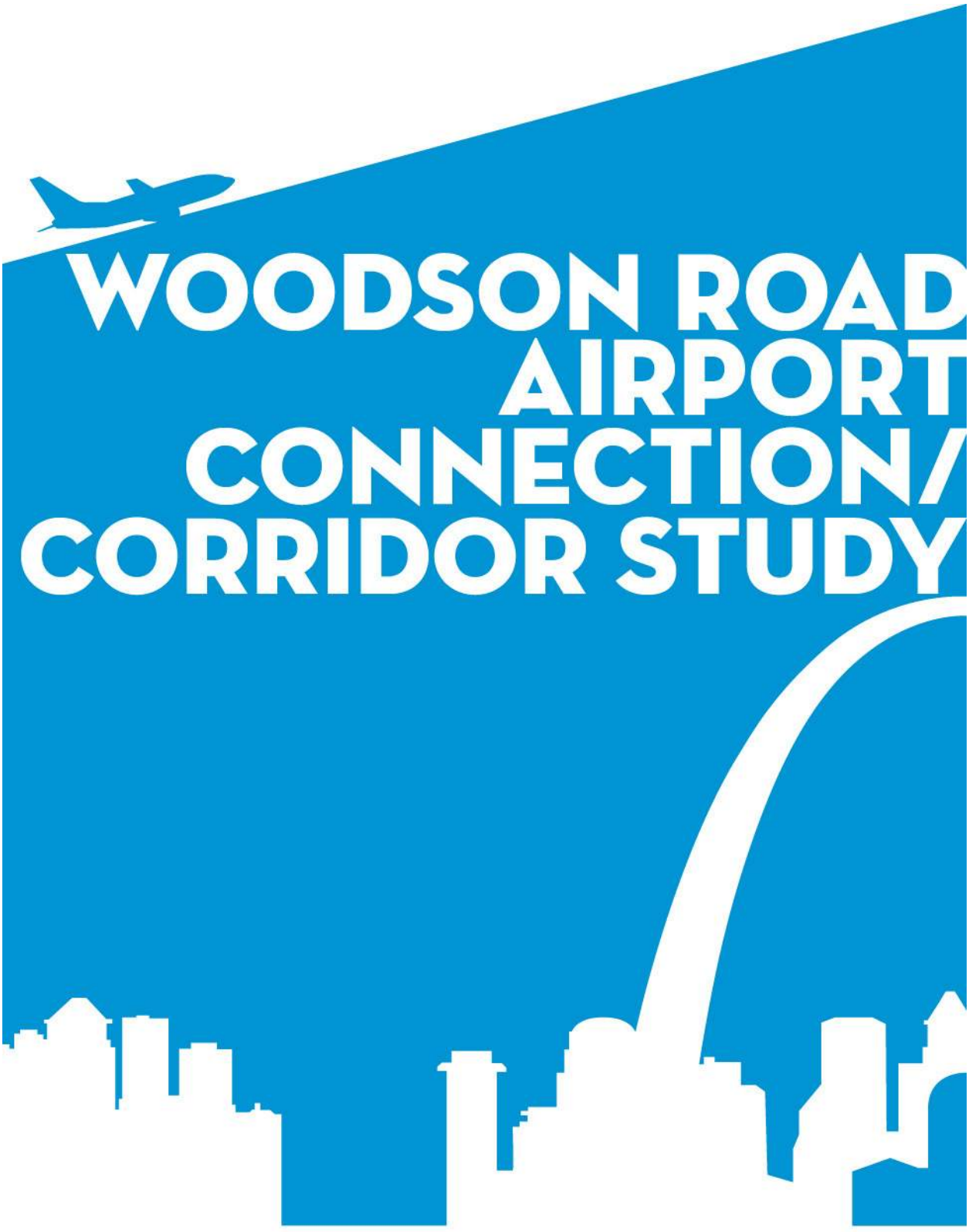
WOODSON ROAD AIRPORT CONNECTION/ CORRIDOR STUDY



WOODSON TERRACE, MISSOURI

Prepared by:

alta PLANNING + DESIGN

EDSI ENGINEERING DESIGN SOURCE, INC.

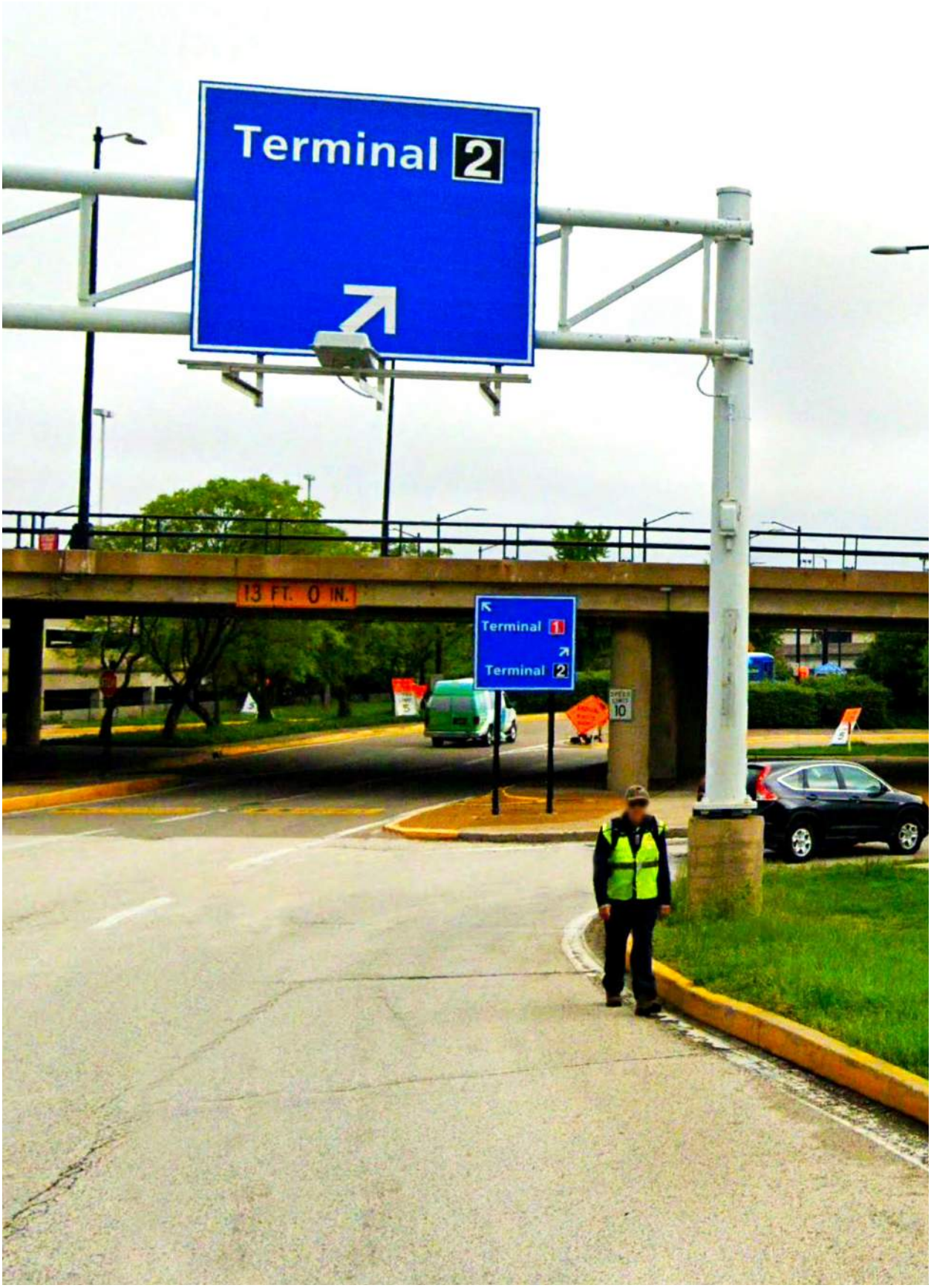

Terminal 2
13 FT. 0 IN.
Terminal 1
Terminal 2

Table of Contents

Page Intentionally Blank

Executive Summary

Figure ES-1: *Study area and project extent*

STUDY PURPOSE AND NEED

In 2011, the City of Woodson Terrace adopted its Comprehensive Plan to guide growth, private development, and investments in public infrastructure and assets. The Plan recommended the City explore the feasibility of extending Woodson Road across Interstate 70 (I-70) to connect to Lambert International Boulevard and St. Louis Lambert International Airport ("the airport"). This potential connection to the airport could provide significant benefit to Woodson Terrace, its residents, and its local businesses in the form of economic development, increased access to transit, and multimodal network connectivity.

The connection of Woodson Road to the Airport is no small undertaking. Such a project would require substantial engineering, interagency coordination, financial and staff resources, political commitment, and time. In addition, project constraints in the form of utilities, clearance, grades, right of way, and obstructions could negatively impact the project or even render the project infeasible.

The Woodson Road Airport Connection and Corridor Study presents and evaluates alternatives to determine the viability of directly connecting Woodson Terrace to the airport. The study also examines options for roadway improvements, biking and walking infrastructure, and corridor development along Woodson Road.

PRIMARY FINDING

Our analysis of the parameters detailed in this Study demonstrate that directly connecting Woodson Road to the airport is feasible, and is best achieved by raising the current elevation of this interstate so that Woodson Road passes under I-70. This design will have the greatest beneficial impact on the Woodson Road corridor, will positively impact neighboring communities, and will enhance multi-modal connectivity and circulation. Also, and critical to feasibility to the airport connection, our analysis determined that this preferred option will provide a solution that will improve I-70 and maintain existing interstate access as it exists between Air Flight Drive and Natural Bridge Road.

EXISTING CONDITIONS

A thorough understanding of the study area is necessary for the development of conceptual alternatives. The Existing Conditions chapter of this Study examines relevant planning studies, the existing surface transportation system, multimodal networks, transit access and circulation, available right of way, utilities, land use, and other relevant information.

CONCEPTUAL ALTERNATIVES

The Conceptual Alternatives chapter provides written descriptions and conceptual plans for both the Woodson Road Airport Connection and the Woodson Road Corridor.

THE WOODSON ROAD AIRPORT CONNECTION ALTERNATIVES

- Pedestrian & Bicycle Suspension Bridge Crossing
- Pedestrian & Bicycle Bridge Crossing
- Pedestrian & Bicycle Undercrossing
- Woodson Road Underpass

The Woodson Road corridor is divided into three separate elements, each with unique alternatives. They are as follows:

ROADWAY CONFIGURATION ELEMENT

Concepts:

- Boulevard
- Three-Lane Roadway

ALTERNATIVE TRAVEL MODES ELEMENT

Concepts:

- Side Path
- Two-Way Protected Bike Lane
- Directional Protected Bike Lanes

CORRIDOR DEVELOPMENT ELEMENT

Concepts:

- Boulevard
- Three-Lane Roadway
- Nodal Emphasis

EVALUATION METHODOLOGY

Each Conceptual Alternative presents unique opportunities, benefits, challenges, and other considerations that must be carefully measured in order to arrive at a preferred alternative. In order to do so, the study utilizes a quantitative evaluation methodology that applies a numeric scale to each evaluation criterion, and groups these criteria and scores into three overarching categories: Feasibility, Connectivity, and Impacts.

This methodology, and resulting scores, allow for the comparison of Conceptual Alternatives and ultimately the recommendation of a preferred alternative for the Woodson Road Airport Connection, as well as the Woodson Road Corridor.

PREFERRED ALTERNATIVE/ CONCEPT

The recommendation advanced in this study consists of a preferred alternative for the Woodson Road Airport Connection, and a preferred alternative for the Woodson Road Corridor.

WOODSON ROAD AIRPORT CONNECTION

Our evaluation of the four Alternatives for the Woodson Road Airport Connection results in a clear demonstration of the Woodson Road Underpass as the preferred alternative (Figures PA-1 and PA-2) for the I-70 Crossing. This alternative performs the best of all alternatives reviewed in all three evaluation categories, and its value is found, particularly, in its performance on both in overall Connectivity and Positive Impacts. Specifically, the connectivity of Woodson Road to the airport supports existing plans, access to the airport and Metrolink, circulation to and from the airport, and connections to land uses and neighborhoods to the south. The preferred alternative also excels in positive impacts supporting safety and security, enhanced economic opportunities, and positive user experience/sense of place.

WOODSON ROAD CORRIDOR

The recommendation for the recommended design concept for Woodson Road is comprised of the best performing alternative for each project element: roadway

reconfiguration, alternative travel mode, and corridor development. The recommended design concept consists of a three-lane roadway configuration with directional separated bike lanes, sidewalks, and focused nodal development at distinct intervals along the corridor.

Further analysis, stakeholder engagement, and public input is suggested to advance this recommended alternative for two very important reasons. First, the evaluation results for the reconfiguration of Woodson Road indicate minimal variation between the roadway reconfiguration and alternative travel mode options, so other alternatives for project elements may be equally viable. Second, changes to Woodson Road in the form of lane reconfiguration, bikeway installation, and adjacent development will have a significant impact on the daily lives of community residents, both in terms of disruption during construction activity and potential benefits of new community amenities and businesses.

The City of Woodson Terrace should develop a constructive dialogue with community residents and stakeholders to further refine the recommended design concept through a corridor planning process to finalize the concept.

NEXT STEPS

With the recommendations for the connection of Woodson Road to the airport and reconfiguration of Woodson Road in hand, the City should develop a communication plan to share the results of this study with to key stakeholders identified as the target audience in the project purpose section of the report. These communications will be critical to building support for the project/projects.

Additional engineering of the concepts should be carried forward to address detailed questions stakeholders may have with the recommended design concept, as well as provide the detail necessary for successful grant application and participation in a variety of funding programs. These may include East West Gateway's Transportation Improvement Program (TIP) for the St. Louis Region, MoDOT's Cost Share Program (for up to 50% of project costs), the Governor's Economic Development Program, and even the USDOT's BUILD Discretionary Grants Program. Any of these funding options will require support from multiple partners for success in the implementation of the alternatives.

Figure ES-2: *Woodson Road Undercrossing Alternative, the preferred Interstate 70 crossing option*

Page Intentionally Blank

Project Purpose

Image PP-1: *St. Louis Lambert International Airport Terminal 1 (source: flystl.com)*

WHY DO AN ANALYSIS?

As Woodson Terrace continues to implement the recommendations from the 2011 Comprehensive Plan, the connection of Woodson Road across I-70 to link directly into Lambert International Boulevard through either a roadway and/or a walking and biking connection presents a range of opportunities in line with the plan's vision and goals:

- Provide multi-modal transportation connection
- Promote economic & recreational opportunities
- Provide for orderly growth & development in Woodson Terrace
- Offer connections from the airport to high quality shopping & entertainment experiences
- Offer attractive & healthy active living environment
- Provide support for environmental stewardship through efficient connections to the Terminal 2 MetroLink Station and environmentally beneficial infrastructure
- Establish a distinct identity for the City of Woodson Terrace

Improving connectivity to the airport, I-70, MetroLink and the region will stimulate economic development in the city's two defined development districts – the Gateway District and the Town Center District. The Gateway District encompasses properties adjacent to Natural Bridge Road and Woodson Road south to Aerospace Drive, and the Town Center District includes properties adjacent to Woodson Road to the

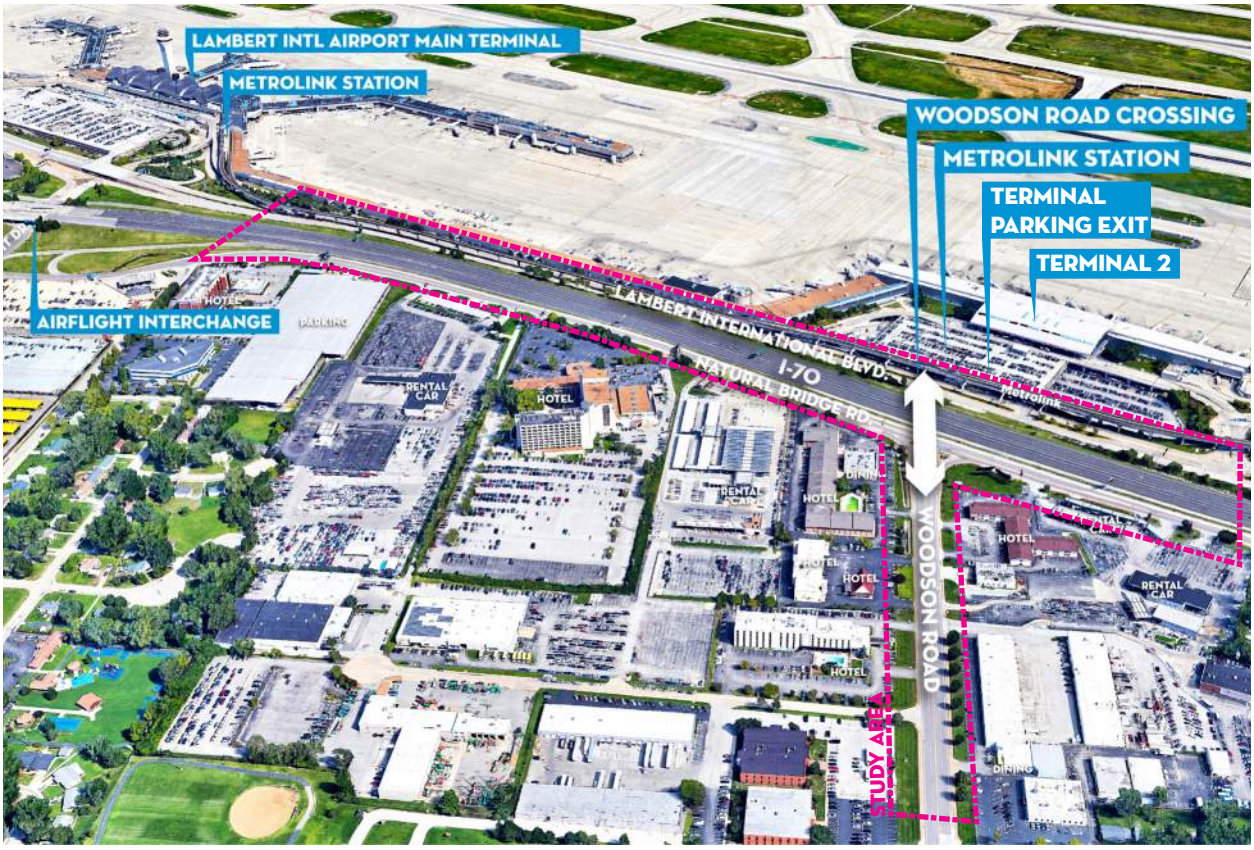


Image PP-2: *Woodson Road Airport Connection Area*

southern city limits. The study aims, first and foremost, to determine whether an Airport connection of some type is feasible and how that connection would integrate into Woodson Road improvements from Natural Bridge Road to Bataan Drive. Based on the outcome. If the connection is in fact feasible, a next step will be to identify a preferred alternative and ultimately present a case to support implementation and funding a preferred alternative.

WHY NOW?

The study is being done now, as a next step for comprehensive plan implementation, since timing is well positioned during key planning steps for airport revitalization, and regional coordination that can support development of adjacent communities, not to mention stimulate further positive development within the city. In the past two years, Woodson Terrace has witnessed $40 million in investment for developments directly serving the airport in new hotel construction and future renovation. Better access to the airport, I-70, and the MetroLink afforded by an I-70 crossing into the heart of the Gateway District at the Woodson Rd. and Natural Bridge Rd. intersection makes attracting private investment to the area and development more viable. It could potentially bring hundreds of thousands, if not millions, of visitors annually to this critical city gateway increasing efficiency of traffic operations and notoriety within the Gateway and Town Center districts. Further south on Woodson Road, within the Town Center district, most properties are under-utilized or abandoned offering significant redevelopment possibilities. The City has enacted the appropriate controls to ensure any development is mutually beneficial for the City, residents, and prospective developers.

Concurrently, considerations to privatize the airport have ended and airport planning can move forward accordingly. The airport is currently undertaking an Airport Layout Plan (ALP) which will seek strategies to increase capacity, address the impacts of being landlocked with limited access, and access airport operations and interaction with adjacent communities. Access and connectivity will be an important component of the plan which a Woodson Road crossing would

ultimately support. Most recently, in February 2020, East-West Gateway Council of Governments' (EWGCOG) Board of Directors directed staff to draft a scope of work for the study of St. Louis Lambert International Airport that would identify economic development potential around the airport and analyze the airport's physical investment needs, regional economic impact, and impact to surrounding communities. Once again, a Woodson Road crossing of I-70 will be a key component to address the impacts to Woodson Terrace, adjacent communities and the region.

STUDY DEFINITION

The study, in this instance, will be focused on determining whether the Woodson Road Airport Connection location context and conditions can support a walking, biking and/or vehicular Woodson Road crossing, and if a crossing is physically feasible from an engineering standpoint. The consultant team was tasked with identifying no more than four (4) alternatives to assess feasibility. Feasible alternatives are to be analyzed to determine the most beneficial crossing and preferred alternative. Planning level rough order of magnitude cost estimates will be prepared for the preferred alternatives for the Airport Connection and improvements along Woodson Road.

This study only considers whether a crossing is feasible and which crossing is preferential based on available information. Detailed engineering is not in the scope of this initial analysis. High level objective evaluations using professional planning, landscape architecture, and engineering judgments with input from City staff and stakeholder interviews will determine the preferred alternative. A community engagement process is recommended to validate or alter the preferred alternatives as project development progresses.

This study does not include survey data, traffic studies, geometric analysis, detailed utility analysis, detailed engineering plans, specifics associated with project implementation, and I-70 traffic control and phasing. The study is intended be used to make decisions regarding next steps for engineering, operations analysis, funding opportunities, and further stakeholder engagement.

TARGET AUDIENCE

The City of Woodson Terrace conducted the study to forward a vision benefiting the city's future for their residents. They realize a visionary project(s) of this scale requires support and partnerships far beyond the city limits. Potential partners and stakeholders have been considered during each step in the process with particular appreciation for MoDOT, Lambert International Airport, and Bi-State for their input.

Improving connectivity and access to the airport and I-70 has potential impacts locally, regionally and even nationally. This project could result in new businesses, jobs, a more vibrant community of Woodson Terrace, and an increase in City and County revenue. Positive development on Woodson Rd. would not only benefit Woodson Terrace and airline passengers, but serve the airport, the City of St. Louis, St. Louis County, and adjacent communities, as well as the region's businesses, workers, residents and visitors accessing the airport and the services directly and indirectly associated with it. The potential return on investment is considerable. The following provides descriptions of the benefits and considerations for specific key stakeholders that must be a part of the ongoing dialog, funding discussions, and project development.

CITY OF WOODSON TERRACE

A Woodson Road connection to Lambert International Boulevard offers significant benefits to Woodson Terrace. The Woodson Road and Natural Bridge Road intersection is the gateway into the city's main commercial corridor called the Gateway District as identified in the Comprehensive Plan and the entrance onto the community's main street called the Town Center District. A vehicular crossing, specifically, would provide more direct access for thousands of daily shuttle routes between the airport and rental car services, hotels, and overnight parking facilities. Conservative estimates, based on representative samples, indicate current shuttle trips at 12,000 to 15,000 which cross I-70 daily. A substantial percentage would be diverted from the Air Flight Drive interchange to a Woodson Road crossing. If even one third of these trips are diverted to Woodson Road, nearly 1.5 million to almost 2 million people annually would be introduced directly to Woodson Terrace, if only one person is riding each shuttle, relieving traffic at Air Flight Drive. With the potential for a Terminal 2 expansion and the growth of Southwest Airlines services, the people entering Woodson Terrace would only increase. Additionally,

Image PP-3: *Image of Denver Aerotropolis (source: Seven G)*

it would open a more direct access to the city from westbound I-70 traffic.

Regionally, Woodson Terrace's segment of Woodson Road is the most opportune area to develop St. Louis's own appropriate-scaled version of an "aerotropolis" like forward-thinking cities such as Atlanta, Dallas, and Denver. The Town Center development district has a framework in place to create an area reflective of authentically St. Louis area places which would serve and fit within the local context. Such a development would further enrich the welcome for airline travelers, provide a desirable location central to the region for commerce and tourism, and increase the city and county's revenues.

Greater connectivity to I-70, the MetroLink Terminal 2 Station, and airport along with Town Center District development would increase the quality of life for Woodson Terrace residents. Improved access to regional transportation networks would make traveling to and from the city more convenient. Town Center development would provide local business and employment opportunities, direct access to dining, entertainment, and other commercial service options. Increased City revenue would help the City deliver better and higher quality services and programming. Developing biking, walking and jogging facilities offers recreational amenities supporting better mental and physical well-being.

Benefits

- Improves access to the airport, MetroLink, I-70 and the region
- Focuses hundreds of thousands, if not millions, of visitors annually to city's central Gateway
- Improves airline passenger access to city businesses and services
- Catalyzes economic development
- Increases residents' quality of life
- Increases City revenues
- Improves City services and programming

LAMBERT INTERNATIONAL AIRPORT/CITY OF ST. LOUIS

Airport connectivity to adjacent communities and the broader roadway network will be a primary element of the airport's upcoming master plan. Connecting to and from the airport terminals to I-70 can be confusing. Navigating from the terminals to rental car services, hotels, and overnight parking is even more difficult. The recent Planning and Environmental Linkages (PEL) study identified the need to improve the level of

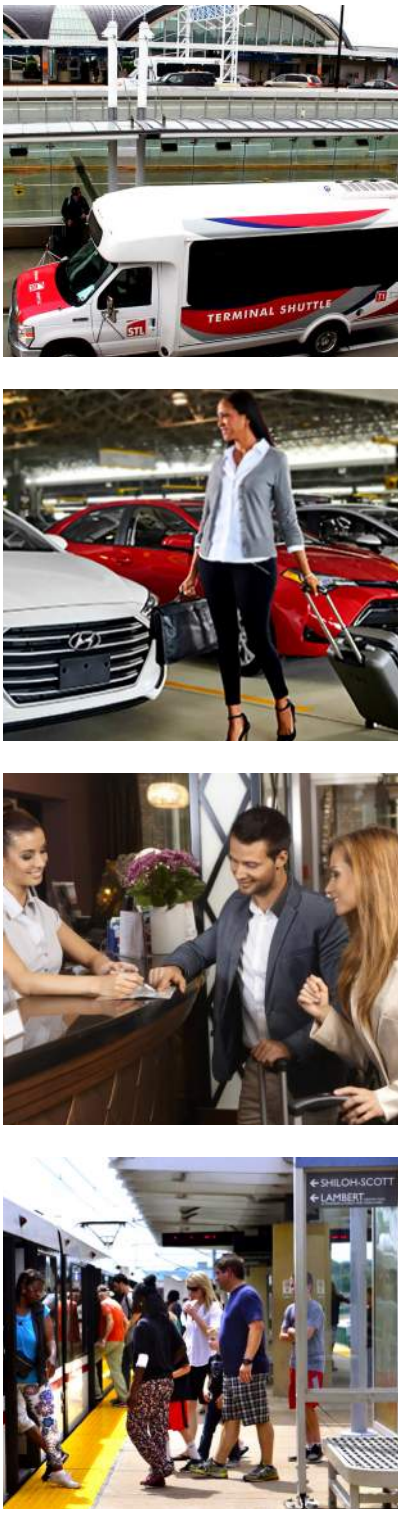


Image PP-4: *Airport Services Top to Bottom: Shuttles, Rental Cars, Lodging, MetroLink Transit*

service for vehicles at the Air Flight Drive and I-70 interchange. The Woodson Road Airport Connection will improve connectivity and enhance efficient operations to the airport for vehicles and reduce the traffic demands on Air Flight Drive, even if only through shuttle route change.

A pedestrian connection would increase access and safety for people walking to and from the airport. With no current pedestrian connection, airline staff, employees at the airport, and others walking to and from the airport have been seen walking within the vehicular travel lanes on Air Flight Drive and others attempt to cross I-70 at Woodson Road resulting in significant safety concerns for police. Providing a pedestrian connection to the Terminal 2 and MetroLink station would provide the only continuous facility for people walking.

Benefits

- Improves access and connectivity from airport to supporting services south of I-70
- Improves crossing safety for people walking
- Simplifies navigation across I-70 for services, visitors and staff
- Provides continuous connection to airport for people walking

AIRPORT SERVICE PROVIDERS & CUSTOMERS

Greater connectivity would simplify the airline traveler experience, particularly for visitors arriving at Terminal 2. Passengers seeking car rental services or a hotel would be able to walk to Hertz, National, and Alamo rental car services, the Hilton, Quality Inn, Hotel St. Louis, Motel 6, Holiday Inn, (New Hotel Developments), and Holiday Inn Express should pedestrian connections are provided. Airport wayfinding enhancements including signage indicating the distance and walking times, gateways, and shade structures would emphasize the walk's convenience. A vehicular connection could reduce shuttle service times for car rental services, hotels, and overnight parking to both terminals from a few minutes to upwards of twenty-five minutes. These travel time reductions could result in increased service frequency and improved air quality.

The Woodson Road and Natural Bridge Road intersection is just as close to Woodson Terrace's Town Center as the Hilton Hotel or Holiday Inn Express. The more direct I-70 crossing supported with Town Center District development presents the opportunity to accomplish some of the same customer service goals and benefits the airport privatization considerations may have offered providing stakeholder and investment support is favorable. If supporting services like rental cars could be combined near or within the Gateway or Town Center District, shuttle services could be merged into a single high frequency shuttle service connecting to more vendors in fewer or a singular location. The connection to the redeveloped Town Center to the south presents a more welcoming and attractive first impression and potential for convenient ancillary services such as dining, commercial services, work share meeting and office space, and entertainment among other business and visitor conveniences planned for this district.

This project provides an occasion to significantly elevate first

Image PP-5: *Airport Staff Walking in Roadway on Air Flight Drive*

impressions for hundreds of thousands of the region's annual airline travelers in both terminals by enhancing their experience with a more safe, simplified, and intuitive I-70 crossing for vehicles, shuttles, and transit users, as well as for people walking and biking.

Benefits

- Simplifies airline traveler experience between airport and services south of I-70
- Provides opportunity for 5 to 10-minute walk from Terminal 2 to services south of I-70
- Reduces shuttle route distances and time upwards of 25 minutes increasing shuttle frequency
- Opens opportunities to develop services supporting some benefits and goals associated with privatization
- Improves visitor first impressions providing more convenience and attractiveness when moving from the airport terminals to the south side of I-70

MoDOT

A Woodson Road connection to the airport would satisfy all three tenets of the agency's mission – Safety, Service, and Stability. This project could improve safety in numerous ways including reducing conflict points, providing separate facilities to support walking and biking, and reducing the time people are in vehicles and on the roadway. Service improvements include greater network connectivity and efficiency, reduction of travel times when crossing I-70, improved level of service for the Air Flight Drive interchange, and a reduced number of trips through signalized intersections. The improved level of service and reduction of idling at signalized intersections would reduce vehicular emissions. The project could also provide more stability for MoDOT's maintenance in the reduction of a signalized intersection, the ability to defer infrastructure upgrade investments in the Air Flight Drive interchange, and the potential of shifting ownership of Woodson Road to the City of Woodson Terrace are of great benefit in sustainability of the MoDOT network, in addition to addressing aging infrastructure on I-70 through this segment, without impacting interchange ramps and access points. As noted previously, the project has significant potential to increase employment, catalyze development, generate new

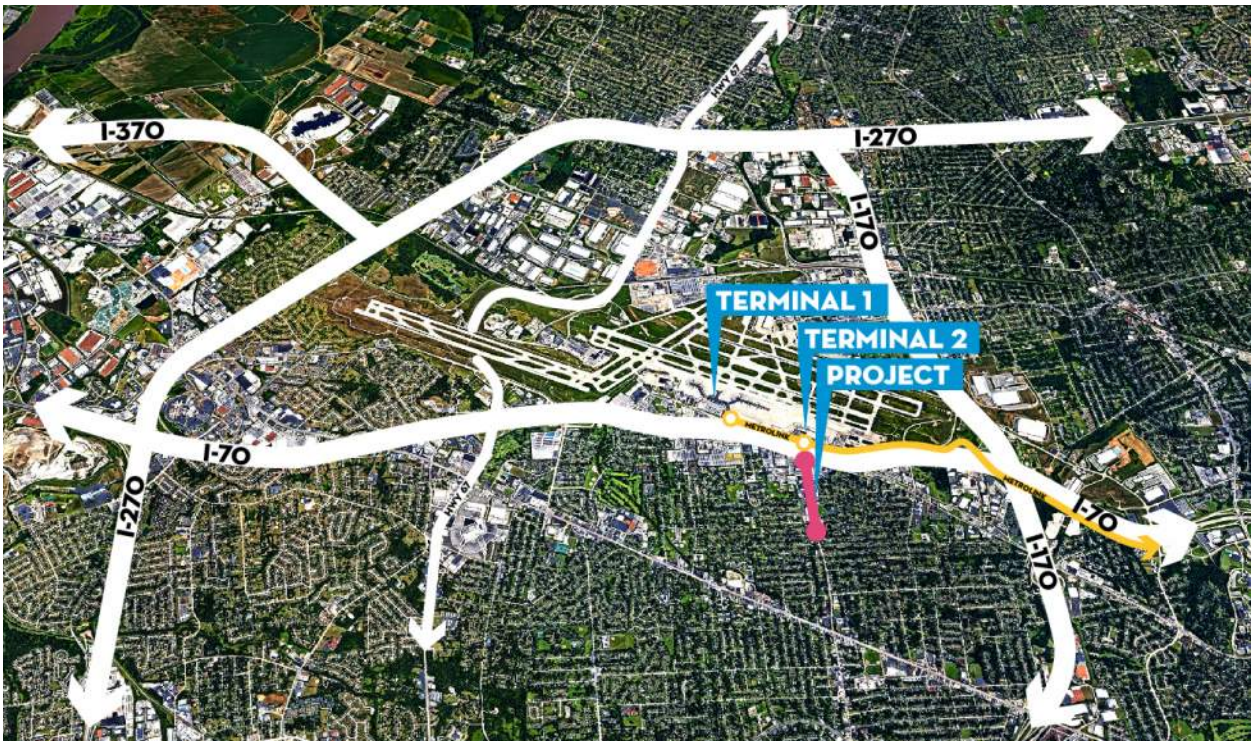


Image PP-6: *Regional Connectivity*

businesses, improve the services of existing businesses, and promote economic prosperity for the St. Louis metro-area derived from the airports' regional impact which would promote resilience and stability in the economy.

Benefits

- Improves safety, reduces/removes ability for people walking to cross on I-70
- Increases network connectivity and efficiency
- Improves level of service for Air Flight Drive interchange
- Improves level of service for vehicles and people walking and biking
- Reduces signal and roadway infrastructure maintenance
- Reduces vehicular emissions
- Supports economic development
- Potentially removes 0.75 miles of roadway (Woodson Road) from MoDOT ownership

ST. LOUIS COUNTY, ST. LOUIS CITY & EAST-WEST GATEWAY COUNCIL OF GOVERNMENTS

The airport's service to the entire metro area gives any improvements and development potential regional importance. The nearly 16 million airline travelers and over 70 thousand tons of cargo serve every corner of the region. The two primary regional beneficiaries are St. Louis City, who owns the airport, and St. Louis County, which surrounds the airport.

A Woodson Road connection could improve the partnership between the City of St. Louis and St. Louis County. With airport privatization no longer being considered, the negative repercussions to the St. Louis County communities south of I-70 currently serving the airport are averted. As the regional Council of Governments, East-West Gateway is a key stakeholder from a regional planning perspective, as well as the entity that will likely offer funding opportunities through a competitive process for several federal grants as they are opened up for community submission.

The connection and potential development would improve airport user experience and services for the City, and support the nearly 24,000 County residents directly adjacent to the airport along I-70, improving their quality of life through employment opportunities, business development, improved infrastructure, and increase city and County revenues. Development opportunities along Woodson Road could be leveraged to develop St. Louis's own appropriate-scaled version of an "aerotropolis." This type of development could provide a competitive advantage over other metropolitan areas attracting business investment, workforce

Image PP-7: *Areas of an Aerotropolis (source: thesmartcityjournal.com) would need to integrated into multiple communities near Lambert International Airport*

talent, and improve the regional economy.

Considered one of the "ideas that will change the world" by TIME Magazine, immediate access to the airport, interstates 70, 170, and 270, and the MetroLink offers the synergy between transportation infrastructure and business potential is ideal for this kind of development concept. It would elevate the airports significance and utilization, and improve the economic influence of the immediate area, St. Louis County, and the metro area.

This project connects directly with many of St. Louis County's Strategic Priorities. Expanding access and opportunities for people to walk, bike and access transit directly supports the emphasis Mobility and Connectivity place on active transportation and transit. The connection has the potential to connect with Places and Spaces priorities on high-impact development and redevelopment. These multi-modal transportation connections and developments, the businesses, jobs, and revenues, would link into prosperity offering opportunities to cultivate economic mobility.

The Woodson Road Connection to the Airport and potential Woodson Road development would meaningfully reduce environmental impacts. Shorter vehicle trips and reduced signals during trips will dramatically lower emissions for shuttles alone. The ability for people walking and biking to access a variety of services within a reasonable distance and time will divert trips from vehicles further reducing emissions. The crossing also would provide access to the MetroLink for Woodson Terrace residents and visitors, again lessening the need for vehicles.

Town Center development in Woodson Terrace will provide additional environmental benefits. Reallocating space within the Woodson Road ROW for a productive streetscape would create opportunities for engineered natural stormwater management, reduced impervious area, and increased biodiversity. The resulting reduction in heat island effect and airborne particulates would create a welcoming place for people. If local residents and visitors are able to walk or bike to places along Woodson Road and communities along Woodson Road to the south, they would have otherwise driven to, theses trips would further decrease vehicle emissions.

Greater convenience and efficiency combined with a development type like the aerotropolis model could increase flying versus driving a vehicle should the airport's national status rise. The greatest

impact would be in diversion from ground freight transport which has 120-percent of the energy intensity compared with air freight.

Benefits

- Provides access and connectivity for metro region
- Offers opportunity to improve St. Louis City and St. Louis County's partnership
- Improves airport user experience and services for St. Louis City
- Supports St. Louis County's Strategic Priorities of Mobility and Connectivity, Places and Spaces, and Prosperity
- Improves quality of life for County residents south of airport and I-70
- Presents opportunity to create a unified development plan between airport and directly adjacent County communities
- Reduces vehicular emissions
- Supports low-impact stormwater management, reduction in impervious area, and increases in biodiversity
- Promotes reduction in heat island effect and airborne particulates

ADJACENT COMMUNITIES

Four cities are adjacent to the airport on the south side of I-70 in the 3.5-miles from Lindbergh Blvd to the I-70/I-170 interchange – Berkley St. John, Woodson Terrace, Edmundson, and St. Ann. Greater access, connectivity, and broader economic development improve the quality of life for the residents of all these communities. An opportunity exists for the communities to align and leverage mutually beneficial development plans, which would offer additional overall community benefits. Even with small partnerships, such as creating a cohesive wayfinding signage system supporting all the services and destinations associated with the airport would contribute to the prosperity of all cities.

Benefits

- Provides improved access and connectivity to the airport, MetroLink, and I-70
- Offers opportunity to improve community partnerships
- Improves quality of life for residents

BI-STATE

Bi-state currently only has one active bus route service on Natural Bridge; light rail service only serves the airport. There are currently no connections for biking and walking to the MetroLink Stations at the airport; so, connecting of these stations to the bus route along Natural Bridge and to the community will serve a significant benefit to the airport and the community, as well as support Bi-State Operations. A connection to Woodson Road would provide the only access to communities south of I-70 and to MetroBus service along Natural Bridge Road, but through thoughtfully planned bus route alterations and bus stops incorporated into the infrastructure for the Woodson Road connection could noticeably increase ridership and service for job access at the airport, adjacent communities and business development in Woodson Terrace.

Benefits

- Provides access to MetroLink for communities south of I-70
- Offers potential to link MetroBus services to the airport

Page Intentionally Blank

EXISTING CONDITIONS

Image EX-1: *Woodson Road Project Extents*

INTRODUCTION

The existing conditions section provides a snap shot of the orientation and infrastructure at the intersection of Woodson Road and Natural Bridge Road, and I-70 from Air Flight Drive east to the point where the interstate ramps to Natural Bridge Road begin. It also focuses on the section of Lambert International Boulevard at the exit of the Terminal 2 parking garage, and the segment of Woodson Road from the Natural Bridge intersection south to Bataan Drive. The consultant team assessed the existing transportation infrastructure and surrounding context through site observations, available aerial survey data, as-built construction documents, and related planning documents were reviewed to determine the feasibility of a Woodson Road connection to the airport. Following a basic assessment of feasibility , a further study of the surrounding area was conducted to form the basis for developing, analyzing and evaluating different alternatives for the I-70 crossing, as well as improvements to Woodson Road. Potential impacts associated

Image EX-2: *Regional Access Map from Woodson Terrace Comprehensive Plan*

with the interstate crossing and Woodson Road improvements were assessed with regards to the City of Woodson Terrace, direct stakeholders, and the broader region.

LOCAL CONDITIONS

The study area's local context is shown on EX-2 and is adjacent to I-70 and the 0.75-mile Woodson Road segment from Lambert International Boulevard north of I-70 south along Woodson Road to Bataan Drive. Woodson Road aligns directly with St. Louis Lambert International Airport Terminal 2 and the Terminal 2 garage exit, as well as the MetroLink station on the upper deck of the garage. Woodson Road serves as the City of Woodson Terrace's main street. Woodson Terrace is the only city adjacent to the airport with a corridor that functions as a town center and is ripe for redevelopment.

Interstate access to Woodson Terrace is not direct, and the Woodson Road and Natural Bridge Road intersection is a half a mile from the Interstate 70 / Air Flight Drive interchange, one mile from Terminal 1, 1-1/2 miles from Terminal 2, and 1-1/2 miles from the Terminal 2 MetroLink Station. Connecting Woodson Road to Lambert International Boulevard, the MetroLink Station, and Terminal 2 would provide nearly 16 million annual airport passengers and thousands of workers supporting its' operations. The connection would create direct access to lodging, restaurants, car rentals, and overnight parking on Natural Bridge Road and the Woodson Terrace Town Center District. It would also provide the more than 24,000 residents in communities

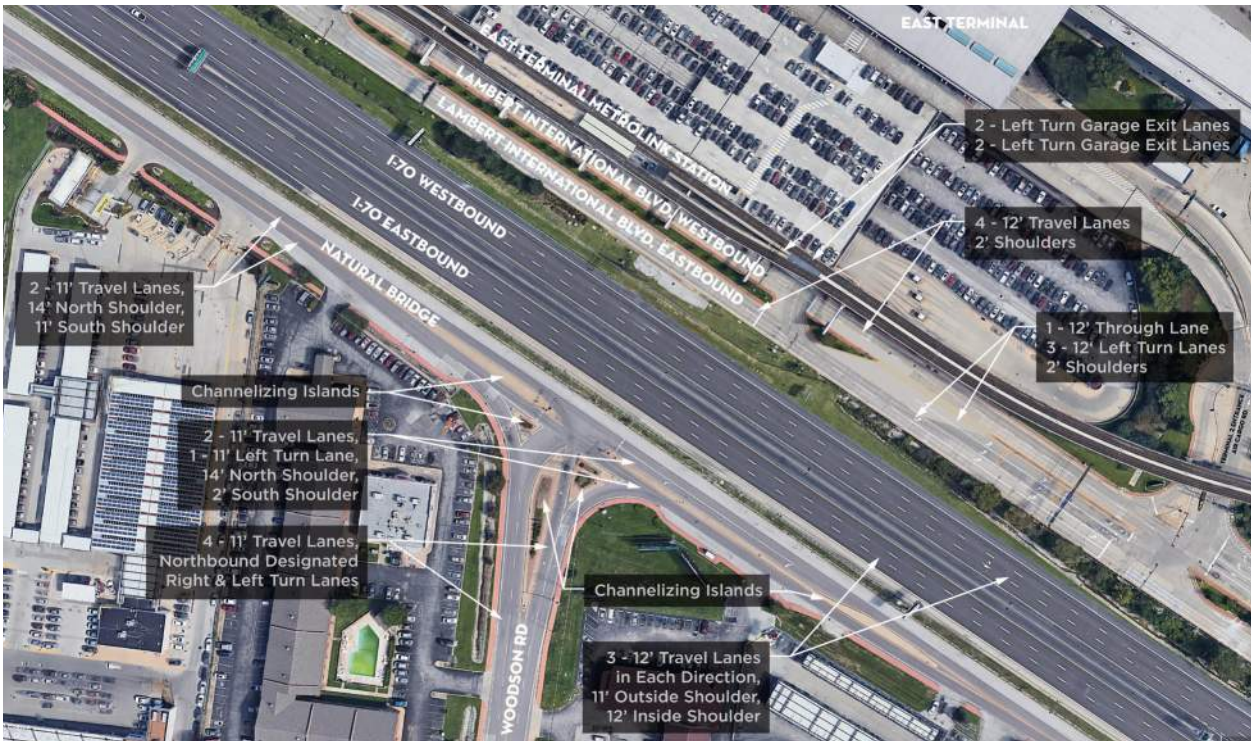


Image EX-3: *Woodson Rd., I-70, & Lambert International Boulevard Context*

adjacent to Woodson Terrace direct access to the MetroLink and airport.

REGIONAL CONDITIONS

The airport, supporting services and amenities, and I-70 provide people and businesses in the St. Louis metro region and beyond, as well as national and international travelers a high level of mobility. Over 145,000 vehicles pass Woodson Terrace daily on I-70. To the west, 40,000 daily vehicles use Highway 67.

The St. Vincent Greenway is the nearest greenway, approximately 2.75 miles east of the study area. It can be accessed by car or utilizing the MetroLink, one stop east of the Terminal 2 Station. Access to the Missouri River Greenway is over 7-miles west. No regional trails are planned to connect Woodson Terrace into the metro region trails network.

EXISTING PLANS

A connection of Woodson Road to the airport is directly or indirectly identified in two existing plans - the City of Woodson Terrace's 2011 comprehensive plan, and the MoDOT 2018 I-70 Planning and Environmental Linkages (PEL) Study. There are also projects in the area included in the most recent MoDOT Statewide Transportation Improvement Plan (STIP), and there is an upcoming airport master plan. Summaries of relevant portions of each of these plans are described in the following sections.

2011 Woodson Terrace Comprehensive Plan

The plan identifies access to and from I-70 and the Terminal 2 MetroLink Station as considerable barriers for access to the city. The plan considered a number of potential solutions, including shuttle service to the airport, a bike bridge over I-70, and raising a portion of I-70 for a pedestrian and vehicle underpass connecting Woodson Road to Lambert International Boulevard. A safe, aesthetically pleasing, human-scale pedestrian environment is envisioned for the underpass with lighting, color, decorative materials, and wayfinding elements.

The Woodson Terrace Comprehensive Plan describes the vision for the City's two development Districts, recommends extending Woodson Road across I-70 to the Airport, and proposes Woodson Road and Natural Bridge Road improvements.

The Gateway Districts identifies the installation of, or improvements to gateways into the city to the north along Natural Bridge Road and

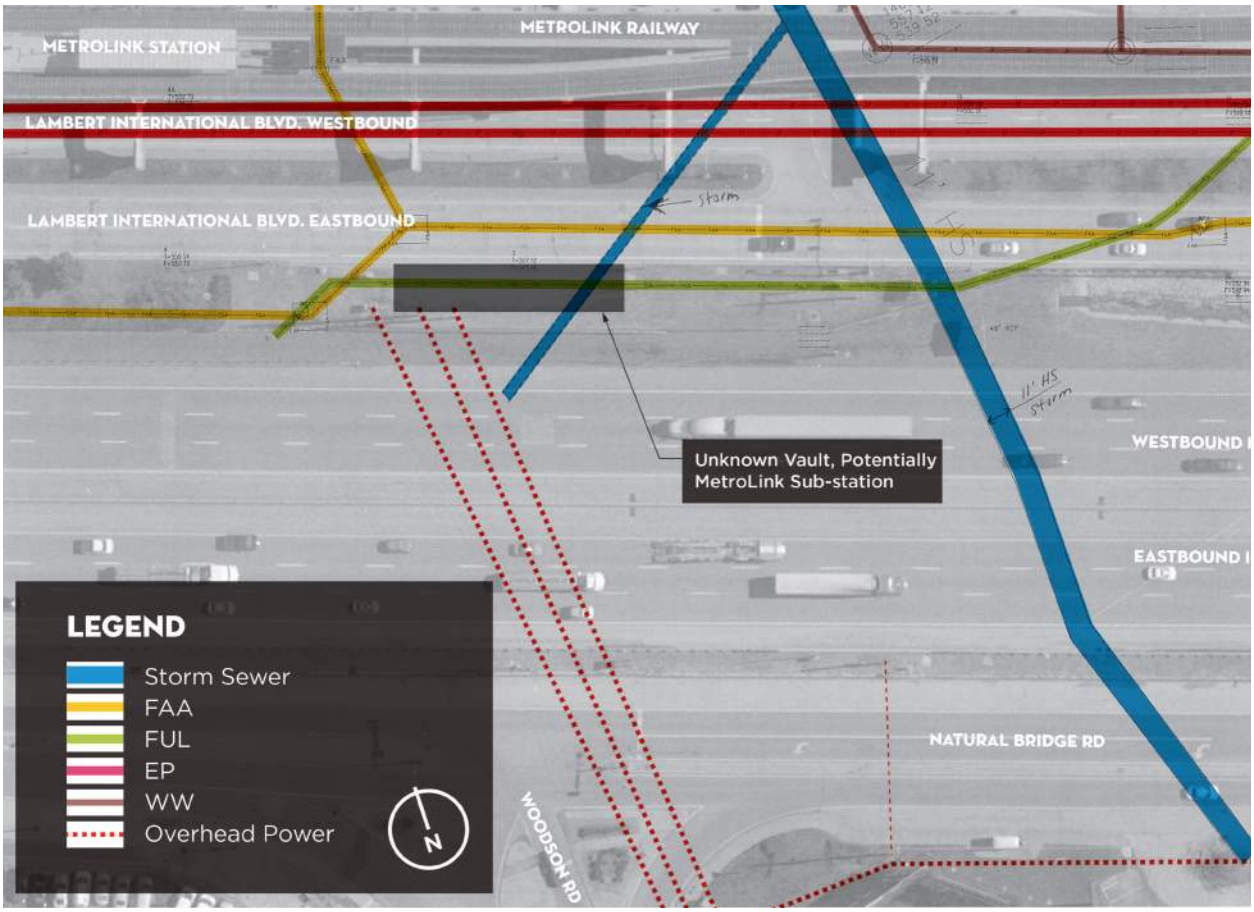


Image EX-4: *Woodson Rd., I-70, & Lambert International Boulevard Utilities*

extends south along Woodson Road to Aero Space Drive. Three focal points are identified, the most important of which being the Woodson Road intersection with Natural Bridge Road being one, and the city limit to the west and east being the other two. The plan envisions these areas to distinguish the segment of Natural Bridge Road within Woodson Terrace's city limits from other stretches of Natural Bridge in the immediate area, providing a sense of identity, transition, and appreciation for the local cultural heritage. The Woodson Road intersection is a key gateway to the community and can create a grand entry, compared with other City entry points, incorporating ornamental landscaping, lighting, public art, and decorative pavement. It is intended to raise interest for visitors entering to city and to serve as a focal element for those traveling north on Woodson Road.

The Town Center District serves to establish the remaining Woodson Road segment within the city as a town center central to the community's fabric. The plan envisions a mix of unique or specialized retail, commercial, and office uses located in zero-setback development two to four stories in height. A civic plaza is recommended with elements designed to encourage public activity and character including seating, pedestrian-scale lighting, landscaping, wayfinding signage, and fountains within an enhanced streetscape. A pedestrian-friendly environment is intended with businesses providing active frontage along the corridor and open views to encourage a sense of safety and security.

Two concepts for the right- of-way along Woodson Road were proposed to enhance Woodson Road that will serve and promote economic development. The concepts include a three-lane roadway with intermittent central medians, bioswales, parallel parking, a pervious paved pedestrian realm on both sides of the roadway with an impervious frontage zone and stormwater

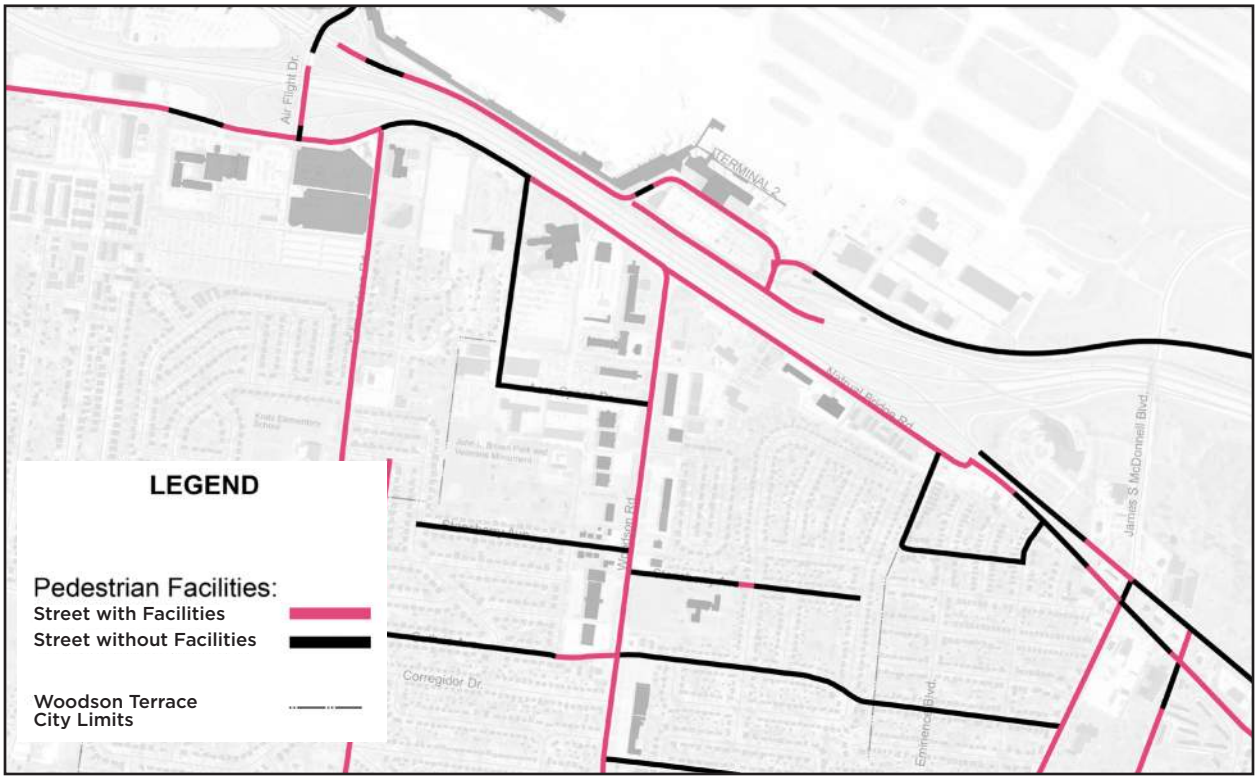


Image EX-5: *Existing Pedestrian Facilities*

planters, street trees, decorative plantings, and pedestrian-scale lighting. One concept recommends on-street bike lanes, while the other shows directional protected bike lane facilities. Regarding drainage, one concept directs pedestrian realm runoff to stormwater planters along the curbs, and the other directs pedestrian realm and parking runoff to curbside stormwater planters and travel lane runoff to the center medians.

2018 PEL Study

MoDOT and EWGCOG published the I-70 Planning and Environmental Linkages (PEL) Study in October 2018. This study was intended "to set a vision and strategic plan for the future of the Interstate 70 (I-70) corridor in the Saint (St.) Louis Region" . Appendix A of the Study describes the existing conditions of the I-70 corridor. The study states that "many sections of I-70 are aging and in need of repair". In addition, the current (Year 2015) and future (Year 2045) I-70 level of service in the vicinity of Woodson Road is E and F in both the morning and the afternoon.

MoDOT recently improved the pavement on I-70 from Springdale (east of I-170) to Union Boulevard (Project Number J6I3165). Construction was completed by Fall 2019.

2020-2024 STIP

MoDOT, in the 2020-2024 STIP, lists two upcoming projects in vicinity of Woodson Road. The first (Project Number J6I3326) consists of repairs to the McDonnell Boulevard Bridge over I-70 and the Lambert International Boulevard ramp to I-70 eastbound. This project is scheduled for construction starting in FY 2022 with an estimated construction cost of $2.1M. The second (Project Number J6I3338) consists of rehabilitation of 14 bridges carrying I-70 or over I-70 between Branch Street and Springdale Avenue, and includes I-70 over Coldwater Creek. Construction is scheduled for FY 2020 and is budgeted at $3.5M.

Airport Master Plan

St. Louis Lambert International Airport plans to conduct a master plan starting in 2020 and considers access and connectivity to and from the airport a primary issue to address. At the start of this study the City of St. Louis was considering privatizing the airport and airport representatives were hesitant to comment on the project discussions conclusions.

Image EX-6: *Walkability Analysis Diagram*

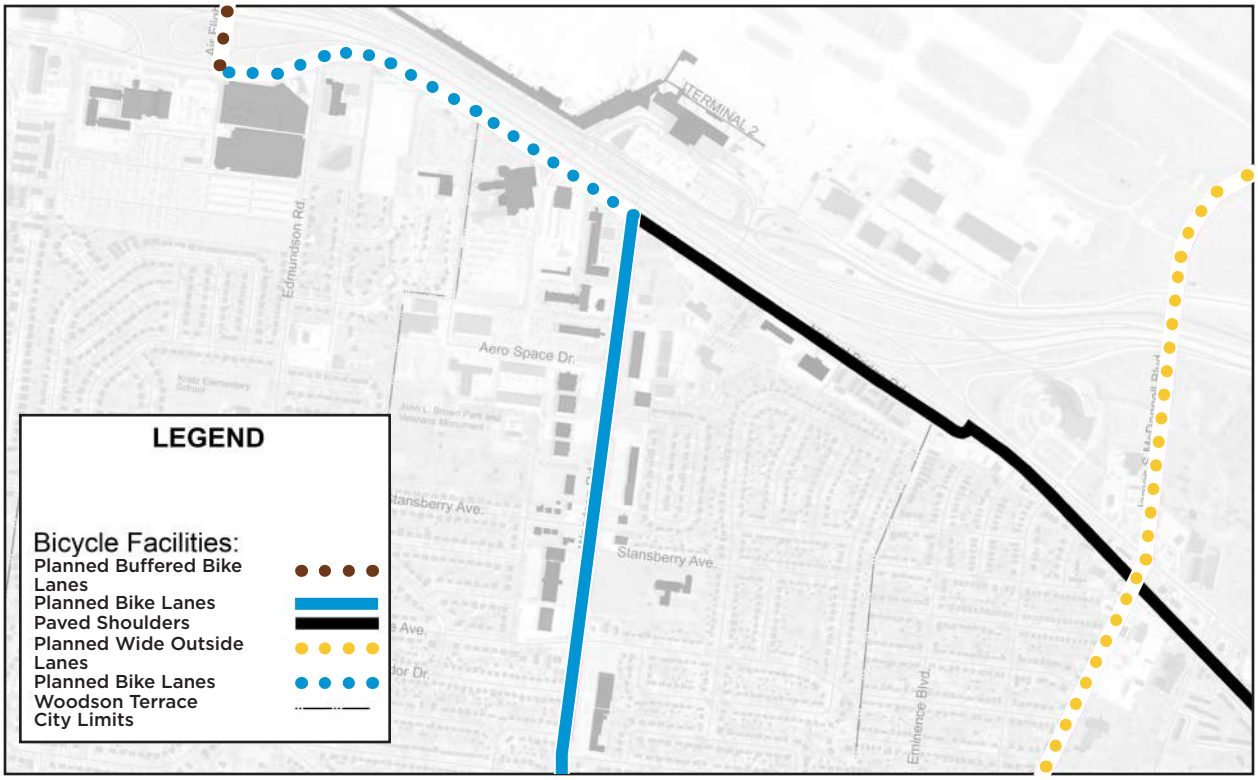


Image EX-7: *Gateway Bike Plan Routes*

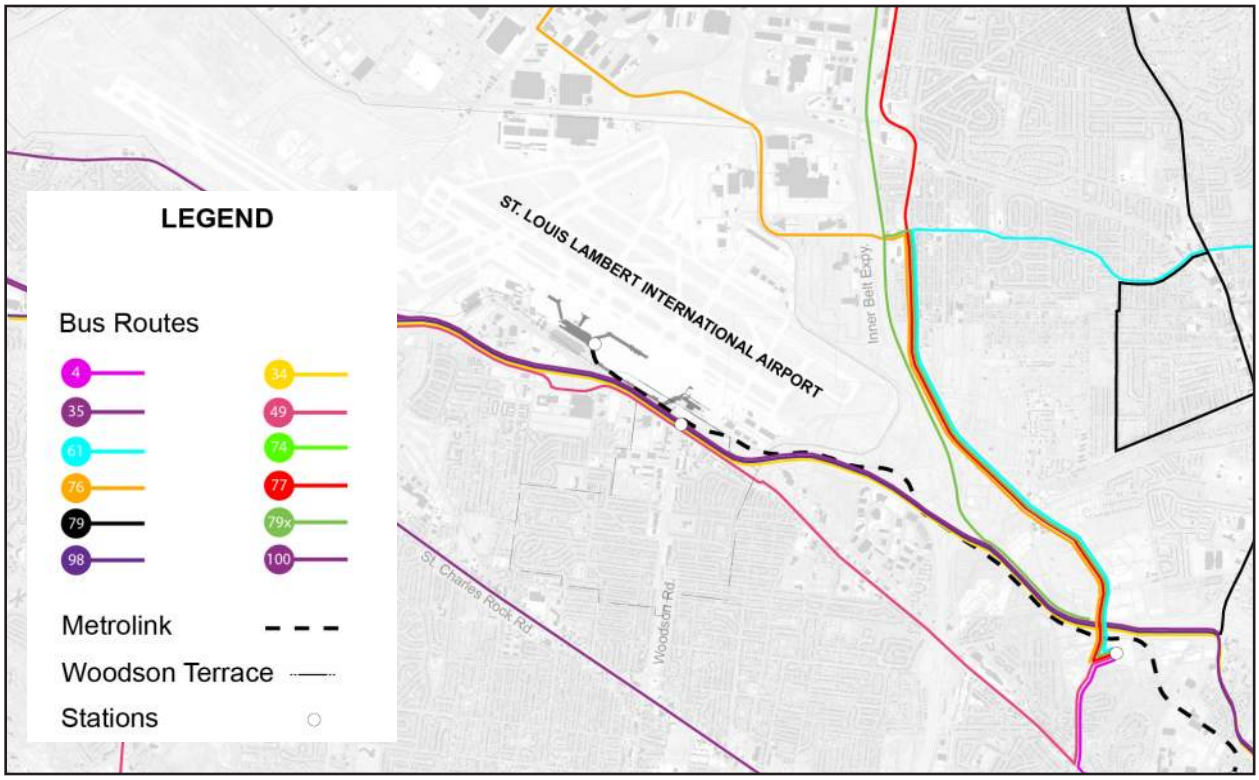


Image EX-8: *Regional Transit Routes*

EXISTING INFRASTRUCTURE

The existing infrastructure pertinent to the crossing of I-70 includes the Woodson Road and Natural Bridge Road intersection, the length of I-70 necessary for elevating the roadway profile for an underpass, and Lambert International Boulevard from the signalized parking garage exit east of Terminal 2. In addition, consideration of the existing infrastructure along Woodson Road will be key in the connection to the airport to provide a key transportation and place-making interventions that will generate economic development and revitalization.

Existing Right-of-way (ROW)

MoDOT owns and maintains the ROW for I-70, Natural Bridge Road, and Woodson Road, and the City of St. Louis owns Lambert International Boulevard. Woodson Road has a 150-foot ROW corridor, and Natural Bridge Road has approximately 80-feet of ROW. The ROW on the acute southeast corner flares with a ROW line perpendicular to Woodson Road approximately 100-feet south of the intersection extending east to the Natural Bridge Road south ROW line.

I-70 has approximately 140 feet of ROW between Natural Bridge Road and Lambert International Boulevard from the end of the I-70 eastbound on-ramp from Air Flight Drive to the interstate split just east of Terminal 2.

Lambert International Boulevard has approximately 130-feet of ROW shared with the MetroLink from the existing parking garage exit onto Lambert International Boulevard west nearly 1,000-feet. Piers straddle Lambert International Boulevard's westbound travel lanes with pillars in the median and approximately 10-feet north of the north curb line. Pillars are spaced approximately 110 feet along the road. Woodson Road's crossing needs to account for these pillars when determining the intersection location.

Existing Roadway Configurations

The Crossing Context Diagram depicts Woodson Road, Natural Bridge Road, I-70, and Lambert International Boulevard existing roadway configuration. Enhanced channelizing islands at the Woodson Road and Natural Bridge Road intersection function as traffic calming elements, pedestrian crossing refuges, and gateway features. No pavement

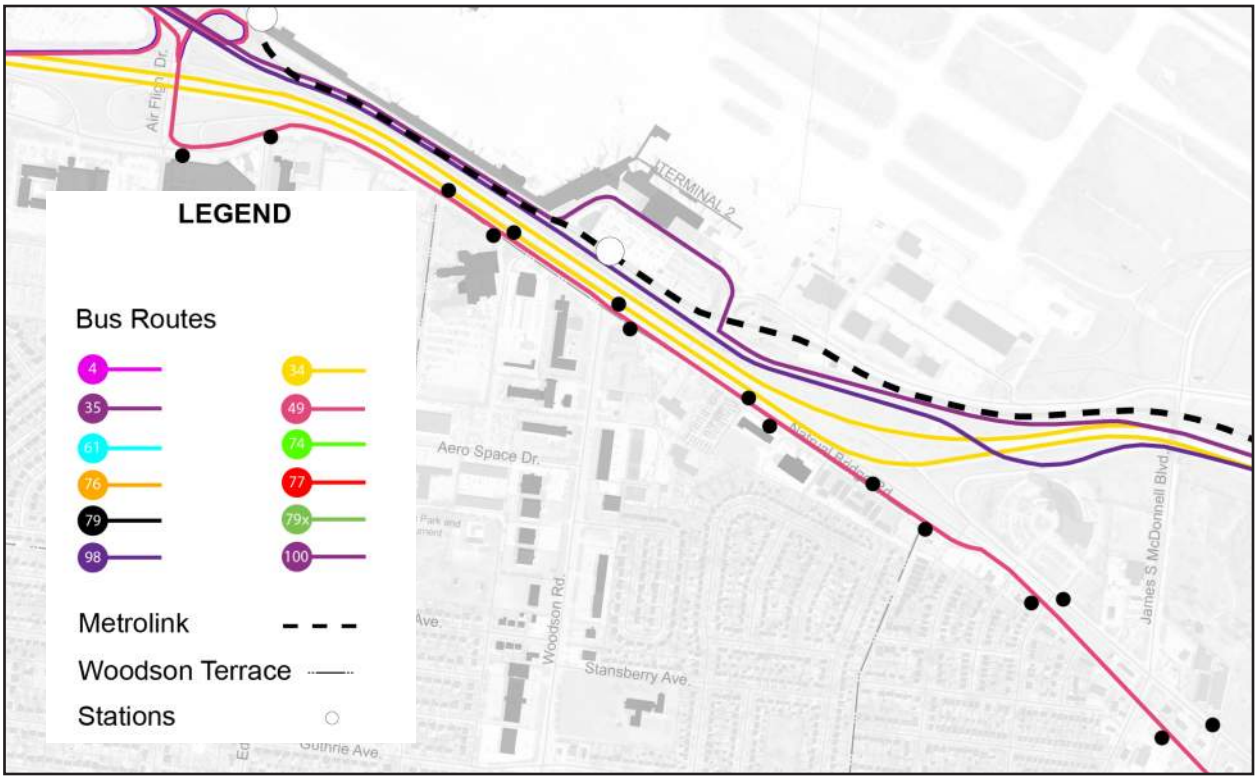


Image EX-9: *Local Transit Routes & Stop Locations*

marking delineates the crosswalks even though openings in the channelizing islands exist. There are no pedestrian signals or actuation buttons.

The intersection of Lambert International Boulevard and the Terminal 2 parking garage exit is signalized. Planned changes to the parking garage exit lanes will turn the two existing left turn lanes into two garage entry lanes. Lambert International Boulevard's westbound lane on the north will become a straight and right turn lane.

Utilities

The I-70 Crossing Utilities diagram on the following page shows known existing utilities within the crossing study area. All utilities potentially impacting the crossing exist within MoDOT ROWs for I-70, Natural Bridge Road, Woodson Road, and Lambert International Boulevard.

All utilities except overhead electric are underground. Overhead distribution power lines running along the east side of Woodson Road extend across I-70 in the same alignment to the southwest corner of an unknown vault. Airport facilities, MoDOT, and Bi-State did not have information readily available about the vault. The vault rests at an elevation equal to Lambert International Boulevard's top-of-curb, which is approximately 4 feet higher than I-70.

Underground utilities are not anticipated to require major adjustments, though care should be taken in understanding their condition and location with respect to bridge piers, wall footings, and other underground structures. FAA communication and fuel utilities will require coordination with the airport, while the others can be coordinated with utility companies.

Underpass Alignment & I-70 Profile

The unknown vault makes extending Woodson Road straight across I-70 not feasible. An alignment tying into the signalized intersection at Lambert International Boulevard and the Terminal 2 parking garage exit is feasible.

The I-70 as-built plan and profile were used to analyze the impacts incurred by an underpass requiring a 58-foot long bridge span and 20-foot tall opening with a 3-foot deep deck. The I-70 Crossing Study Area and Profile Diagram on the following page shows the existing profile. The profile

Image EX-10: *Woodson Road Looking South*

can include an underpass while providing a vertical curve and tangent slopes that tie back into the existing profile retaining interstate design standards. The extent of I-70 revised profile can provide a comfortable buffer on the east and west end to avoid impacts beyond the ramps to Natural Bridge and Air Flight Drive.

Existing Pedestrian Facilities

Intermittent and limited facilities exist for people walking within the study area. Sidewalks exist on Woodson Road and Natural Bridge Road. Substantial gaps and substandard ADA facilities disconnect the city from Terminal 1 via Air Flight Drive. People walking are regularly observed in Air Flight Drive's vehicle lanes or shoulders. Terminal 2 cannot be accessed on foot. Sidewalks are not present on side streets for connecting residents to Woodson Road.

No pedestrian facilities exist along the north side of Lambert International Boulevard.; however, the Terminal 2 parking garage has an egress onto the paver apron approximately 80-feet west of the parking garage vehicular exit. A stairwell descends approximately 4.5-feet to the top of curb elevation.

Walkability

One-quarter mile walk takes five- minutes. From the Woodson Road and Natural Bridge Road intersection, Terminal 2 is less than one- quarter mile away. Seven hotels, four rental car locations, and two restaurants are also within a five-minute walk. In addition, all destinations on Woodson Road and Natural Bridge Road within the project area can be accessed within fifteen minutes.

Existing & Planned Bicycle Facilities

Bike lanes exist on Woodson Road, but these facilities are disconnected from the broader network. The Gateway Bike Plan proposes bike lanes on Natural Bridge Road from Woodson Road to Air Flight Drive for a connection to Terminal 1, continuing west on Natural Bridge Road, as well as east of Woodson Road on Natural Bridge Road. To the east of Woodson Road, on Natural Bridge Road, the Gateway Bike Plan recommends Bike lanes east through I-170. In the vicinity of the project area, the Gateway Bike Plan includes, shoulders on James S McDonnell Boulevard and wide outside lanes on Brown Road.

Transit Facilities

MetroLink stations serve each airport terminal. However, No MetroBus routes, pedestrian,

Image EX-11: *Activity Nodes and Development Districts*

bicycle, or motor vehicle facilities connect with these stations. No buses serve the airport. The nearest MetroBus stops are located Natural Bridge Road. Four MetroBus routes travel east/west past Woodson Road and the airport. Regionally, no transit services run north/south through or near Woodson Terrace.

Land Use

Woodson Terrace's zoning designates properties along I-70 on Natural Bridge Road as C-2 Highway Commercial backed to the south by industrial. C-3 shopping, services, and office primarily line the west side of Woodson Road from Aero Space Drive to Guthrie Ave, with a pocket of C-4 retail commercial at Stansberry Avenue. C-4 retail commercial lines Woodson Road's east side, except for R-1 single family residential on the Gateway City Church property.

Development Districts

Two development districts overlap the project. The Gateway District encompasses Natural Bridge and Woodson Roads north of Aerospace Drive. The Woodson Road and Natural Bridge Road intersection is considered a focal gateway. South Woodson Road falls within the Town Center District redevelopment area. Recommended corridor improvements include a civic plaza, streetscape, amenities, furnishings, and pedestrian lighting.

Activity Nodes

Overlapping the walkability analysis on the City's development districts defines four opportunity points where increased pedestrian activity could provide access to gateway features ,destinations, and neighborhoods along Woodson Road. Key activity nodes may include Natural Bridge Road, Aero Space Drive, Guthrie Avenue, and Bataan Drive.

Shuttle Services Existing Shuttle Routes

Shuttles move visitors from airport terminals to overnight parking, car rental services, and lodging along Natural Bridge Road. Three routes are analyzed – two-terminal stops, Terminal 2 only, and Terminal 1 only. The PEL study recommends improving Air Flight Drive's function. Nearly 15,000 daily shuttle trips funnel through the Air Flight Drive underpass from each individual business or service. The diagram to the left shows existing two-terminal routes.

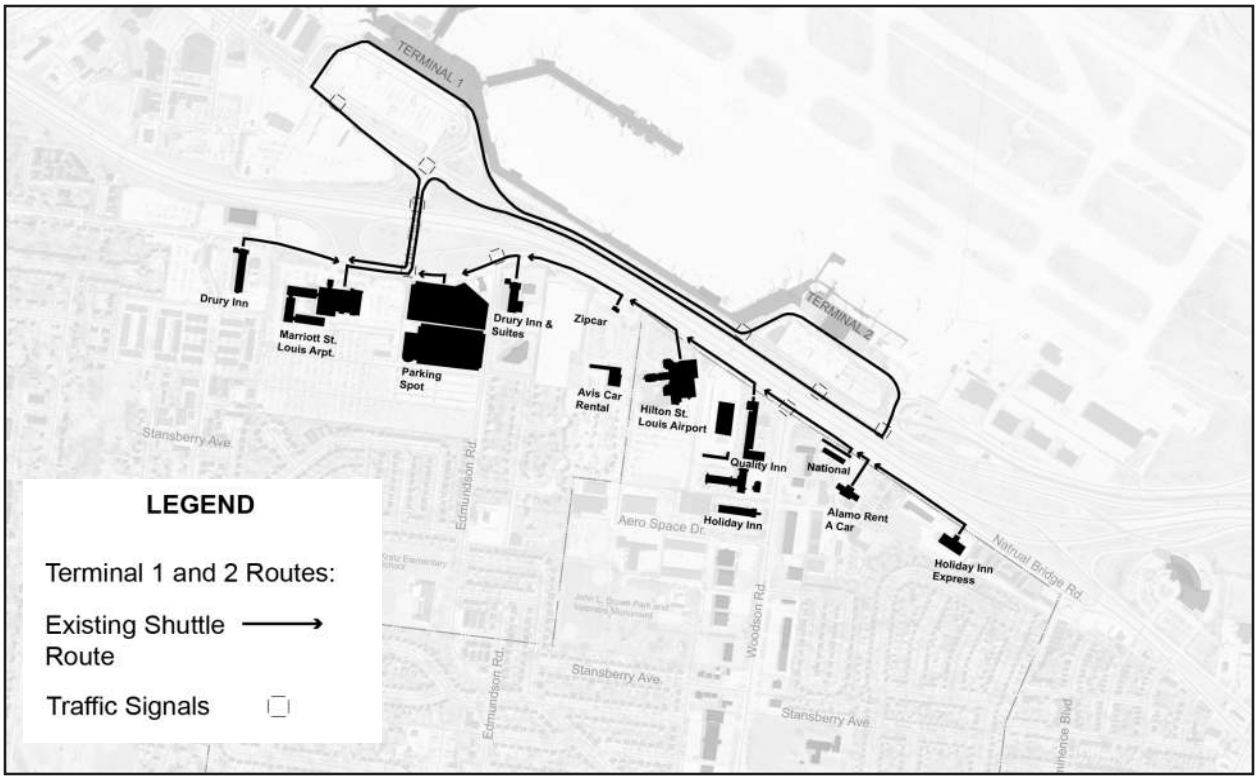


Image EX-12: *Existing Two-Terminal Shuttle Routes*

Existing Two-Terminal Shuttle Routes
Travel time for existing two-terminal routes range from 19 to 34 minutes depending on service locations and intersection signalization.

Existing Terminal 2 Only Shuttle Routes
Currently, shuttle services east of Air Flight Drive traveling only to Terminal 2 incur extended travel distances between approximately 300-feet to nearly 1.8-miles from doubling back. Travel times to only Terminal 2 can take 11 to 29 minutes including 10 to 14 traffic signals. The diagram to the left shows existing Terminal 2 only routes.

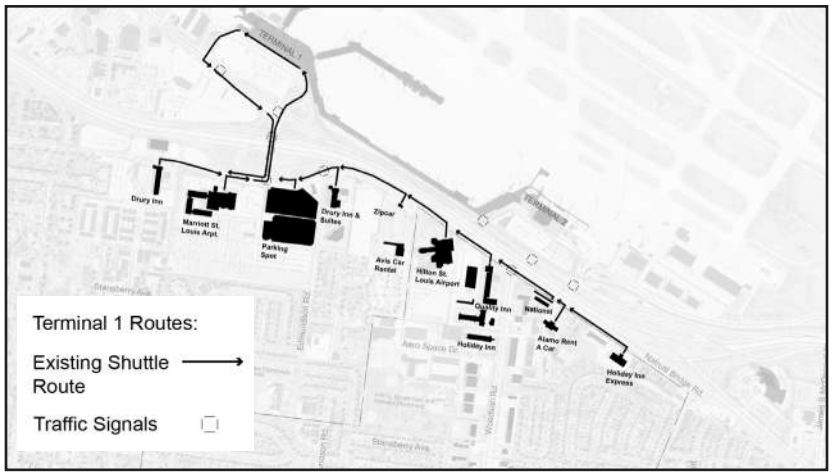


Image EX-13: *Existing Terminal 1 Shuttle Route*

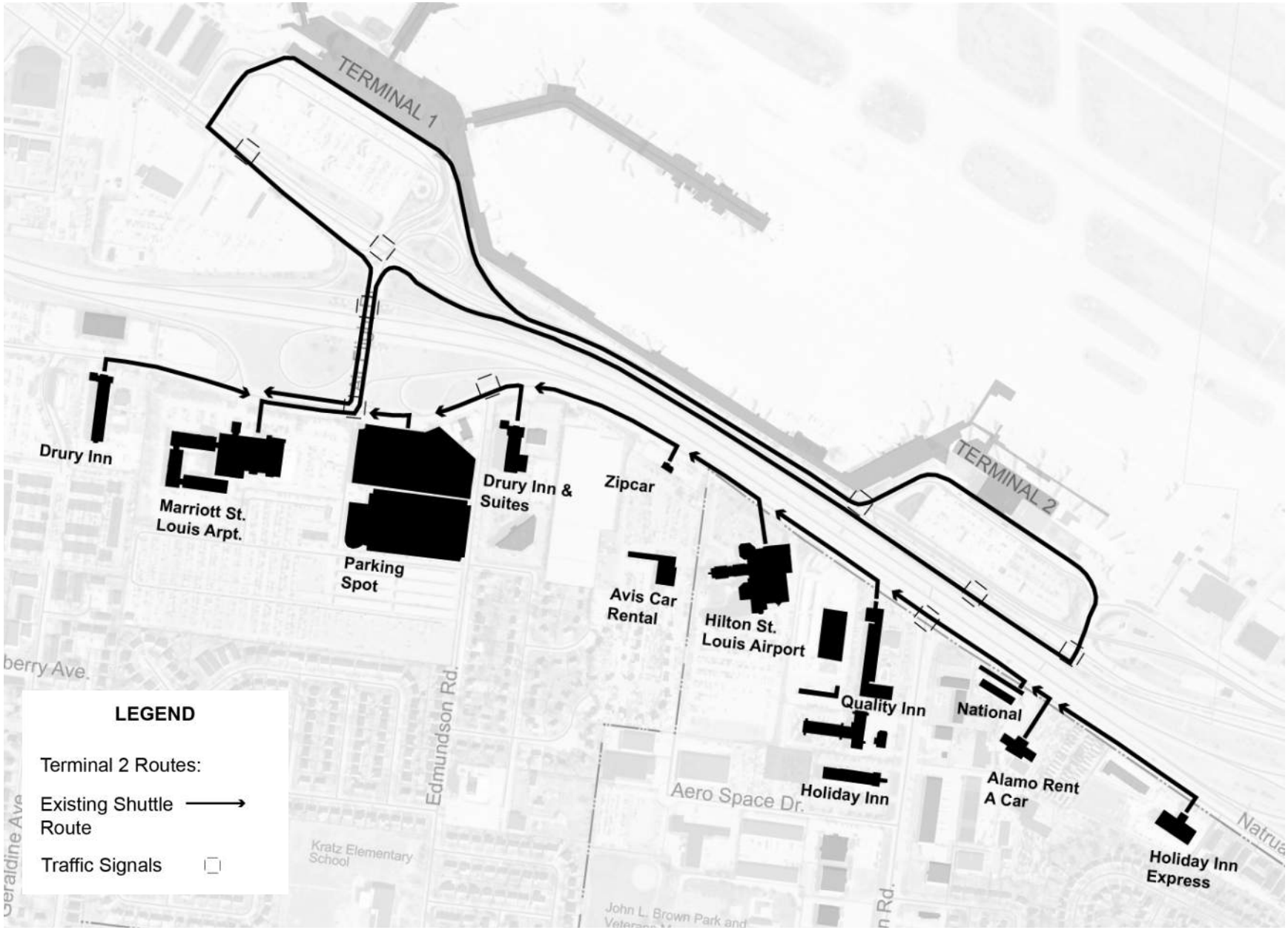


FIGURE EX-14: EXISTING TERMINAL 2 SHUTTLE ROUTE

Conceptual Alternatives

Image CA-1: *Terminal 2 Parking Garage Access*

INTRODUCTION

The existing conditions assessment indicated that there were no fatal flaws for a connection of Woodson Road to the airport based on an assessment of the physical ability to cross I-70, south of Lambert International Boulevard; overhead with a bridge for walking and biking, or under I-70 with a roadway extension or a undercrossing for walking and biking. The goal of the initial assessment of existing conditions was focused on fatal flaws that would limit development of alternatives. Pertinent items for this assessment were identification of major utility conflicts, ability to provide ramps that achieved a grades of no more than 5%, maintaining clearance over or under I-70 to MoDOT and FHWA standards, providing a vertical profile of any change to I-70 being to an acceptable K value. In addition, an assessment was made to maintain any profile change between the I-70 ramps to Air Flight Road and Natural Bridge Road to the west and east respectively. The finding that there were no fatal flaws with any crossing type, the study moved forward.

Based on the assessment of existing conditions, an extension of Woodson Road to the airport is not only feasible, but will provide significant benefit to the city, airport, MoDOT, St. Louis City, St. Louis County, and Bi-State Development Agency. The next step is further study of the surrounding area to form the basis for developing, analyzing, and evaluating different alternatives for consideration. Potential impacts associated

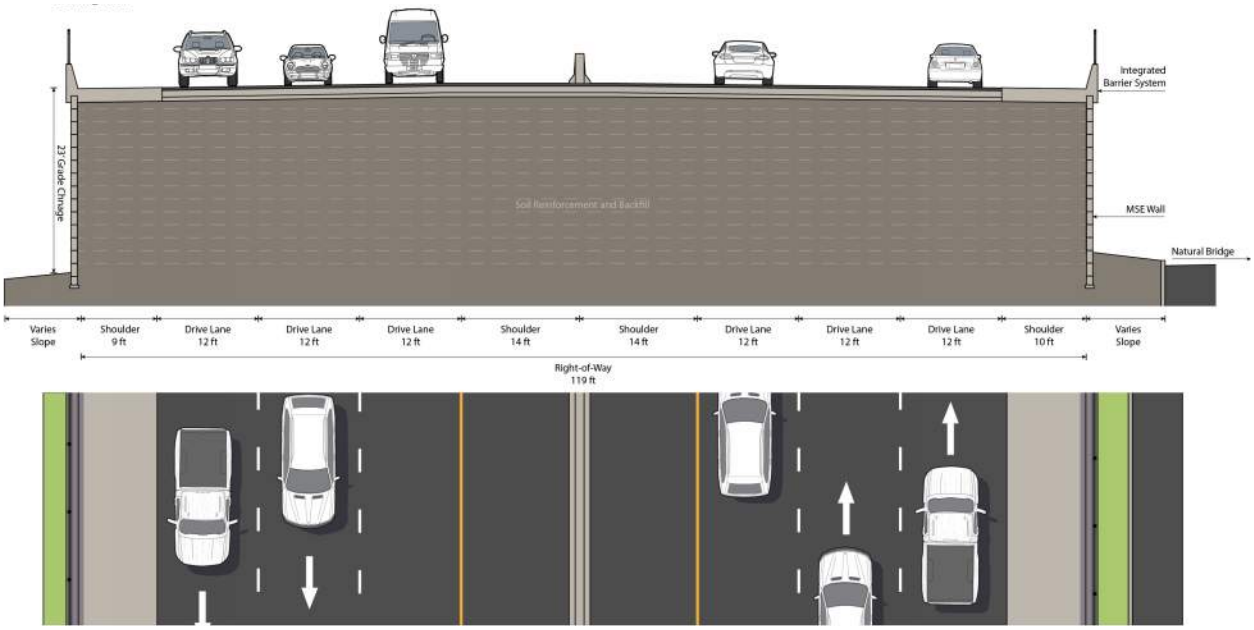


Figure CA-2: *I-70 Elevation Section*

with the interstate crossing and Woodson Road improvements were considered with regards to the City of Woodson Terrace, key stakeholders, and the broader region.

The feasibility of crossing I-70 with either a pedestrian and bicycle crossing or a multimodal vehicular crossing, which includes infrastructure for walking and biking, is the focus for this study. This Conceptual Alternatives section provides written descriptions and conceptual plans to describe the proposed alternatives, as well as an assessment of important considerations for each alternative relative to the benefits, challenges, and consideration to determine the feasibility and viability of the alternative. Beyond feasibility, a description of associated operational enhancements to the transportation network are outlined.

The connection of Woodson Road to the airport will provide a range of opportunities that could result in benefits to the communities far beyond Woodson Terrace. This project presents significant opportunity to enhance first impressions for visitors to the St. Louis region and enrich their experience with more and higher quality services. The connection of Woodson Road to the Airport will bring people to the center of Woodson Terrace's Gateway District and the front door of the Town Center District, stimulating economic development, tax revenue generation and job creation not only for Woodson Terrace, but for other communities on both the Woodson Road and Natural Bridge corridors. Positive development on Woodson Road would not only benefit Woodson Terrace but numerous stakeholders.

Another part of this study are improvements to Woodson Road from Natural Bridge Road to Bataan Drive. This segment of Woodson Road and the intersection of Natural Bridge, is within Woodson Terrace's Gateway and Town Center District. The combination of the I-70 crossing improvements and Woodson Road improvements are likely to become the basis for grant applications. These two parts of this study must be coordinated to ensure that they integrate seamlessly. In order to develop the concept for Woodson road, the roadway configuration, walking and biking elements, and

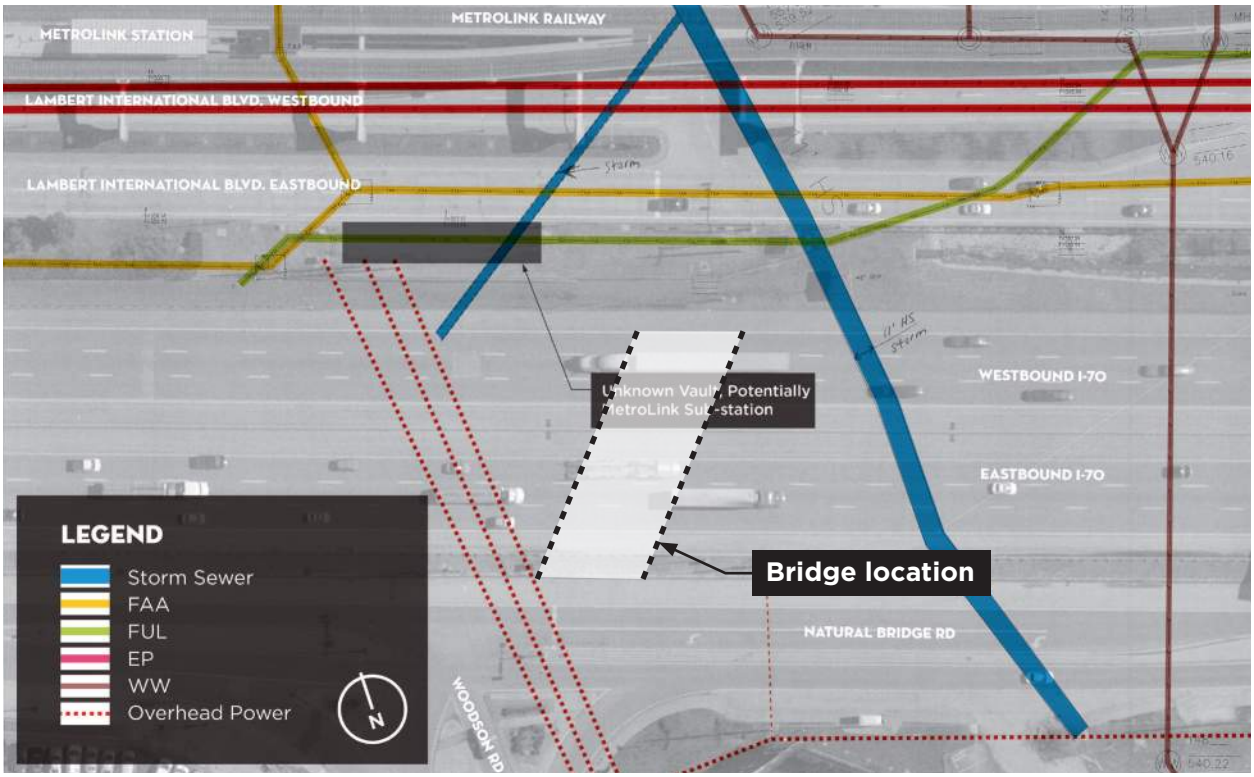


Figure CA-3: *I-70 Crossing Utility Analysis*

the connection to land use are described and considered.

I-70 CROSSING

Existing right-of-way, roadway configurations, utilities, and the I-70 interstate profile all are important considerations for a feasible interstate crossing. Prior to the definition of each alternative, the following provides a description of important considerations for any connection over or under I-70. Please note that roadway geometric studies were not conducted as part of this study, therefore professional judgment and a six-foot buffer for the underpass were employed to account for turning movements. The shared use path size and buffers are derived from federal and local standards and best practices for urban greenways.

Utility Considerations

Existing utilities do impact the feasibility of extending Woodson Road straight across I-70; however, skewing the crossing from the Natural Bridge Road intersection to the signalized Lambert International Boulevard intersection of the Terminal 2 garage exit is feasible and provides greater access and flexibility compared with a straight Woodson Road alignment. Extending Woodson Road straight across I-70 would conflict with a utility vault, of which the implications are not defined at this time. Raising I-70 for an underpass will require moving the overhead lines. Storm drainage patterns on I-70 will change if the interstate is elevated and should be considered in the development of a planning level cost estimate. Underground utilities appear to be minor challenges to foundations for either an overpass bridge or an interstate bridge over a Woodson Road underpass.

Roadway Considerations

The acute underpass alignment requires specific consideration for vehicle turning movements and the location of pedestrian and bicycle facilities. The westbound right turn into the crossing from Natural Bridge Road may limit the size of vehicles capable of making the turn or increase the bridge span and costs associated. A roundabout intersection will provide the greatest flexibility when making the turn. If the vehicle cannot simply make the turn, it may be able to travel around the roundabout to enter the underpass from a different direction. A vehicle is more likely to ride up onto the curb making an acute turn. For this reason, the pedestrian and bicycle crossing should be located

Page Intentionally Blank

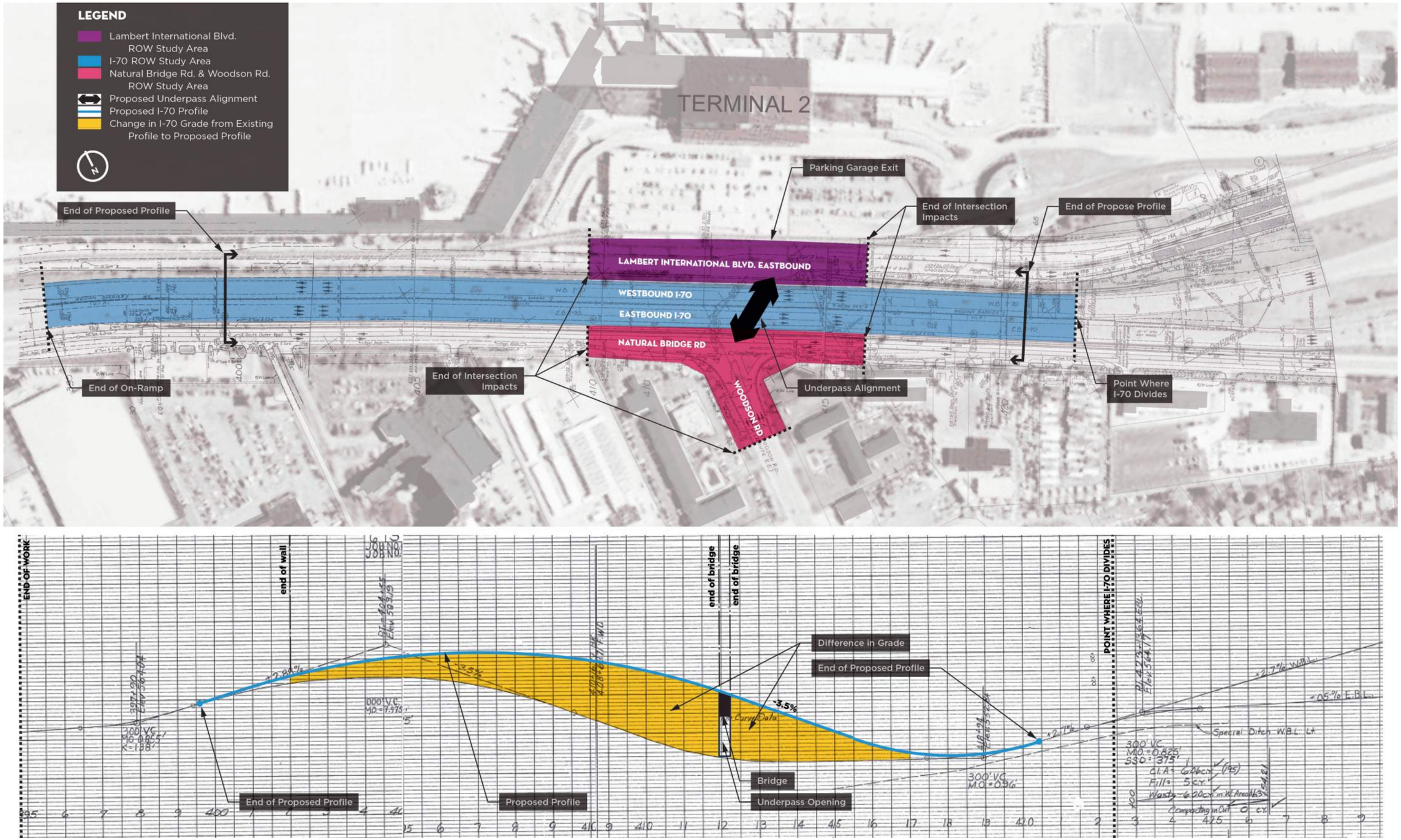


Figure CA-4: Woodson Road Airport Connection & Profile

Page Intentionally Blank

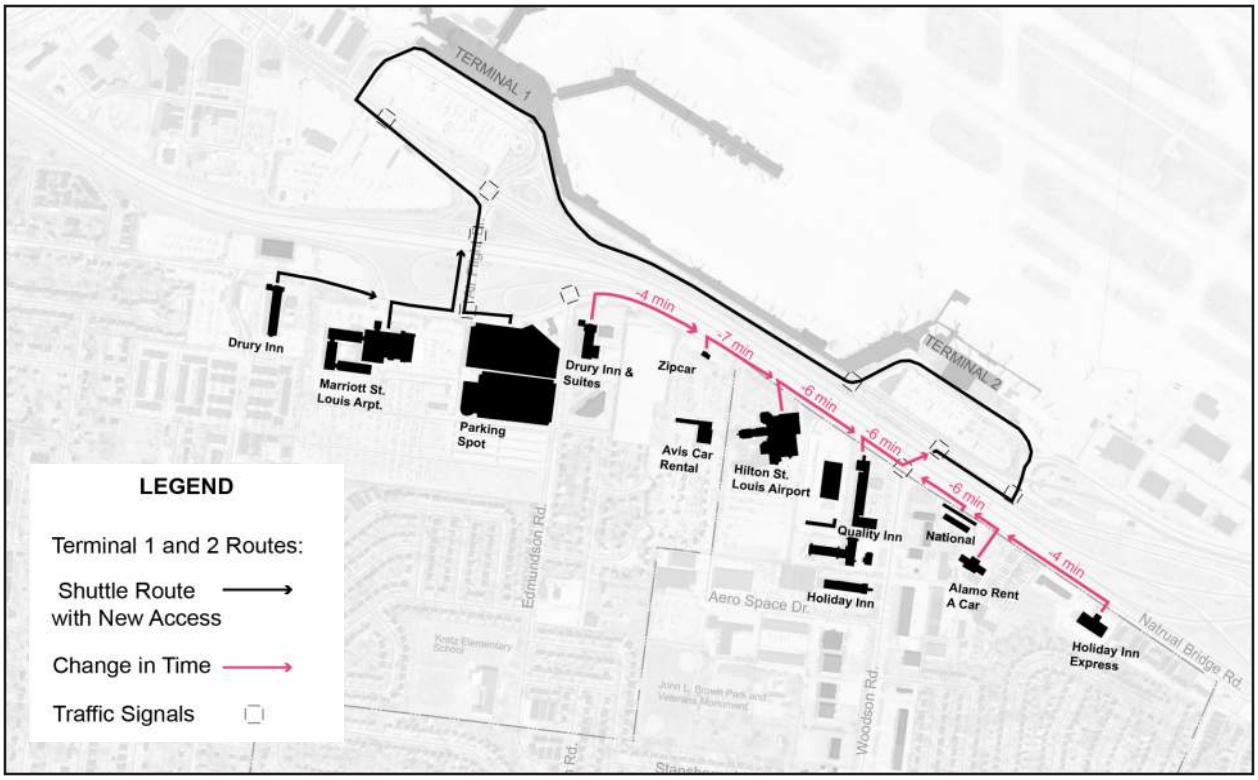


Figure CA-5: *Two Terminal Shuttle Route Analysis*

on the west side of the crossing and a generous setback to the bridge structure considered for this turn. The design vehicle will likely be firetruck for this crossing, but the fire protection district has not been engaged as a part of this study. No turn movement analyses have been conducted, so further analysis is needed when geometric design is performed for the intersections.

The consultant team met with airport staff during the study process, where they stated that the Terminal 2 parking garage exit lane configuration will change as part of broader circulation adjustments. The east-most lane will become an entry lane and the northern westbound Lambert International Boulevard travel lane will become a straight and right turn lane at the intersection. A left turn from eastbound Lambert International Boulevard is not envisioned.

PARKING LOT, RENTAL CAR AND HOTEL SHUTTLE OPERATIONAL CONSIDERATIONS

A Woodson Road vehicular connection could significantly impact existing shuttle routes and service. Three shuttle routes were assessed; a two-terminal route, Terminal 2 only route, and Terminal 1 only route.

Alternative Two-Terminal Shuttle Routes

If services east of Edmundson Road modified the two-terminal route by crossing I-70 at Woodson Road, between six and seven signals and four to seven plus minutes could be removed for eight shuttle services. The diagram to the left shows potential impacts for alternative shuttle routes for two-terminal routes.

Alternative Terminal 2 Shuttle Routes

If all shuttles modified routes traveling only to Terminal 2 to cross I-70 at Woodson Road, one to 16 minutes and three to 11 traffic signals would be eliminated from every shuttle trip. Figure CA-6 shows potential impacts for alternative Terminal 2 only shuttle routes.

Alternative Terminal 1 Shuttle Routes

If shuttles east of the Hilton St. Louis Airport Hotel modified routes to cross I-70 at Woodson Road, two to four minutes and four to five traffic signals would be eliminated from those shuttle trips. The diagram to

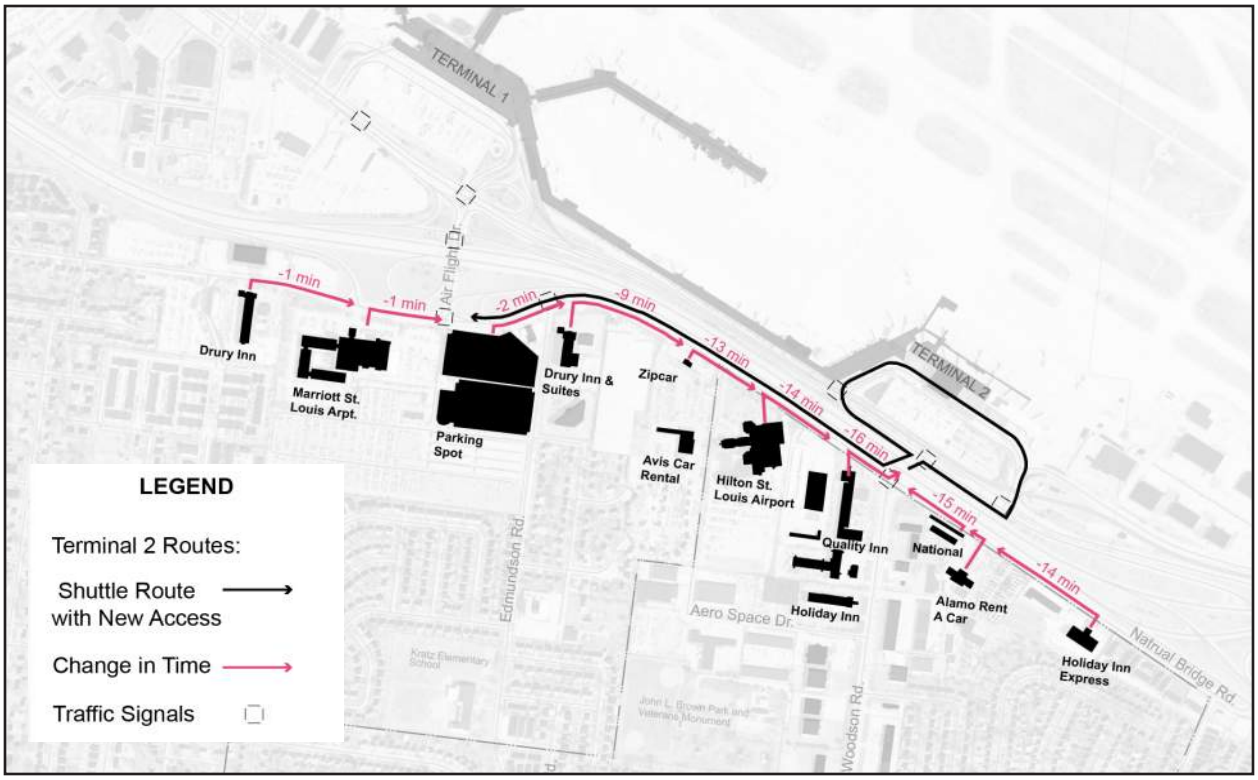


Figure CA-6: *Terminal 2 Only Shuttle Route Analysis*

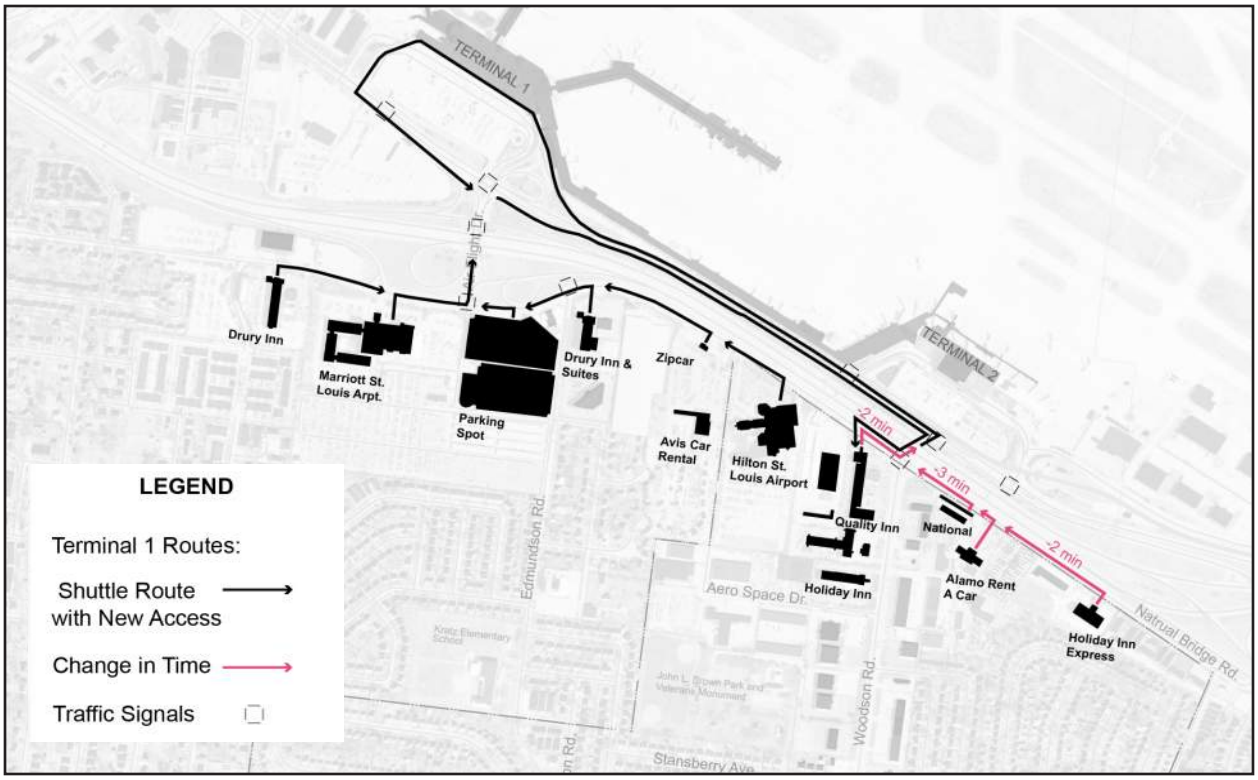


Figure CA-7: *Terminal 1 Only Shuttle Route Analysis*

the right shows alternative Terminal 1 only shuttle routes.

Terminal 2 / MetroLink Parking Garage Considerations

No current pedestrian or bicycle accessible path to Terminal 2 exists from off the airport. A set of stairs lead from Lambert International Boulevard exists that accesses the parking garage and the MetroLink elevator to the station. Image CA-1: Parking Garage Access illustrates a rough concept of the recommended parking garage access that can also access the elevator at the ground garage level.

Comprehensive Plan Considerations

The Woodson Terrace Comprehensive Plan identifies the Woodson Road and Natural Bridge Road intersection as the most important gateway location in the Gateway District recommending a more grand entry incorporating ornamental landscaping, lighting, public art, and decorative pavement. The plan envisions this gateway intersection providing a sense of identity, transition, and appreciation for the local cultural heritage. It is intended to raise interest for visitors entering the city and a focal element for those traveling north on Woodson Road. Provision for the recommended elements is included in the intersection design for each concept.

I-70 CROSSING CONCEPTS

Four I-70 / Woodson Road crossings, including two pedestrian and bicycle bridges and two I-70 underpass alternatives, were developed with different Natural Bridge Road intersection configurations, bridge approaches, structures, pedestrian and bicycle facilities locations. All alternatives incorporate the same Lambert International Boulevard crossing and parking garage access illustrated in Image CA-1 on page 14. The path will cross the median between the two existing signal posts, which will be modified to include pedestrian signal heads and push buttons. Each alternative is described with benefits, challenges, and considerations.

All bicycle and pedestrian ramping and grades were developed with a five-percent grade, eliminating the need for landings along the slope in accordance with PROWAG standards. Underpass alternatives raise I-70 23 feet to allow passage under the interstate to travel at the same level to provide uninhibited vision and a perception of safety and security from end to end.

PEDESTRIAN & BICYCLE SUSPENSION BRIDGE CROSSING

The pedestrian and bicycle suspension bridge crossing is feasible to construct. It aims to capitalize on the landmark potential of an overpass crossing. The bridge supports pedestrian and bicycle modes of travel only. The pylon supporting the bridge functions like the arch being visible from the Terminal 2 entrance, over a mile away from the westbound MetroLink, over a mile away from eastbound and westbound interstate users, over a mile south on Woodson Road, and over 1.5-miles east on Natural Bridge Road. A landmark roundabout gateway intersection at Woodson Road and Natural Bridge Road would enhance the user experience for travelers of all modes and would provide a dramatic entrance into the City of Woodson Terrace and a point of interest that would stimulate positive activity as well as help users orient themselves within the area. Bridge ramp switchbacks are minimized to create a more continuous and open experience.

The 18-foot wide bridge deck provides a 6-foot walking path with a 1-foot shy zone against the bridge rail and a 1-foot buffer beside the bicycle facility as well as a bi-directional bike path with two 5-foot lanes and a 2-foot shoulder against the railing. Overall, the crossing length from landing to landing is over 1,000 feet long and consists of three sections: a 310-foot ramp with a five percent grade which finishes ascending to 20 feet over I-70; a 300-foot bridge span over I-70; and a 400-foot ramp with a five percent grade down to the landing at Lambert International Boulevard on the west side of the Terminal 2 parking garage intersection.

Impacts to I-70 are minimal. Travel in east and westbound could continue on both sides of the interstate, with a maximum one lane closure in each direction. Protective walls are necessary on both sides of the pylon narrowing the shoulders, but are a relatively minor protrusion into the 12-foot shoulders and should not impact lane alignments. The eastbound and westbound DMS sign may need to be relocated to ensure the appropriate site distance after passing under the bridge. Minor roadside signage will need to be relocated.

Benefits

- An iconic bridge with art, history, and cultural elements could garner private and public

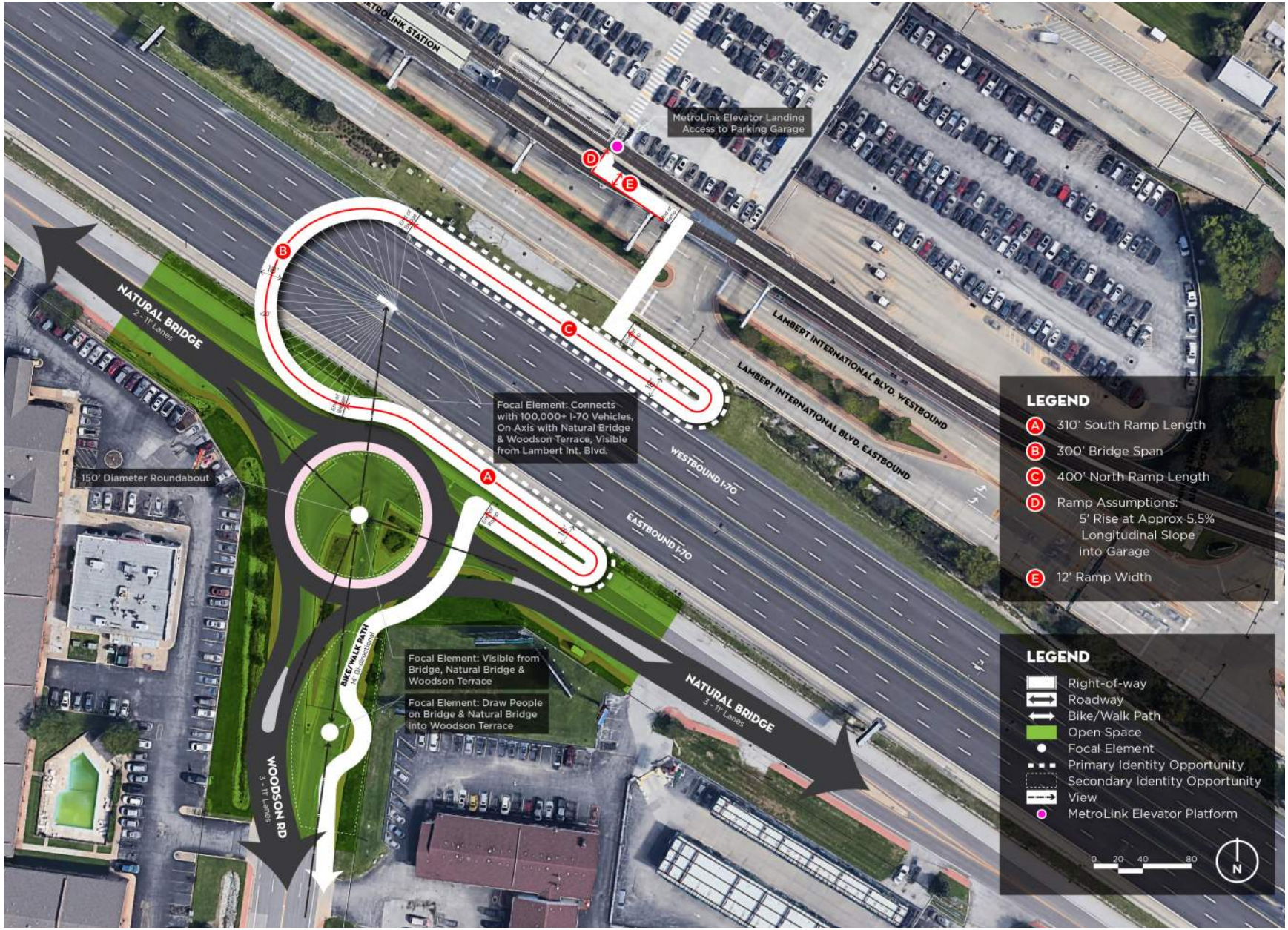


Figure CA-8: Pedestrian & Bicycle Suspension Bridge Alternative

funding.
- The iconic bridge and landmark intersection would provide a one-of-a-kind identity for Woodson Terrace.
- The 18-foot path provides for safety and comfort, sweeping vistas, reduces switchbacks, and does not cross over itself, creating one seamless user experience.
- The bridge and ramps' form create a gateway for interstate users into and out of "St. Louis."
- Construction could be localized, minimizing impacts to I-70, allowing for at least two open travel lanes.

Challenges
- A bridge overpass extends crossing distance more than 800-feet compared with a direct bridge or underpass.
- A pedestrian and bicycle bridge is not likely divert trips for shuttles and motor vehicles to walking and biking compared with the activity of an underpass that includes vehicles.
- Not providing vehicular connection limits the crossing's benefits for the airport, supporting services, and the broader region.

Considerations
- Requiring zero-setback development at the Woodson Road and Natural Bridge Road intersection would frame the bridge and roundabout gateway, further enhancing user experience and sense of place.
- A rapid flashing beacon should be considered where the path crosses Natural Bridge Road.

PEDESTRIAN & BICYCLE BRIDGE CROSSING

The pedestrian and bicycle bridge crossing, shown in Figure CA-8, is feasible to construct. It draws attention to the south side of the interstate focusing on the Woodson Terrace entry. A spiral shared use path swings upward from Natural Bridge Road, around a focal feature, over the interstate to a comfortable switchback leading to Lambert International Boulevard. The focal element could be visible from almost 0.5-miles on eastbound and westbound I-70, over a mile south on Woodson Road, the north side of Lambert International Boulevard, and over 0.5 miles east on Natural Bridge Road.

Natural Bridge Road sways south guiding users from both directions into Woodson Terrace's Town Center. The curves slow traffic, and the T-intersection would be signalized to stop traffic for path users. Shifting Natural Bridge Road south creates a significant buffer between I-70 and the intersection, reducing the interstate's visual impact. The area could serve as an attractive pocket park. The bridge and focal element create an artful terminus to Woodson Road. The bridge over the path crossing becomes a gateway feature for users entering the park and Woodson Terrace.

The 18-foot wide bridge deck provides a 6-foot walking path with a 1-foot shy zone against the bridge rail and a 1-foot buffer beside the bicycle facility as well as a bi-directional bike path with two 5-foot lanes and a 2-foot shoulder against the railing. Overall, the crossing length from landing to landing is over 1,000 feet long. South of I-70, a 210-foot 5-percent ramp on grade ascends to a 250-foot bridge beginning just after passing the focal element. The bridge spans over the crossing, creating an entry into the civic park. The bridge expands visibility from Natural Bridge Road to encourage a better sense of safety and security. A 150-foot bridge over I-70 transitions to 200-foot bridge spanning over half the 200-foot 5 percent ramp on grade which lands at Lambert International Boulevard on the west side of the Terminal 2 parking garage intersection. The bridge spans across a series of pillars located to minimize impacts to I-70, construction costs, and other relocation of utilities and obstacles.

Overhead power lines will need to be relocated. The north end of the overpass descends using a switch back to avoid the vault landing on the west side of the Lambert International Boulevard and Terminal 2 parking garage intersection to cross Lambert International Boulevard. The eastbound and westbound dynamic message sign and a westbound structural sign may need to be relocated to ensure the appropriate site distance after passing under the bridge. Minor roadside signage will need to be relocated as well.

Benefits
- The more modest bridge would cost less than the iconic alternative.
- The ramp configuration develops a civic green space between the interstate and Woodson Road and Natural Bridge Road Intersection.
- The focal element draws attention to the gateway entrance of Woodson Terrace's Town Center providing a unique identity for the City only, and would not likely be appropriated regionally like the iconic bridge.

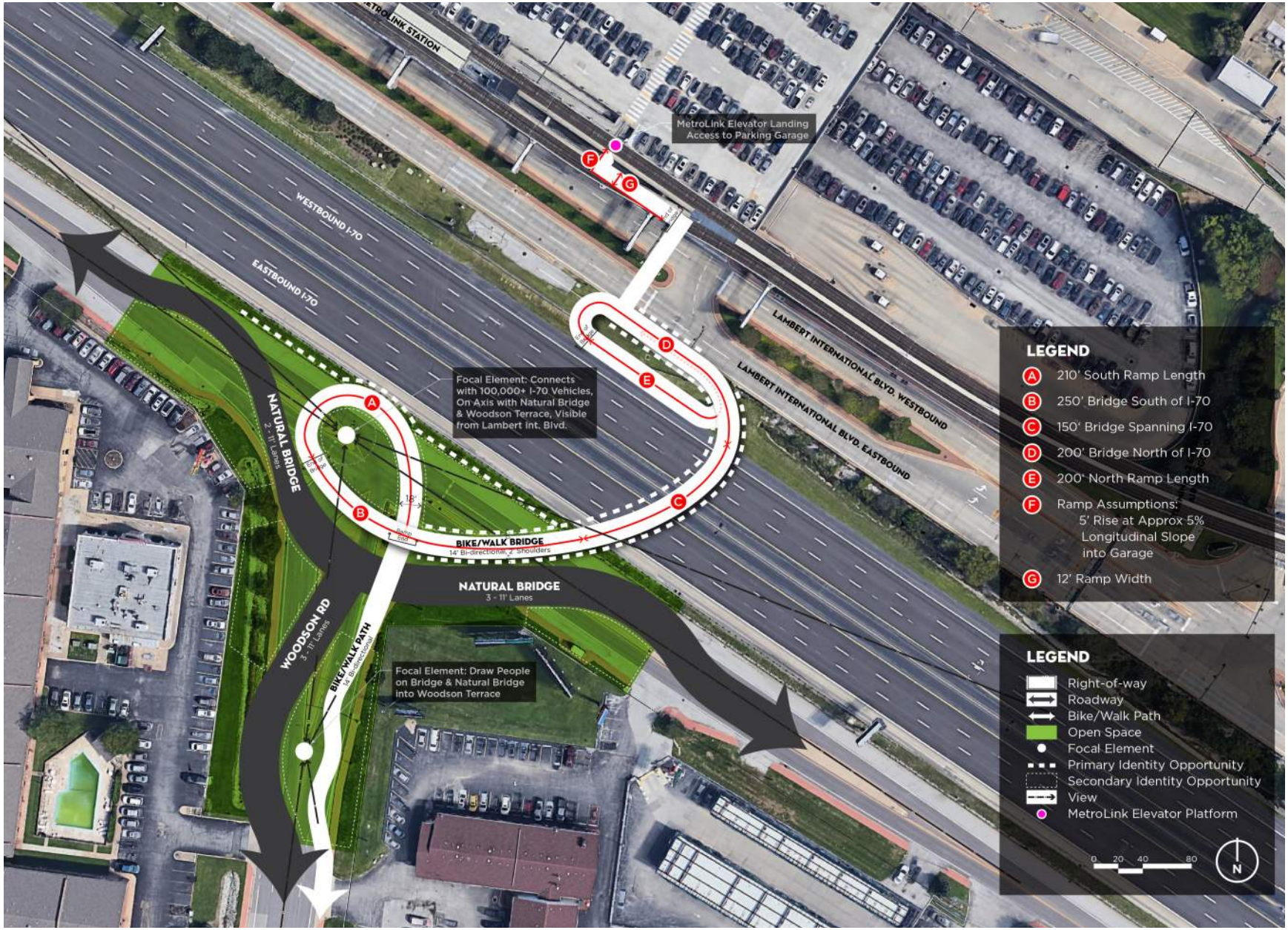


Figure CA-9: Pedestrian & Bicycle Bridge Alternative

- Natural Bridge Road's curves present the opportunity of creating a lush and attractive streetscape transition into the Woodson Road intersection dramatically enhancing the corridor's character.
- Construction could be localized, minimizing impacts to I-70, allowing for at least two open travel lanes.

Challenges

- A bridge overpass extends crossing distance more than 800 feet compared with a direct underpass.
- A pedestrian and bicycle bridge is not likely to divert trips for shuttles and motor vehicles to walking and biking compared with the activity of an underpass that includes vehicles .
- If not well designed, points where the path crosses over itself could weaken a user's sense of safety and security. Transitioning under an overhead path could generate a feeling of isolation and disconnection further amplifying the perception of a lack of security.

Considerations

- The length of the bridge on the south side of I-70 should not be reduced to ensure the greatest sense of user safety and security is not compromised.
- Requiring zero-setback development at the Woodson Road and Natural Bridge Road intersection would frame the focal element further enhancing a user's experience of the gateway.

PEDESTRIAN & BICYCLE UNDERCROSSING

The pedestrian and bicycle underpass crossing is feasible to construct. It is the most direct and efficient alternative. Walking and biking facilities separate into designated walking and biking paths prior to crossing Natural Bridge Road and Lambert International Boulevard to reduce conflicts in the underpass and expand the opening to provide a sense of security and comfort for users. The T-intersection at Woodson Road and Natural Bridge Road is very familiar for all travel modes. A 6-foot walking path with a 2-foot shoulder against the underpass wall and 1-foot buffer from bicycle facilities is located on the east side further away from Woodson Road to enhance crossing safety. The bi-directional bike lanes are two 7-foot lanes with a 5-foot buffer from the underpass wall making the underpass opening 20 feet high, 30 feet wide, and approximately 120 feet long.

I-70 occur with a roadway crossing including pedestrian and bicycle facilities; therefore, the 20-foot by 60-foot underpass opening was used to analyze elevating I-70. Figure CA-1: depicts the areas of Woodson Road, Natural Bridge Road, I-70, and Lambert International Boulevard being analyzed. The potential impacts to the interstate's vertical profile considers the bridge opening with three feet allocated for the bridge structure and deck. Applying tangents and vertical curves within MoDOT design standards, the underpass crossing from the Natural Bridge Road intersection to the Terminal 2 parking garage and Lambert International Boulevard signalized intersection is feasible.

The existing interstate profile served as the datum for the proposed profile. The length of I-70 will incur similar impacts as the Multi- Mode Underpass Alternative requiring reconstruction of less than 2,200 feet beginning about 1,250 feet east of the east side of Air Flight Drive and just shy of 300 feet west of the interstate split. Raising the interstate 23 feet will require building retaining walls, relocating the overhead power lines, and relocating or replacing interstate structural signs as well as two dynamic message signs (DMS). The yellow shaded area under the proposed profile shown in Figure CA-1 indicates the area where walls will be required. Enhancing the walls required to elevate I-70 could provide a very memorable landmark for travelers on Natural Bridge Road and Woodson Road.

A minimum distance of 25 feet is recommended between the underpass exit and a roadway crossing to provide enough visibility and stopping distance for people riding bikes. Ample buffer space for pedestrian and bicycle facilities should be provided from the vertical bridge structure for right turns from eastbound Lambert International Boulevard onto Woodson Road. Aligning Woodson Road perpendicular to Lambert International Boulevard will help facilitate the turn.

Benefits

- This underpass is the most direct and accessible crossing alternative.
- A pedestrian and bicycle underpass would reduce the impact to I-70 and bridge costs compared with the Multi-Mode Underpass Alternative.

Challenges

- If not attractive and inviting, this alternative could be the

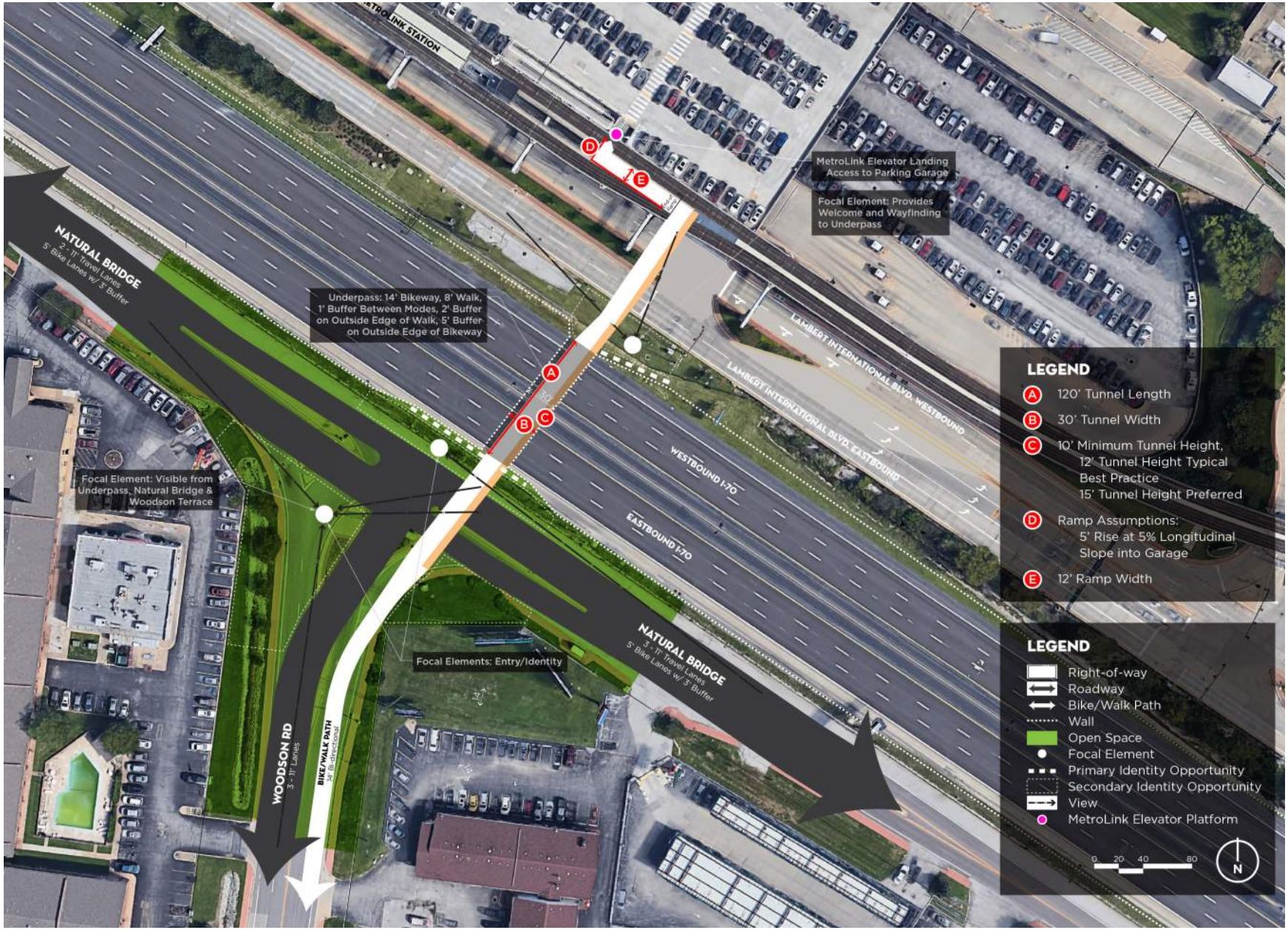
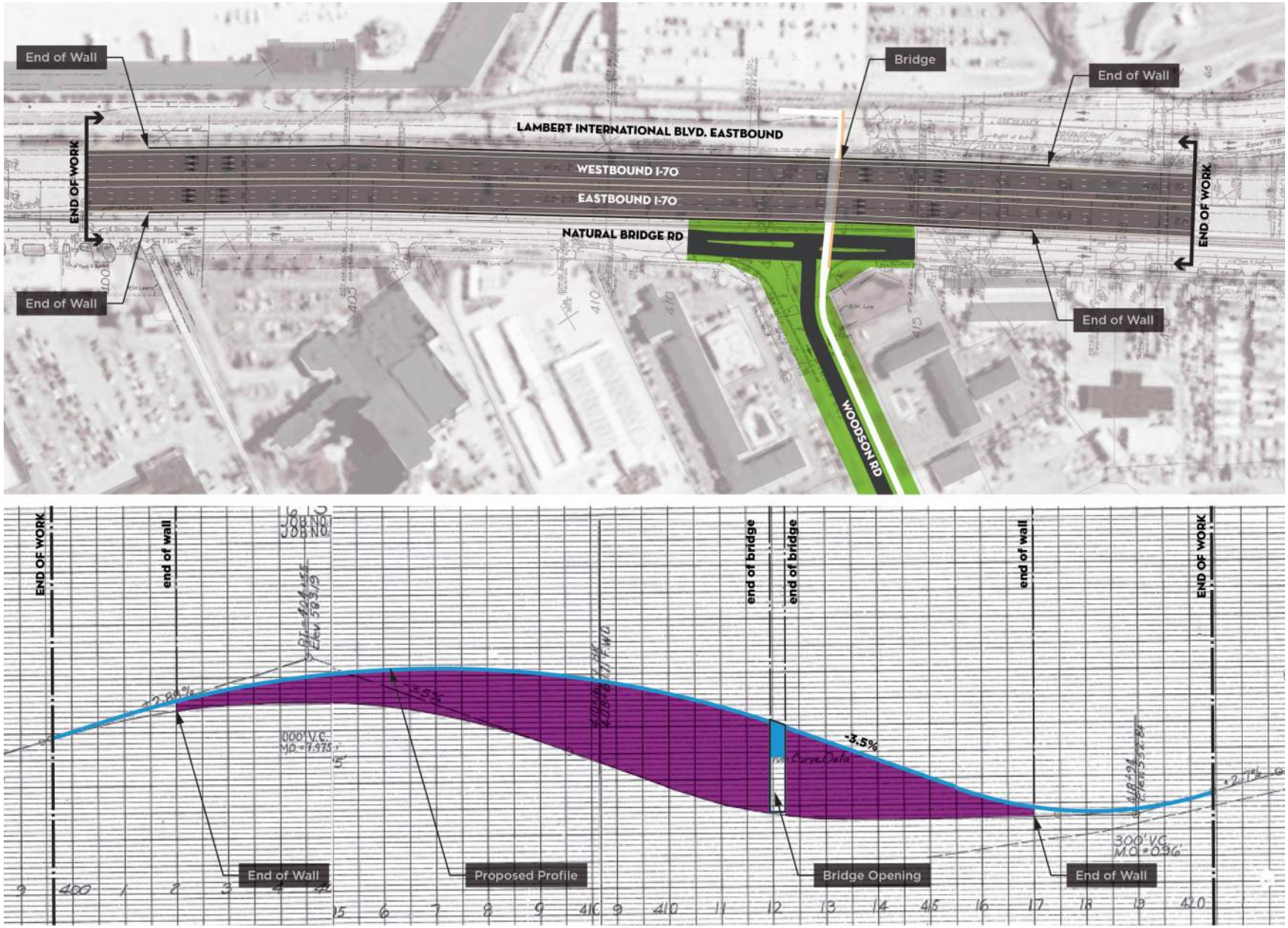


Figure CA-10: Pedestrian & Bicycle Underpass Alternative

Figure CA-11: Ped & Bicycle Underpass Alternative Extents Plan & Profile



least utilized of all alternatives presented.
- This alternative provides the lowest benefit-to-cost ratio of all alternatives presented.
- Combining the pedestrian and bicycle underpass with the T-intersection provides the least memorable gateway experience.
- A landmark or focal feature is not central to the design, lessening Woodson Terrace's regional identity compared with the other alternatives.

Considerations
- Maximize a user's ability to see light from the opening at the other end of the underpass.
- Maximize the underpass opening and install an enhanced structure compared to a box culvert to increase the user's perception of safety and security.
- Provide generous pedestrian-scale lighting for the full underpass length.

WOODSON ROAD UNDERPASS ALTERNATIVE

The multi-mode underpass crossing provides a connection for all modes - walking, biking, driving, and transit. This greatly enhances connectivity to Terminal 2, for motor vehicles supporting the airport, and for residents south of I-70. It also improves access to Woodson Terrace from westbound I-70.

The roundabout provides a landmark gateway into Woodson Terrace as well as the airport and best facilitates vehicular turning movements. Enhanced lighting and art in the underpass, making the I-70 walls attractive, and elevating the aesthetics in the roundabout center would create a memorable first impression for thousands of daily shuttle riders and all other travelers enjoying the crossing. The roundabout also provides the greatest flexibility when making the acute turn into the underpass. If a vehicle cannot simply make the turn, it should be able to travel around the roundabout to enter the underpass from a different direction. To avoid the likelihood of vehicles riding up onto the curb when making this turn, the pedestrian and bicycle crossing is located on the west side of the crossing which also reduces the interstate bridge span.

A straight and left turn lane for the southern westbound Lambert International Boulevard travel lane will greatly improve access from I-70 westbound to Woodson Terrace. With the planned parking garage entry, the vehicular underpass provides greater access to it from the northbound lane.

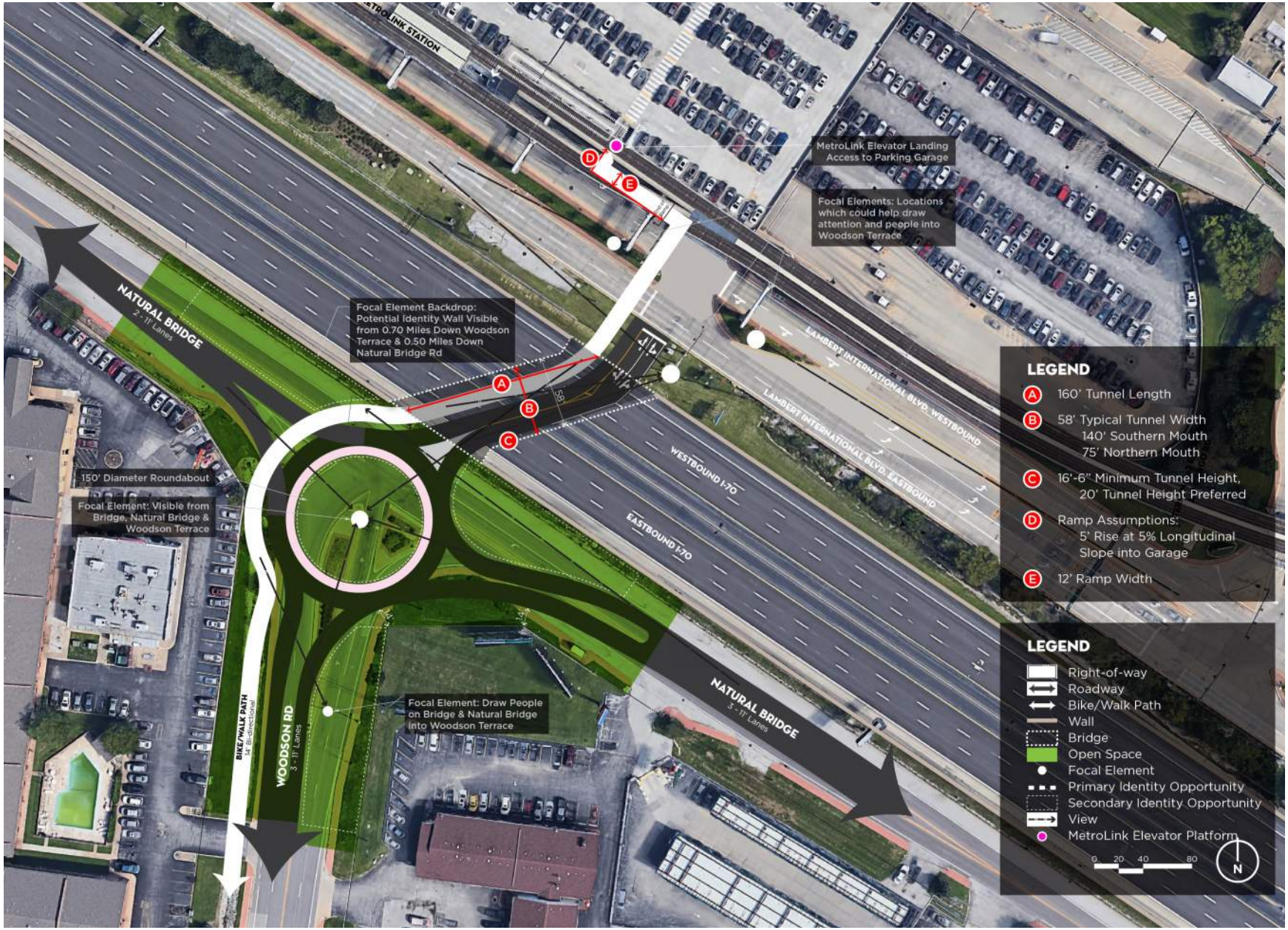
This alternative incurs the greatest impact to I-70 with the Woodson Road crossing including pedestrian and bicycle facilities. A 20-foot by 60-foot underpass opening supports two 12-foot travel lanes with a 2-foot shoulder on both sides and 2-foot vertical wall buffer and a 14-foot shared use path with a 5-foot roadside buffer and 5-foot vertical wall buffer. A 3-foot bridge deck elevates the interstate 23 feet. Figure CA-12 depicts the proposed profile and extent of impacts to I-70.

The existing interstate profile served as the datum for the proposed profile. The length of I-70 will incur similar impacts as the Pedestrian and Bicycle Underpass Alternative requiring reconstruction of approximately 2,300-feet beginning about 1,250 feet east of east side of Air Flight Drive and approximately 200 feet west of the interstate split. Raising the interstate 23 feet will require building retaining walls, relocating the overhead power lines, and relocating or replacing interstate structural signs as well as two dynamic message signs (DMS). The yellow shaded area under the proposed profile shown in Figure CA-1 indicates the area where walls will be required. Enhancing the walls required to elevate I-70 could provide a very memorable landmark for travelers on Natural Bridge Road and Woodson Road.

The multi-mode underpass proposes a straight and left turn lane for the southern westbound Lambert International Boulevard travel lane which would greatly improve access from I-70 westbound to Woodson Terrace. The addition of a designated left turn lane has not been proposed. Pillars for the pier supporting the MetroLink tracks straddle both sides of Lambert International Boulevard's westbound lanes. More detailed analysis is required to determine definitively that a designated left is not feasible. Traffic studies are not part of this study and should be conducted to develop a more comprehensive understanding of the impacts associated with the preferred I-70 crossing alternative. This study's primary goal is to determine whether it is physically feasible for Woodson Road to cross I-70.

Benefits
- An underpass is a more direct and accessible crossing alternative compared with an overpass.
- An enhanced underpass and roundabout would provide the most memorable first impression for the most airport travelers

Figure CA-12: Woodson Road Underpass Alternative



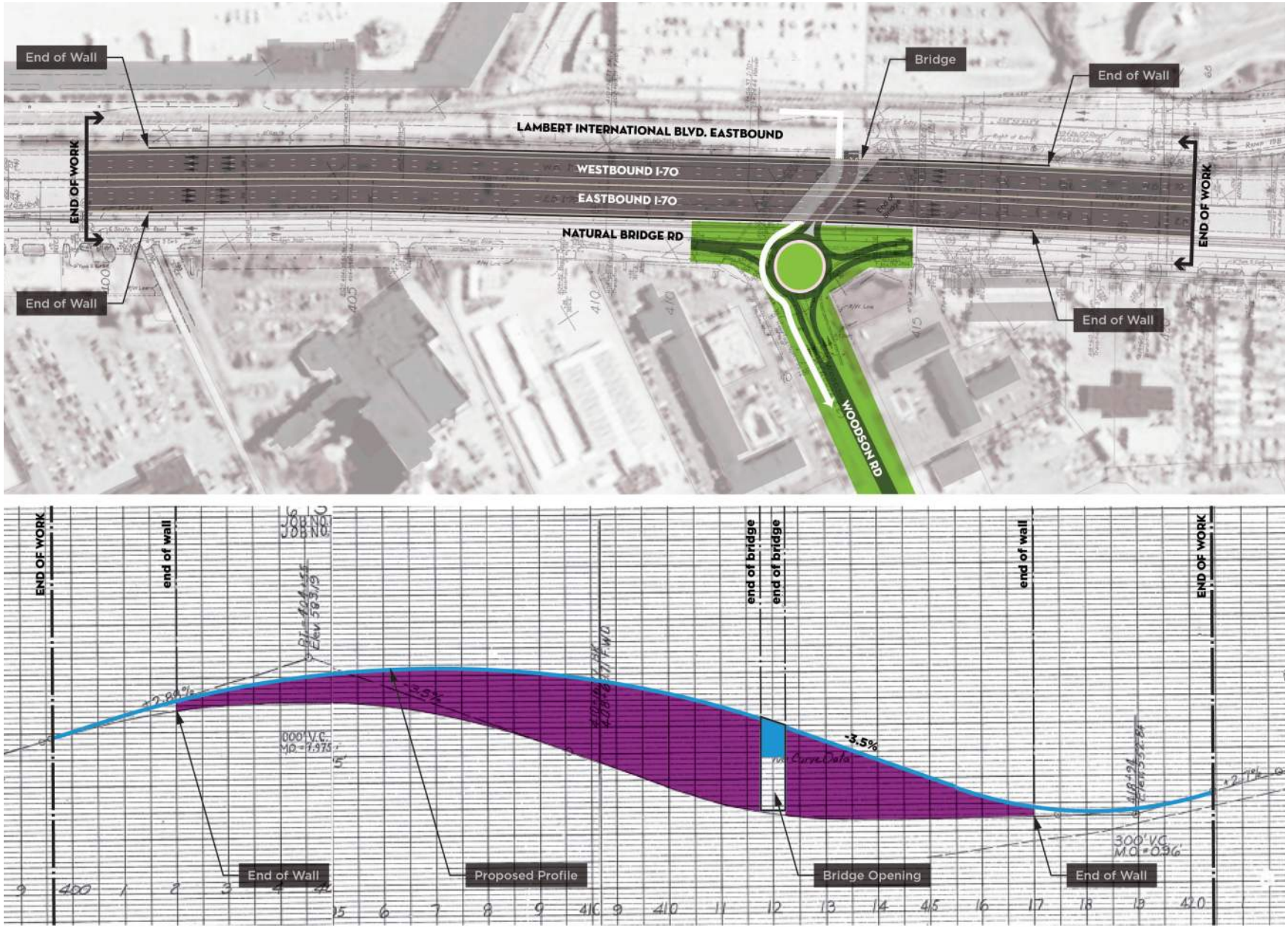


Figure CA-13: Woodson Road Underpass Alternative Extents Plan & Profile

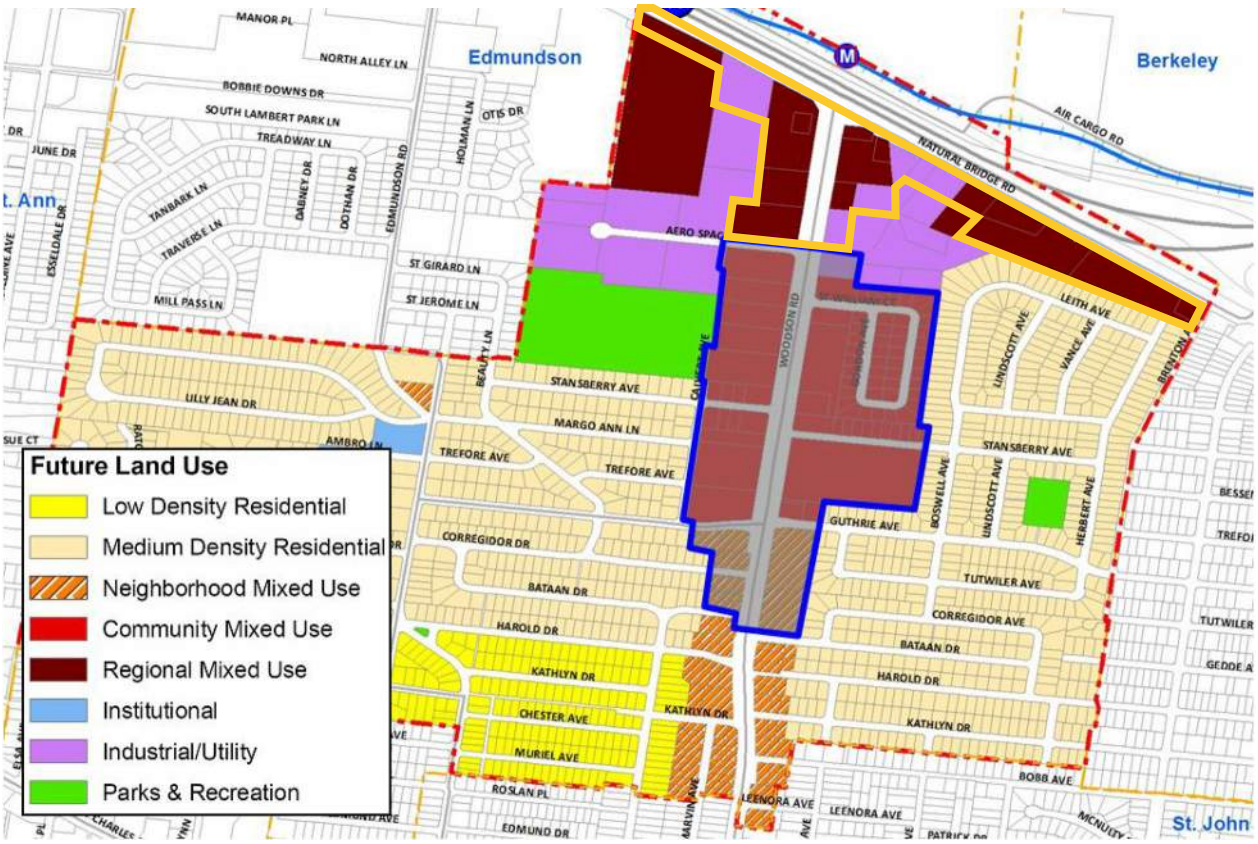


Figure CA-14: *Woodson Terrace Comprehensive Plan Future Land Use Map*

visiting "St. Louis."

- Best benefit to cost of any option making this alternative the most like to receive funding.
- Reducing shuttle distances and time idling at signals would substantially reduce emissions.
- Provides more intuitive access to Woodson Terrace for westbound I-70 using Lambert International Boulevard.
- With the planned ingress modifications to the Terminal 2 parking garage, a vehicular crossing would increase access to the Terminal 2 parking garage.

Challenges

- A roundabout intersection is required to accommodate the crossing skew necessary to connect into the signalized intersection.

Considerations

- A roundabout intersection is required to accommodate the crossing skew necessary to connect into the signalized intersection.
- A rapid flashing beacon or HAWK signal should be considered where the path crosses Natural Bridge Road.
- Plan views through the underpass to frame focal elements to optimize first impressions and attract people walking and biking
- Provide generous pedestrian scale lighting for the full underpass length.

WOODSON ROAD ANALYSIS

Woodson Road's generous 150-foot wide ROW has the potential to provide ample space for an active street life. Supporting approximately 10,000 average daily vehicles (ADT), it is a prime candidate for a road diet to three lanes. Narrowing the roadway may provide so much space curbside that, even with zero-setback redevelopment, the corridor could struggle to develop a strong sense of place. Thoughtful streetscape design or narrowing the ROW need to be considered to make sure the City benefits from all the potential.

In the Woodson Terrace 2011 Comprehensive Plan, a vision for Woodson Road was given great definition. Combining this vision with information with the Corridor Anchors and Urban Design

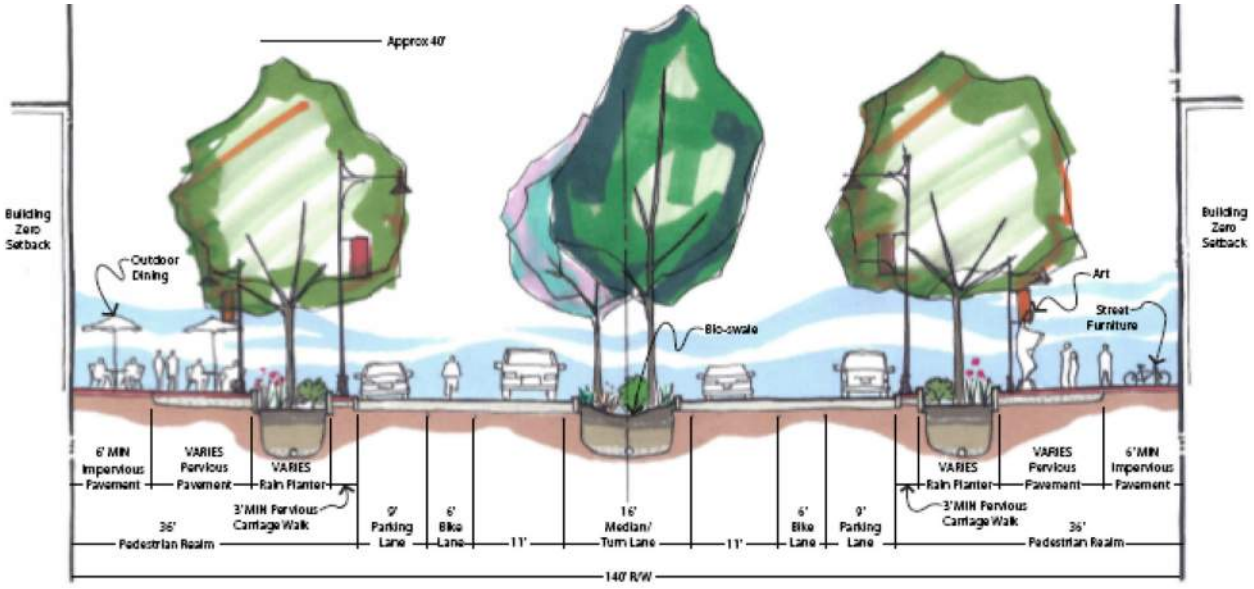


Figure CA-15: *Woodson Terrace Comprehensive Plan Woodson Rd. Concept 1*

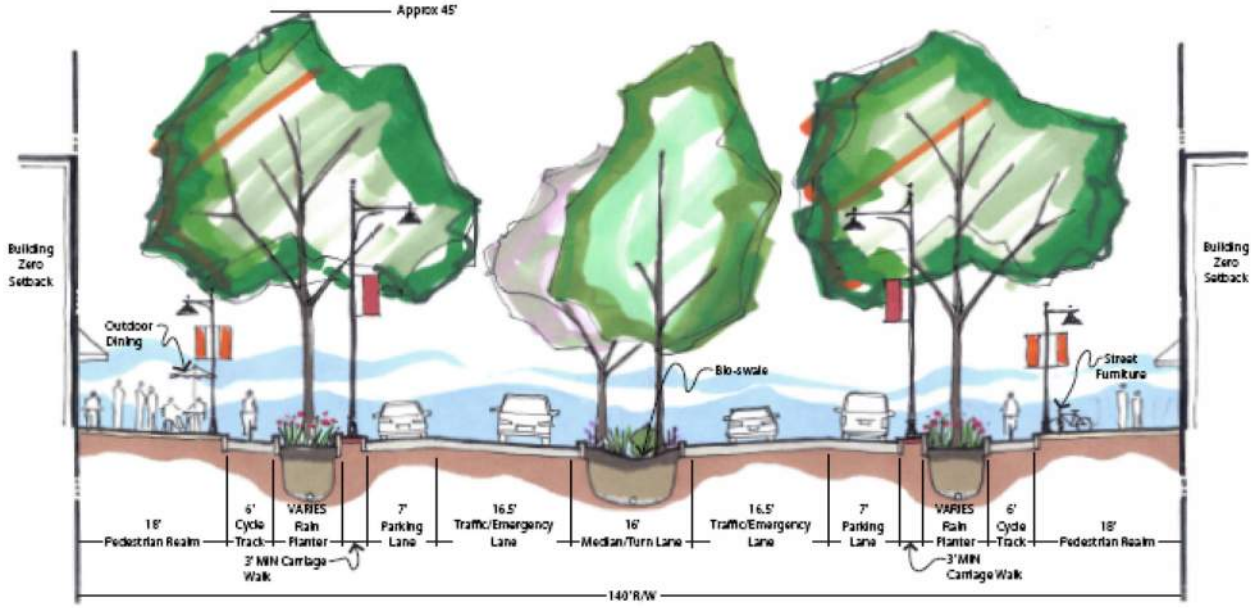


Figure CA-16: *Woodson Terrace Comprehensive Plan Woodson Rd. Concept 2*

Figure CA-17: *Corridor Anchors & Urban Design Analysis Diagram*

Analysis, and Building Setback Assessment, this Woodson Road Analysis section sets the conceptual alternatives context for Woodson Road.

WOODSON ROAD CONCEPT DEVELOPMENT METHODOLOGY

The process for developing the preferred Woodson Road concept alternative has been specifically tailored to produce the most objective result possible. There are three overarching roadway corridor components – the roadway realm from curb to curb; the pedestrian realm from the curb to the ROW line; and the land use realm consisting of private parcels adjacent the public ROW. In addition to the I-70 crossing alternatives, appropriate alternatives for each of the three roadway corridor components are presented with associated benefits, challenges, and considerations that will be evaluated in the next section, Alternatives Evaluation. The highest rated alternatives from each roadway corridor component will be assembled together and become the preferred alternative used to develop the order of magnitude cost estimate.

WOODSON ROAD CONCEPT COMPREHENSIVE PLAN CONSIDERATIONS

The Woodson Terrace Comprehensive Plan established the Town Center District, shown in Figure CA-14, which overlays Woodson Road and the adjacent properties. The Town Center segment of Woodson Road extends from Aero Space Drive south to Guthrie Avenue and is envisioned to become the heart of the community. The plan recommends a mix of unique or specialized retail, commercial, and office uses located in zero- setback development, two to four stories in height. The plan also envisions a civic plaza with elements designed to encourage public activity and character, including seating, pedestrian-scale lighting, landscaping, wayfinding signage, and fountains. A pedestrian-friendly environment will support businesses and provide active frontage along the corridor and open views to encourage a sense of safety and security.

Two roadway configurations within the Woodson Road ROW were proposed with derivations in drainage and bicycle facilities. Common concept components include a three-lane roadway with intermittent central medians with bioswales and parallel parking; upwards of a 36-foot wide pervious paved pedestrian realm on both sides of the roadway with an impervious frontage zone and stormwater planters; street trees and decorative planting; and enhanced roadway and pedestrian-scale lighting.

On major arterials, boulevards require additional space for emergency vehicles, typically 20-feet, and a viable planted area. In the comprehensive plan, space needed for emergency vehicles was presented in alternative one as a 1-foot shoulder, 11-foot travel lane, 6-foot bike lane, 2-foot parking buffer, and 7-foot parking lane. Alternative two simply offered wider travel lanes, moving the bicycle facilities outside the vehicular travel way to a planting protected bike lane. Both alternatives have a 12-foot median.

Protected bike facilities serve bicyclists from a wider spectrum of experience than on-street bike lanes. Considering the broad range of users arriving at the airport, low-stress protected facilities are recommended. Because a boulevard requires allocating more ROW to the vehicle realm, a three-lane roadway should be considered, which will have implications for stormwater management.

CORRIDOR ANCHORS & URBAN DESIGN ANALYSIS CONSIDERATIONS

Woodson Road from Natural Bridge Road to Bataan Drive can be split into three 5-minute walks, each one-quarter mile long. Figure CA-17 shows how these quarter mile segments almost correspond directly with the development districts. The northern segment frames the portion of Woodson Road within the Gateway District.

It begins at the focal gateway intersection of Natural Bridge Road and end near Aero Space Drive. The middle segment could be slightly extended to encompass the portion of Woodson Road within the Town Center District from Aero Space Drive to Guthrie Avenue The southern segment from Guthrie Avenue to Bataan Drive aligns with the end of the quarter-mile walks.

The ends of each segment are ideal locations for focal points, activity areas, and development intensity enticing visitors to explore the corridor. As noted in the comprehensive plan, the Natural Bridge Road intersection is a point of regional prominence and recommends an it to be enhanced or "grander" to identify the entry into Woodson Terrace's core. Being closest to the airport, the segment will cater primarily to visitors. To draw those visitors and other people from the region, the Gateway and Town Center District corridor transition is an opportunity to draw them in and should cater to visitors. The middle segment is located at the heart of Woodson Terrace and should reflect the local character discussed in the comprehensive plan. Guthrie Avenue is the southern entrance to the Town Center District which suggests the need for another, possibly more modest, activity node and/or gateway supporting and attracting local visitors from Woodson Terrace and the neighboring communities. The southern segment has residential development to the west and underutilized commercial parcels on the east. This signals a transition from surrounding neighborhoods into a more active commercial area. Signaling this transition at Bataan Drive and along Woodson Road would accentuate the experience of entering into a unique and special community.

BUILDING SETBACK ASSESSMENT

LEGEND

Woodson Rd

Setbacks

A - 60 Feet
B - 128 Feet
C - 147 Feet
D - 127 Feet
E - 118 Feet
F - 429 Feet
G - 139 Feet
H - 83 Feet
I - 94 Feet
J - 99 Feet
K - 220 Feet
L - 139 Feet
M - 134 Feet
N - 89 Feet
O - 135 Feet
P - 155 Feet
Q - 156 Feet
R - 60 Feet

Figure CA-18: *Building Setback Assessment Diagram*

The comprehensive plan recommends zero-setback development in the Town Center District. The setback analysis, Figure CA-18, shows many parcels could be redeveloped in front of existing buildings. Narrowing the ROW may help other properties develop. Considering this, evaluating streetscape improvements from ROW line to ROW line and alternatives in which the ROW narrows is worth considering.

WOODSON ROAD CONCEPTUAL ALTERNATIVES

As noted in the introduction, this study will likely initiate further studies and become the basis for grant applications, the process for developing the preferred Woodson Road concept alternative, has been specifically tailored to produce the most objective result possible. Alternatives have been developed for three overarching roadway corridor components – the roadway from curb to curb; what is often called the pedestrian realm, which is the area on both sides of the roadway from the curb to the ROW line; and the roadway corridor development as it fits within the transportation system and relates to adjacent properties. In addition to the I-70 crossing alternatives, appropriate alternatives for each of the three roadway corridor components are presented with associated benefits, challenges and considerations which will be evaluated in the next section, Alternatives Evaluation.

ALTERNATIVE TRAVEL MODES ELEMENT

Alternative travel modes include walking and biking. Three alternatives are considered including a shared use path (SUP), separated mode urban greenway, and directional protected bike lanes. Each alternative features a 10-foot curbside buffer from the curb to the bicycle facility which provided room for signage, dining, stormwater planters, other amenities, and a space for people getting out of parallel parked cars. Where desired, the curbside buffer can become larger if ROW is available, but should not be less than 5-feet wide.

The alternatives are illustrated in Figure CA-19, Figure CA-20, and Figure CA-21 on the following page. The diagrams illustrate a representative pedestrian and bicycle realm on one side of the roadway for clarity and will be mirrored on the other side for the preferred alternative.

SIDE PATH CONCEPT

The SUP allocates a 10-14-foot wide path for people walking and biking. A 10-foot buffer (5' Minimum) from the path to the face of the curb separates the facility from the vehicle realm. The buffer protects SUP users and provides space for stormwater planters, amenities, lighting, dining and other beneficial elements. Building frontage should be a minimum 6-feet from the path edge, but 10-feet is recommended including a 3-foot buffer to the path edge along active building frontage like for dining and retail in the Town Center District.

Benefits

- Combining walking and biking saves ROW which could be allocated to other uses, amenities, and space for programming.
- An alternative with bicyclists traveling in both directions maximizes the people passing businesses on the facility side of the roadway.

Challenges

- In active areas, if sufficient frontage and buffer areas to step aside or pass are not available, combining people walking 3 mph with bicyclists traveling 8-12 mph invites potentially harmful conflicts.
- SUPs stimulate economic activity for businesses on the side with the bicycle facilities. A SUP on one side of the road will likely generate comparable economic activity on both sides of the roadway.

Consider

- If ROW space is available, consider a SUP on both sides of the roadway.
- A SUP in an urban context is the least efficient bicycle facility. It is recommended for recreation, areas serving families, and less experienced cyclists.

TWO-WAY PROTECTED BIKEWAY CONCEPT

Separated mode urban greenways designate separate areas for walking and biking. The walking facilities should be a minimum 6-foot wide. The bi-directional protected bike lanes should be a minimum 10-feet wide with two 5-foot lanes, but a 12-foot wide bike facility is preferred. A 10-foot buffer from the path to the face of the curb separates the facility from the vehicle realm, and a minimum 1-foot buffer should separate the walking and biking facilities.

Benefits

- Separate walking and biking facilities improve safety by reducing potential for conflicts and the walk provides buffer

space to the frontage area. Separating the travel modes is a preferred facility in active areas.
- Variations in the buffer space between travel modes creates pocket for amenities, art or planting.
- Two side-by-side lanes allow opportunity for passing without entering pedestrian areas.

Challenges

- Protected bike lanes stimulate economic activity. When located on only one side of the road, the side with the faculties will likely witness greater economic activity.
- Separating travel modes requires additional ROW.

Consider

- Separated mode urban greenways are the preferred multi-functional bicycle facility in an urban setting. These greenways serve the broadest range of users because modes are separated re-leaving conflicts and the two side-by-side lanes provide opportunity for passing without entering pedestrian areas. They are recommended for tourism, in high activity areas, and areas serving families.
- Separated mode greenways are intended to be located only on one side of the roadway. Directional protected bike lanes and the SUP alternativess should be considered before making the decision to locate bicycle facilities on both sides of the roadway.

DIRECTIONAL PROTECTED BIKE LANE CONCEPT

Directional protected bike lanes also designate separate areas for walking and biking. The difference is one bike lane is located on both sides of the roadway traveling in

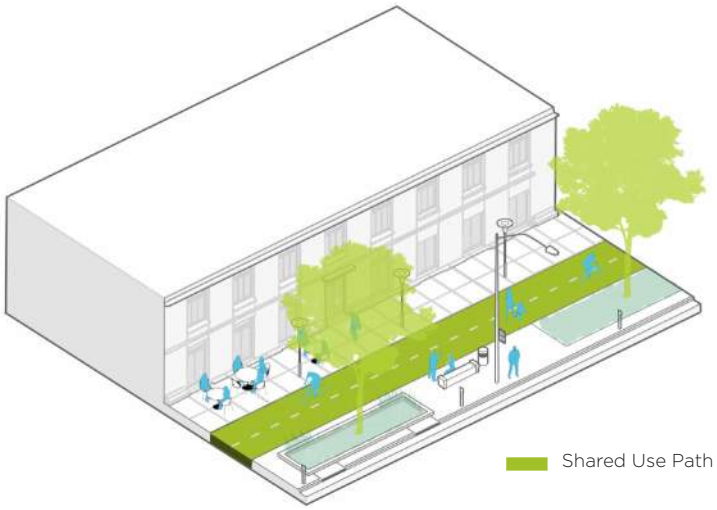


Figure CA-19: *Shared Use Path Concept Diagram*

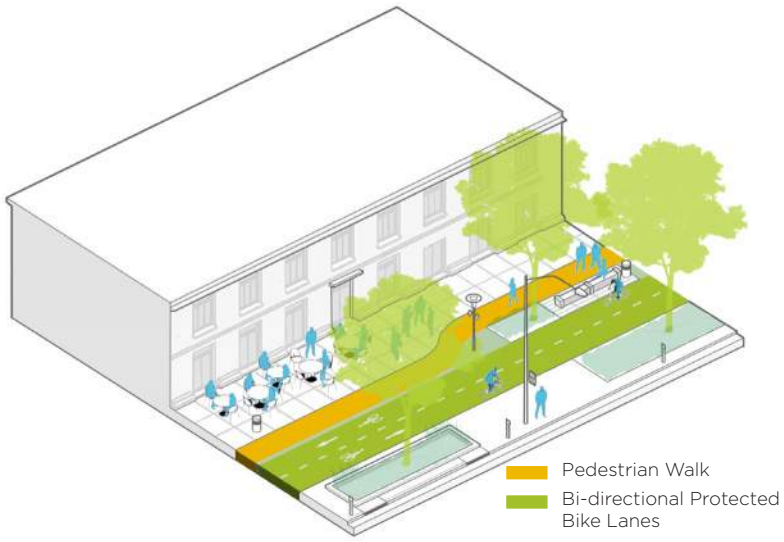


Figure CA-20: *Separated Mode Urban Greenway Concept Diagram*

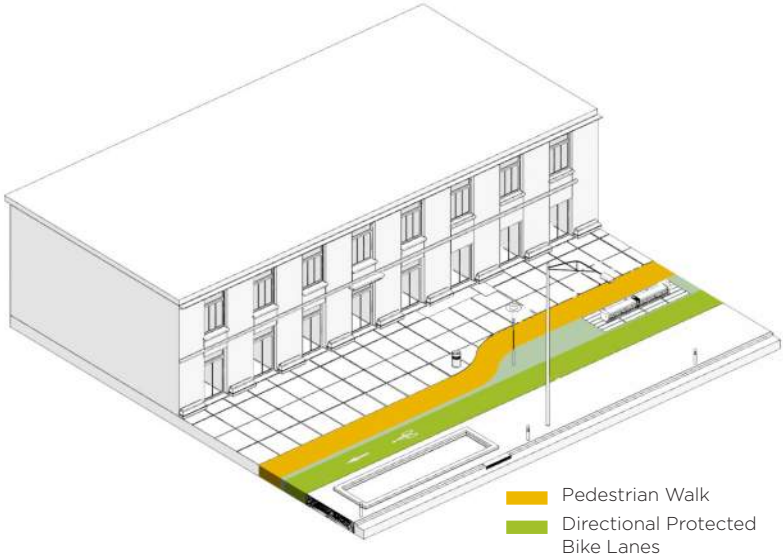


Figure CA-21: *Directional Protected Bike Lane Concept Diagram*

the direction of traffic. The walking facilities should be a minimum 6-foot wide. The directional protected bike lanes should be a minimum 6-feet wide with a minimum 1-foot buffer separating the walking and biking facilities. A 10-foot buffer from the path to the face of the curb separates the facility from the vehicle realm.

Benefits

- Separate walking and biking facilities improve safety by reducing potential for conflicts and the walk provides buffer space between bicycles and the building frontage area. Separating the travel modes is a preferred facility in active areas.
- Directional protected bike lanes are an alternative to bi-directional facilities when space is limited.
- A bike lane on both sides of the roadway will stimulate activity and commerce on both sides.
- Variations in the buffer space between travel modes creates pocket for amenities, art or planting.
- Directional protected bike lanes provide separate facilities in less ROW width compared with the other alternate travel mode facilities.

Challenges

- Only users traveling in one direction have direct access to adjacent businesses.
- To pass slower bike lane users, faster bicyclists will need to veer into facilities for people walking.

Consider

- Directional protected bike lanes are utilized primarily for moving users in a fashion similar to cars in a roadway. These facilities cater to moderate experienced bicyclists and can be uncomfortable in higher activity areas for inexperienced riders.

ROADWAY CONFIGURATION ELEMENT

Traffic volumes indicate a road diet is viable, and the comprehensive plan advances this concept with cross sections for two boulevard alternatives. Building on these initial concepts from the comprehensive plan, this study examines two roadway alternatives: a three-lane roadway alternative, and a boulevard alternative.

3-LANE ROADWAY CONCEPT

The three-lane roadway alternative has three 11-foot travel lanes and two 8-foot parallel parking lanes totaling 49-feet from curb to curb. Aggregating the vehicle realm to comfortable, yet minimal, ROW utility provides 101-feet of ROW for pedestrian- and bicycle-oriented usage. The additional area outside the roadway can be used to incorporate more programming, amenities, and services. Without a median, motorists have clear views to street activity and businesses on the both sides of the roadway. This configuration also offers motorists a sense of openness and accessibility to both sides of the roadway.

Benefits

- Allocates all non-vehicular ROW to the side of the roadway in which people can access and inhabit space engaging more opportunity for services, amenities and programing.
- Motorist have unobstructed views of both sides of the roadway to see businesses and street activity.

Challenges

- With 150-feet of ROW, over 50-feet from the curb to zero-setback development could diminish the active street frontage benefits this type of development offers.

Consider

- Reducing the ROW width to move development closer to the roadway edge. The increased developable area could incentivize investment.
- Planning, designing, and investing in civic amenities and programming to fully activate the pedestrian and bicycle realm.
- A dual direction bicycle facility on both sides of the roadway to offer greater access and opportunity for visibility to businesses.
- Consider alternating back-in angled parking with moving the curbs to the travel lane edge creating pockets for traffic calming, mid-block crossings, stormwater management, amenities, services, and programming. The same number of parking spaces could be provided compared with parallel parking.

BOULEVARD CONCEPT

The boulevard alternative has two 15- foot travel lanes with a 2-foot buffer to the median and 3-foot door buffer to parallel parking, 8-foot parking lanes, and a center median which could range in width from 12- foot to 25-feet. The medians create a parkway setting with potential to increase shade from trees over most of the roadway, reducing the heat island effect. At upwards of 25-feet in width, the median could provide substantial opportunities to creatively manage stormwater and develop an inviting experience for motorists. Allocating ROW space to the center median moves the

travel lanes closer to zero-setback development increasing visibility to businesses on the side closest to the roadway.

Benefits

- Increased shade opportunities could reduce heat island effect improving visitor comfort.
- Increased trees near roadway has the potential to dramatically reduce air pollution from particulates creating a move inclusive environment for people with respiratory concerns.
- The median provides substantial opportunity for stormwater management and development of an inviting driving experience.
- Moves each lane of traffic closer to the ROW edge and zero-setback development.

Challenges

- ROW allocated to the median becomes inaccessible space. The same amount of stormwater management could occur outside the roadway.
- Open stormwater management will collect trash and debris which will need to be maintained. Maintenance in the vehicular realm is less accessible compared with the pedestrian realm.
- The median increases motorist separation from one side of the ROW decreasing visual connection to half of the corridor's businesses. It also develops a sense of barrier or physical separation from the opposite side of the roadway for people driving vehicles, biking and walking.

Consider

- A boulevard/parkway is conducive to mixed-use development more heavily weighted toward residential.
- Developing a linear median park is an opportunity employed in some mixed-use commercial development in other cities. Success is directly related to the amount of programming, amenities and services provided in the median area.

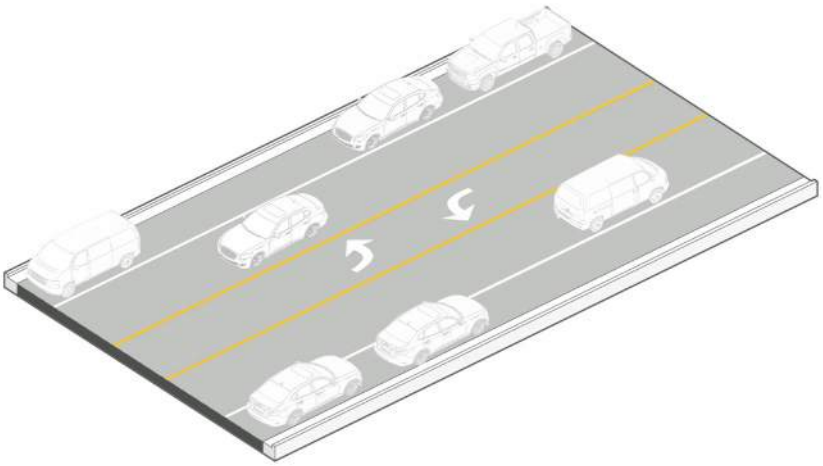


Figure CA-22: *Three-lane Roadway with Parallel Parking on Both Sides*

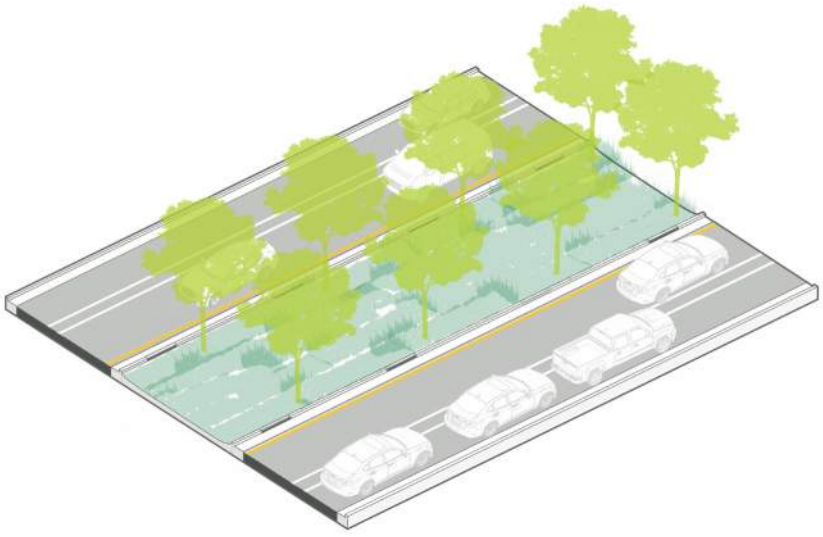


Figure CA-23: *Boulevard Roadway with Parallel Parking on Both Sides*

CORRIDOR DEVELOPMENT ELEMENT

The City of Woodson Terrace has the resources and tools necessary to shape the form and function of Woodson Road. Public infrastructure investments and zoning regulations provide the framework to influence private development and bring to life the vision it has set forth for Woodson Road in its comprehensive plan. This section of the evaluation considers the nexus of transportation and land use development by examining three potential alternatives for corridor development based on public investments in transportation infrastructure.

3-LANE DEVELOPMENT CONCEPT

The three-lane development alternative builds on the three-lane roadway configuration and envisions redevelopment along the corridor in a linear, even fashion. With the potential for medians at select points through the corridor, this alternative can better control access to adjacent properties and provide opportunities for mid-block pedestrian crossings, further enhancing pedestrian safety and connectivity. The three-lane alternative provides unobstructed sight lines for clear identification of businesses and development along the corridor.

Benefits

- Access control and mid-block pedestrian crossings increase pedestrian and bicycle safety and connectivity.
- Motorists have unobstructed views of both sides of the roadway to see businesses and street activity along building frontages.

Challenges

- Addition of a center turn lane without select locations of medians creates a barrier to crossing except at intersections.
- The three-lane section is a traditional section in the region and does not serve to slow traffic traveling along new development frontage envisioned for this corridor.

Consider

- Reducing the ROW width to move development closer to the roadway edge. Increased developable area could incentivize investment.
- Planning, designing, and investing in civic amenities and programming to fully activate the pedestrian and bicycle realm.
- Back-in angled parking can slow traffic and create better views of development, mid-block crossings, amenities, services, and programming.

BOULEVARD DEVELOPMENT CONCEPT

The boulevard development alternative is similar in many ways to the three-lane section alternative. Development is still linear in nature; however, the presence of a tree-lined median offers unique benefits and challenges to consider. The median offers a more comfortable environment for all road users and presents more options for mid-block pedestrian crossings. It also creates stricter access control, limiting left turns through most of the corridor. The boulevard concept also brings a sense of character and identity that would separate the corridor from similar small business districts in the region.

Benefits

- Controlled access to land uses along Woodson Road enhances safety and comfort for all road users.
- Medians with trees and plantings will frame the street, and calm traffic, and allow fewer trees in front of existing and future buildings, increasing sightlines and allowing more space outdoor dining, benches, public art, and other amenities.
- Increased trees near roadway have the potential to reduce air pollution from particulates as well.
- Mid-block crossing opportunities will connect existing and future development west and east of Woodson Road.
- Sections of the median can be used for stormwater management.

Challenges

- Access controls along Woodson Road would present limitations on access and developments along Woodson Road.
- Access points will need to be coordinated with existing businesses to make sure existing businesses can maintain access for economic viability.
- The landscaped median increases pedestrian crossing distances.
- The median develops a sense of barrier or physical separation from the opposite side of the roadway for people walking, biking or driving vehicles.

Consider

- A boulevard/parkway is more conducive to mixed-use development that has more emphasis towards residential land use.

NODAL EMPHASIS DEVELOPMENT CONCEPT

The nodal emphasis development alternative envisions development and activity concentrated at key intersections, or nodes, along the corridor. Development density and building heights can be increased at these nodes to encourage orderly growth and development, generate pedestrian activity through a mixture of land uses, and build an identity and sense of place as Woodson Road transforms into the Town Center envisioned in the comprehensive plan.

Benefits

- Traffic calming by creating visually apparent areas of development emphasis.
- Emphasis to design and intensify development at key nodes along Woodson Road.
- Both density and building height can be more increased on nodes and lessened between nodes to provide more character and appeal to draw businesses and development to the area.
- Nodal focus provides framing of the key intersections for providing visual cues for those walking, driving, or biking along Woodson Road, as well as calm traffic at nodes.

Challenges

- Since the development heights and density will be increased at the nodes can increase development opportunity and, in turn, property value.
- Nodal concentration may lead to a lack of private investment between nodes.

Consider

- Balancing noal mixed-use development with supporting uses between nodes to balance development interests along Woodson Road so all development does not focus on nodes.

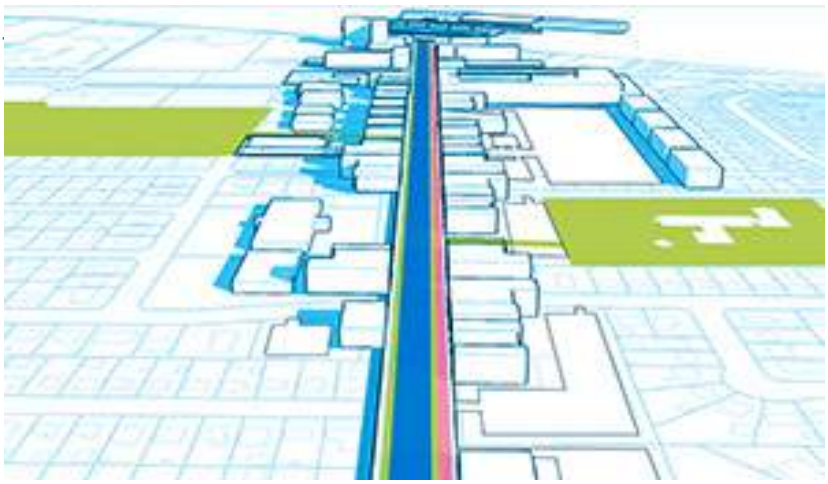


Figure CA-24: *Three-Lane Development Concept*

Figure CA-25: *Boulevard Development Concept*

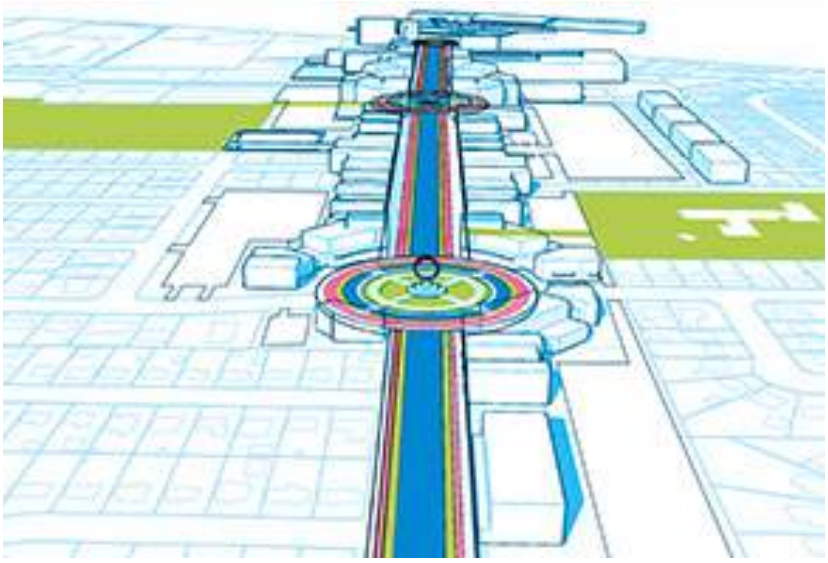


Figure CA-26: *Nodal Emphasis Development Concept*

ALTERNATIVES EVALUATION

Figure AE-1: *Woodson Road Looking North Towards Lambert International Airport*

INTRODUCTION

The evaluation criteria and process provide qualitative, objective order of magnitude measures which can facilitate the evaluation of infrastructure, environmental impacts, demographic information, economic development, and other critical data inputs to determine inherent strengths and weaknesses when comparing alternatives to identify an alternative that best meets the project's vision and goals. The outcomes inform the feasibility of the project and provide guidance for the ultimate project direction for the City and the region.

METHODOLOGY

The analysis comprises of three overarching themes: Feasibility, Connectivity, and Impact. While the ultimate goal is to determine if connecting Woodson Road to the airport is feasible, the City and potential partners in the project will consider quality of the connection, and potential impacts important factors. Several key criterion are combined to create a composite score for each theme. A numerical scoring system rates each criterion on a scale from one to four, one being the lowest possible score, and four being the highest possible score. For each criterion, specific thresholds were developed to correspond with the numerical scoring system. Some criterion does not correspond directly to each infrastructure element. Low scores can reflect, for instance, limited right-of-way availability, the need for significant structures, a lack of connectivity to destinations, or other constraints and challenges. A higher score, on the other hand, defines that an alternative's performance for a particular criterion is excellent or promising. This can reflect a potential to capitalize on inherent opportunities, such as excess rights-of-way, high transit connectivity, minimal roadway crossings, and partnering potential.

CRITERIA THEMES & DESCRIPTIONS

Criteria are grouped into the three themes - Feasibility, Connectivity, and Impact - with multiple sub-themes of related evaluation criteria. In total, 46 individual criteria are used to evaluate each alternative.

FEASIBILITY

The technical feasibility for building each alternative is evaluated in the following seven categories: utility impacts; impacts to I-70; stakeholder support; potential benefits for the infrastructure investment; impediments to construction like ownership, time estimated to acquire land, permits, and construction means and methods; and potential funding opportunities. These technical feasibility categories are then averaged to provide a Total Feasibility Score for each infrastructure alternative.

Criteria used to score each technical feasibility category are located on the following page organized top to bottom from highest to lowest. The numbers on the side represent the numerical scoring system from one to four, one being the lowest possible score, and four being the highest possible score.

PHYSICAL FEASIBILITY

This criterion relies on a preliminary engineering assessment of profiles, grades and the ability of the alternative to meet the design guidelines of stakeholders such as MoDOT, the City of St. Louis (for the airport), and City of Woodson Terrace. While topographic surveys were not accomplished in this study, as-built plans were used for I-70 and the I-70 crossing, and contours secured for the project area were used to define elements of each alternative. This criterion included the feasibility of bridge structures, walls and horizontal and vertical changes to highways and infrastructure needed for an alternative.

UTILITIES

This criterion relies on limited data at the proposed connection of Woodson Road to the airport, a visual survey of the current corridor conditions and professional judgment of planners, engineers, and landscape architects to determine the impact of existing utilities on alternative development. The overhead and underground utility information secured include: natural gas lines, cable, electric lines, sewer, stormwater, airport fuel, fiber optics, and internal airport communications.

I-70 IMPACTS

This criterion estimates the operational impacts to I-70 during construction and after completion. Impacts include traffic control, project extents, construction phasing, implementation timeline, and ultimate changes to I-70 transportation facilities.

STAKEHOLDERS

This criterion considers ROW or property owner/ stakeholder support for infrastructure development based on their potential willingness to assist in funding, building, maintaining and operating the proposed improvements. Primary stakeholders include the City of Woodson Terrace, MoDOT, City of St. Louis, Lambert International Airport and Bi-State.

CAPITAL COSTS

Construction costs relate to extent of work, on context, design elements, and technical complexity. Planning level capital cost judgments rely on professional engineers and landscape architects considering potential funding sources with relation to the infrastructure component's magnitude related to the potential benefit.

MAINTENANCE & OPERATIONS

Once constructed, infrastructure requires continual care and stewardship to retain its full value and reach its intended lifespan. This criterion evaluates the likely post-construction costs related to operations and maintenance.

CONSTRUCTIBILITY

Technical complexity for construction of an infrastructure project is multi-fold. It considers the overhead and underground utility adjustments, physical constraints, as well as the structures required to provide the intended facilities and other structures that would require relocation. This criterion also considers the time it will take for addressing issues including traffic control, permitting needs from stakeholders, potential construction duration, and coordination with other projects. The ratings for this criterion are based on professional experience of planners, engineers, and landscape architects.

FUNDING OPPORTUNITIES

The component will consider the need and potential for partnerships between the City of Woodson Terrace and public and/or private entities to raise capital funds. the corridors with funding partners identified will score higher.

	Physical Feasibility	Utilities	I-70 Impact	Stakeholders
Highest Rating				
4	Alternative is feasible and addresses several future infrastructure needs	No Utility Impediments	Minimal to No Changes to I-70 Are Required	Full Stakeholder Support and Interest
3	Alternative is feasible	Utilities can be Moved at Reasonable Cost	Moderate Changes to I-70 Are Required	Moderate Stakeholder Support and Interest
2	Some elements are feasible, others are in question	Utilities can be Moved at High Cost	Significant Changes to I-70 Are Required	Low Stakeholder Support and Interest
1	Not Feasible	Utilities Impede the Concept	Required Changes to I-70 Are Not Feasible	No Stakeholder Support and Interest
Lowest Rating				

	Capital Costs	Maintenance & Operations	Constructability	Funding Opportunities
Highest Rating				
4	Public and Private Funding Sources Available, Very High Benefit to Cost	Basic Operations and Maintenance. (City and partners are committed to ongoing funding)	Can be coordinated with related projects to reduce time and resources. Minimal impacts to regional or local travel	Full Private Funding
3	High Benefit to Cost, Competitive in Traditional Infrastructure Sources with Other Public Funding Available	Basic Operations and Maintenance. (City is only committed to ongoing funding)	Will take greater than average time, coordination, and resources. Some delays to regional and local travel movements	Public/Private Funding Partnership
2	Can Be Funded Through Traditional Infrastructure Sources, Moderate Benefit to Cost	High Operations and Maintenance. (City and partners are committed to ongoing funding)	Will take a significant amount of time, coordination, and complex installation. Major delays to regional and local transportation movements	Joint City and Public Grant Funding
1	Too Significant Cost to Benefits	High Operations and Maintenance. (City is only committed to ongoing funding)	Is Not Feasible to Implement	Sole City of Woodson Terrace Funding
Lowest Rating				

	FEASIBILITY								% of Average Total Score
	Physical Feasibility	Utilities	I-70 Impact	Stakeholder	Capital Costs	Maintenance & Operations	Constructability	Funding Opportunities	
Woodson Road Airport Connection Alternatives									
Iconic Pedestrian & Bicycle Suspension Bridge	3	3	3	3	2	3	3	3	**72**
Pedestrian & Bicycle Bridge	3	3	3	3	2	3	3	2	**69**
Pedestrian & Bicycle Underpass	3	2	2	3	2	3	2	2	**59**
Multi-Mode Underpass	4	2	2	3	4	3	2	3	**72**
Roadway Concept									
Three-Lane	3	4	NA	3	2	3	4	2	**75**
Boulevard	4	3	NA	3	2	1	3	2	**64**
Alternate Travel Mode Concept									
Shared Use Path	3	3	NA	3	2	3	4	2	**71**
Separated Mode Urban Greenway	3	3	NA	3	2	3	4	2	**71**
Directional Protected Bike Lane	3	3	NA	3	2	3	4	2	**71**
Corridor Concept									
Three-Lane	3	4	NA	3	3	3	4	2	**79**
Boulevard	4	4	NA	3	2	3	3	2	**75**
Nodal Emphasis	2	3	NA	3	4	2	2	3	**68**

CONNECTIVITY

Transportation infrastructure not only serves users as a valuable transportation asset, but connects residents, visitors, and commerce to important places and to one another. This evaluation theme explores each infrastructure alternative's ability to connect people to the places they live, work, play, pray, shop, and everything in between.

Criteria used to score each technical feasibility category are located on the following page organized top to bottom from highest to lowest. The numbers on the side represent the numerical scoring system from one to four, one being the lowest possible score, and four being the highest possible score.

EXISTING PLANS

This criterion reviews the project's connection to existing plans for the area including the Woodson Terrace Comprehensive Plan, I-70 Planning and Environmental Linkages (PEL) study. Connections may include projects identified in the plans, the plan's vision and goals, special districts, and regulations and the degree in which each infrastructure alternative supports the plan.

ACCESS & CIRCULATION

The transportation system in and around Woodson Terrace is more simple roads and highways. Travel options available to people include MetroLink, Metro Bus, sidewalks, bikeways, trails, shuttles and other ride sharing alternatives. These all contribute to the City's diverse, multimodal transportation options. While these multimodal systems span the immediate area and beyond, their coverage and effectiveness varies. Each transportation option is evaluated for user access and network circulation.

Access

Access refers to the services and destination people are traveling toward. It involves considering various impediments like distance, availability and quality of crossings, service regularity and travel barriers. This criterion evaluates the traveler's ability to connect to their desired destination.

Circulation

This criterion analyzes the level of service afforded each travel option and the level of stress that the proposed improvement provides. The estimated impact of each alternative are rated in terms of improving or reducing the functionality of the transportation network.

LAND USE

All transportation infrastructure relates to and serves the adjacent properties. A direct connection to the airport would dramatically impact the way residents, airport visitors, and services such as hotels, car rentals and parking interact. This criterion evaluates the increase of existing and potential connectivity between people and their desired destinations including parking, lodging, retail/commercial, and dining.

NEIGHBORHOOD

Woodson Road is Woodson Terrace's main street. It is the community's backbone, affording residents access to a variety of community assets and everyday destinations such as schools, employment resources, parks, houses of worship, community centers, grocers' as well as neighborhood destinations and entertainment that are critical to the existing and enhanced quality of life of the community. The following evaluation criteria document each alternative's potential to bring people closer to these everyday destinations.

	Existing Plans	Access	Circulation
Highest Rating			
4	Specific Plan Recommendation	Significantly improves user access to services & destinations	Significantly improves efficiency, options & emergency circulation
3	Direct Connection or Support	Improves user access to services & destinations	Improves operational efficiency, options & emergency circulation
2	Indirect Connection or Support	No impact to user access to services & destinations	No impact to operations
1	Plan Does Not Support Improvements	Reduces access to services & destinations	Reduces operational efficiency, options & emergency circulation
Lowest Rating			

	Land Use	Neighborhood Amenities & Community Facilities
Highest Rating		
4	Significantly improves access & circulation to existing & future land uses	Significantly improves connectivity
3	Improves access & circulation to existing & future land uses	Improves connectivity
2	No impact to access & circulation to existing & future land uses	No impact to connectivity
1	Reduces access & circulation to existing & future land uses	Limits connectivity
Lowest Rating		

Woodson Road Airport Connection Alternatives	CONNECTIVITY				% of Average Total Score
	Existing Plans	Access & Circulation	Land Use	Neighborhood	
Iconic Pedestrian & Bicycle Suspension Bridge	75	69	69	75	**72**
Pedestrian & Bicycle Bridge	75	67	69	75	**71**
Pedestrian & Bicycle Underpass	75	73	69	75	**73**
Multi-Mode Underpass	88	96	100	100	**96**
Roadway Concept					
Three-Lane	63	52	56	50	**55**
Boulevard	63	48	44	25	**45**
Alternate Travel Mode Concept					
Shared Use Path	88	60	69	75	**73**
Separated Mode Urban Greenway	88	65	69	75	**74**
Directional Protected Bike Lane	88	67	69	75	**74**
Corridor Concept					
Three-Lane	75	63	69	75	**70**
Boulevard	75	60	63	75	**68**
Nodal Emphasis	75	83	94	100	**88**

NOTE:
Within each category in the connectivity evaluation, there are numerous sub-categories. Scores within each category reflect the percentage of the average sub-category scores. The complete scoring results, including sub-categories, are located in the appendix of this study.

POTENTIAL IMPACTS

The project's transformational potential extends beyond the obvious provision of a transportation or recreation facility. Improvements can also serve as a catalyst for environmental, social, and economic change. This theme's criteria examines the degree to which each alternative could provide opportunities or beneficial changes in the fabric of the community and region. They are grouped into the following sub-categories: security and surveillance, economic development, user experience, sense of place and environmental assets and opportunities.

Criteria used to score each technical feasibility category are located on the following page organized top to bottom from highest to lowest. The numbers on the side represent the numerical scoring system from one to four, one being the lowest possible score, and four being the highest possible score.

SAFETY & SECURITY

A city's streets are social spaces, bringing people together and creating opportunities for civic exchange and interaction. Through the introduction of crime prevention through environmental design (CPTED) principles, particularly in areas with a potential for criminal activity, the improvements can activate this public space to support positive social activity. This criterion examines the potential for each alternative to provide actual and perceived user safety.

ECONOMIC DEVELOPMENT

As noted, transportation infrastructure relates to and serves adjacent properties which can translate into economic development and investment. This criterion is split into tourism, job creation, revenue opportunities, potential for catalyzing development, and investment potential and evaluates the possible opportunities each infrastructure alternative could stimulate.

USER EXPERIENCE

User experience is an important gauge for evaluating hospitality. The airport welcomes nearly 16-million people pass through Lambert international annually from the all corners of the United States and beyond. Approximately 7,000 work at the airport daily to serve those travelers. This area of the metropolitan region may have visitors from the broadest spectrum of people from differing cultures, ethnicities, and socio-economic backgrounds of every age and physical ability. The region's prosperity is linked directly to the airport. Lambert's Terminal 2 is growing, and this project has the potential to enhance the user's experience in the benefit of the airport, supporting services, City of Woodson Terrace, and region.

Part of many traveler's experience is finding a shuttle or other way to cross I-70 to rent a car, check into a hotel, or access overnight parking. This reception can positively or negatively impact the person's perception of the St. Louis region and influence potential future travel. This category evaluates level of service, user navigation, amenities, support for people of all ages and abilities, the capacity to include people from varying socio-economic backgrounds, and the potential to connect sincerely with different cultures and ethnicities.

Resident & Visitor Service

Infrastructure improvements will serve local residents as well as regional, national and international visitors. Their purposes and intentions for visiting the area range from work, vacations, visiting family in good times and bad, and entertainment among others. Serving people effectively from so many places and states of mind requires ample, simple, efficient, and intuitive travel options and navigational supports. Experience along those routes or level of stress that a pedestrian or cyclist experiences on those corridors is also rated. This criterion assesses infrastructure alternatives for user comfort in terms of convenience, navigation, and supporting amenities and services.

Available Options

This criterion evaluates opportunities and potential to provide physical comfort in shade, noise reduction, space for movement, and regular places for rest, pause, and social interaction. Beneficial connections to nature, which enhances mental health and calm, are also considered.

Inclusion

This criterion considers the ability of infrastructure alternatives to serve

people with varying physical, mental, and age-related abilities. All facilities must meet the provisions outlined by the Americans with Disabilities Act (ADA) at minimum. Inclusive design principles, visual hierarchy, and age-specific considerations are employed to evaluate enhancements which could accommodate users of all ages and abilities in the user experience.

Equity
Places often cater to specific demographics and target markets providing queues which communicate who is welcome and who may not be included. Visitors who do not fit within specifically identified groups are less likely to return. This criterion assesses each infrastructure alternative's capacity to serve people of different social and economic backgrounds.

SENSE OF PLACE

The quality of a place impacts the conscious and sub-conscious user experience. Because the airport is the portal, or entry, into the St. Louis region, the proposed improvements will play a unique role in providing a positive first impression. The regional significance of this project requires considerations beyond function into the realm of hospitality. The following criteria examine the degree to which each alternative can promote a comfortable, engaging, and attractive setting uniquely representative of the St. Louis region. Criterion assess opportunities to support programs and events; provide amenities and services; reflect St. Louis' culture and character; bring notoriety to the region; promote innovations in design, technology, commerce; and provide a comfortable setting which will impart fond memories and connections to Woodson Terrace and the broader region.

Programming and Amenities
This criterion evaluates the area available for amenities like outdoor dining; furnishings; seating; art; and historic, cultural and interpretive elements; gateways; and signage among others as well as programmatic events and activities.

Regional Cohesion
This criterion assesses the potential to represent and promote a uniquely St. Louis experience through each infrastructure alternatives form, character, and framework for providing visitors an opportunity to discover and explore the richly diverse history, culture, institutions, architecture, entertainment options, innovations available throughout the region.

User Comfort
This criterion evaluates opportunities and potential to provide physical comfort in shade, noise reduction, space for movement, and regular places for rest, pause, and social interaction. Beneficial connections to nature, which enhances mental health and calm, are also considered.

ENVIRONMENTAL

This criterion assesses potential environmental impacts like reduced emissions, air pollution reduction and carbon sequestration, and energy reduction and evaluates opportunities to implement stormwater best management practices and support and increase biodiversity.

USER EXPERIENCE

	Residents & Visitors Service	Available Options	Inclusion	Equity
Highest Rating				
4	Saves Time & Effort, Intuitive to Navigate	A variety of options for users without vehicle or a low level of experience	Provides reasonable equal accommodations for users of all ages and abilities	Reasonable opportunities for everyone
3	Convenient Time & Effort, Easy to Navigate	Limited travel options for users without vehicles or a low level of experience	Meets ADA Standards and Enhances Inclusion of All Abilities	Opportunities represent more than half the socio-economic spectrum
2	No Change in Time & Effort, Comfortable to Navigate	Limited travel options for users without vehicles or a moderate level of experience	Meets ADA and Other Physical or Mental Needs	Some opportunities for a limited socio-economic range
1	Inconvenient Time & Effort, Difficult to Navigate	Only provides travel options for users with vehicles or high level of experience	ADA Minimum	Opportunities do not consider socio-economics
Lowest Rating				

SENSE OF PLACE

	Programming & Amenities	Regional Cohesion	User Comfort	Environmental
Highest Rating				
4	Substantial Area to Support Programming & Amenities	High Potential to Promote Representation	High Potential to Promote User Comfort	High opportunities for creating beneficial impacts
3	Moderate Area to Support Programming & Amenities	Moderate Potential to Promote Representation	Moderate Potential to Promote User Comfort	Moderate opportunities for creating beneficial impacts
2	Limited Area to Support Programming & Amenities	Limited Potential to Promote Representation	Limited Potential to Promote User Comfort	Some opportunities for creating beneficial impacts
1	No Areas to Support Programming & Amenities	No Potential to Promote Representation	No Potential to Promote User Comfort	Limited to no opportunities for creating beneficial impacts
Lowest Rating				

Woodson Road Airport Connection Alternatives	IMPACTS					% of Average Total Score
	Safety & Security	Economic Development	User Experience	Sense of Place	Environmental	
Iconic Pedestrian & Bicycle Suspension Bridge	100	65	71	83	75	**79**
Pedestrian & Bicycle Bridge	75	55	71	75	75	**70**
Pedestrian & Bicycle Underpass	75	55	75	67	100	**74**
Multi-Mode Underpass	100	95	96	92	100	**97**
Roadway Concept						
Three-Lane	100	45	71	42	25	**57**
Boulevard	75	40	71	67	100	**71**
Alternate Travel Mode Concept						
Shared Use Path	100	60	88	58	50	**71**
Separated Mode Urban Greenway	100	55	96	75	50	**75**
Directional Protected Bike Lane	100	55	96	75	50	**75**
Corridor Concept						
Three-Lane	100	75	88	67	50	**76**
Boulevard	75	60	92	75	100	**80**
Nodal Emphasis	100	100	100	100	75	**95**

NOTE:
Within each category in the impact evaluation, there are numerous sub-categories. Scores within each category reflect the percentage of the average sub-category scores. The complete scoring results, including sub-categories, are located in the appendix of this study.

EVALUATION RESULTS

The cumulative result for the conceptual alternatives are represented on this page. Each alternative option has three bars representing the scores for feasibility (blue), connectivity (purple), and impact (magenta). Alternative options are shown side-by-side with all the other alternatives within their respective categories- roadway, I-70 crossing, alternative travel modes, and corridor development.

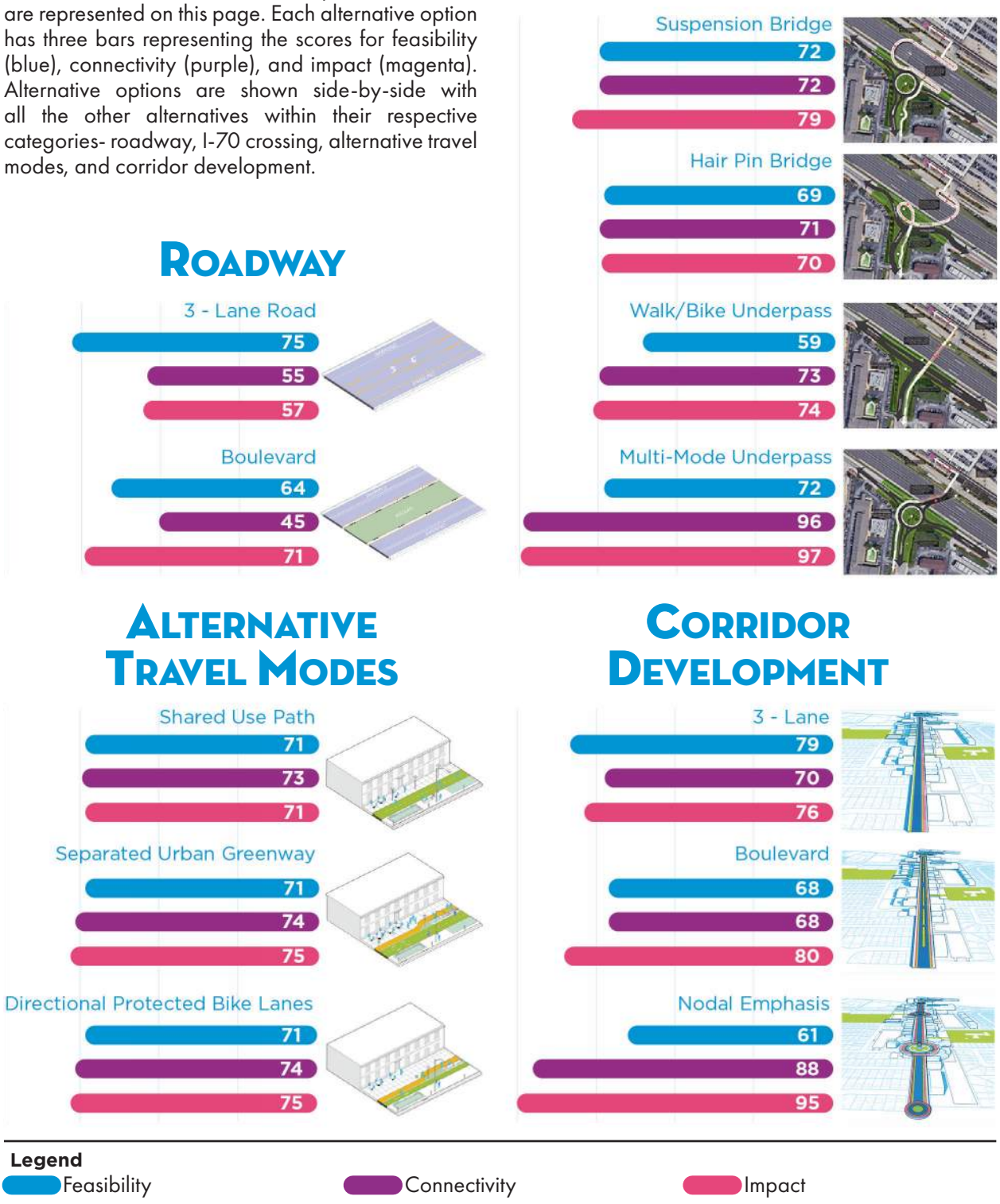


Figure AE-2: *Cumulative Evaluation Results*

Preferred Alternative/Concept

INTRODUCTION

The evaluation of alternatives for the Woodson Road connection to the airport, as well as the development of alternatives that address the reconfiguration of Woodson Road from Natural Bridge Road to Bataan Drive, were coordinated with the City Core Team relative to the methodology and criteria described in the previous chapter. This section will provide a recommendation of a preferred alternative in each case and the basis for that recommendation.

While the choice of alternative for the connection of Woodson Road across I-70 was clear, the evaluation results for the reconfiguration of Woodson Road were less definitive. The recommended design concept for Woodson Road based on these evaluation results is described in this chapter; however, the ultimate selection of a preferred alternative should be pursued through a collaborative design process with greater stakeholder coordination and public engagement.

WOODSON ROAD AIRPORT CONNECTION PREFERRED ALTERNATIVE

The preferred alternative for connecting Woodson Road to the airport across I-70 is the Woodson Road Underpass Alternative (Figures PA-1 and PA-2), which includes a side path for walking and biking on the west side of the crossing, and a roundabout intersection for Woodson Road at Natural Bridge. This alternative rates the highest in all three evaluation categories.

The Feasibility evaluation category includes multiple criteria that consider the actual construction and maintenance of crossing alternatives. All alternatives rate within minimum reasonable expectations for these eight feasibility criteria. The roadway underpass alternative is clearly the most expensive; however, in the connectivity and impact criteria, it is a far superior alternative. The alternative achieves a 92% rating for the criteria associated with connectivity of the community and to active plans. In the criteria for impact, it achieves a 97% rating for a significant positive impact on enhancement of safety and security, offering the best potential for economic development, supporting a sense of place, and offering a high-quality user experience.

Figure PA-1: *Preferred Woodson Road to Airport Connection*

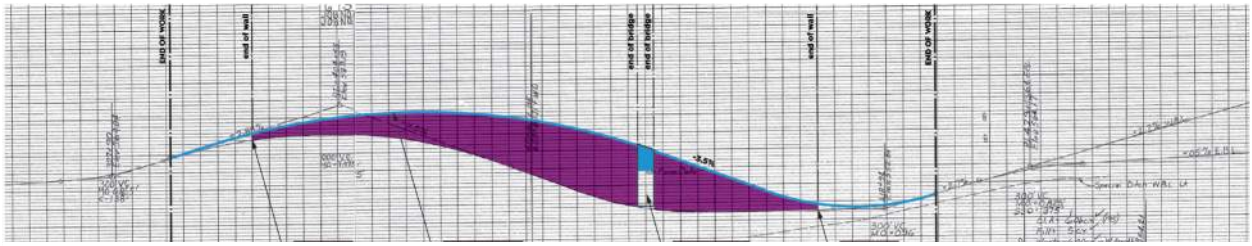


Figure PA-2: *I-70 Reconfiguration Profile*

WOODSON ROAD CORRIDOR RECOMMENDED DESIGN CONCEPT FROM NATURAL BRIDGE TO BATAAN DRIVE

The feasibility study includes the development of a concept for Woodson Road from Natural Bridge Road to Bataan Drive. The roadway concept has been divided into three project elements for consideration and analysis: roadway configuration, alternative travel mode, and corridor development. These three elements include slight variations of choice for how the corridor could be configured. For two of the three elements (roadway reconfiguration and alternative travel mode), the evaluation process yields similar results for all alternatives. For the third project element (corridor development), one alternative clearly ranks higher than the others. The complete evaluation results are described below.

Roadway Reconfiguration

The recommendation for roadway configuration is for a three-lane roadway configuration based on better construction feasibility and connectivity (Figure PA-3). The three-lane section can include midblock crossings and enhanced crossings at key nodes along the corridor that support redevelopment activities. In the short term, this alternative will support the anticipated, and expected access to new development like the Best Wester Plus just south of Natural Bridge Road, as well as the anticipated rebranding of the Holiday Inn as a DoubleTree Hotel.

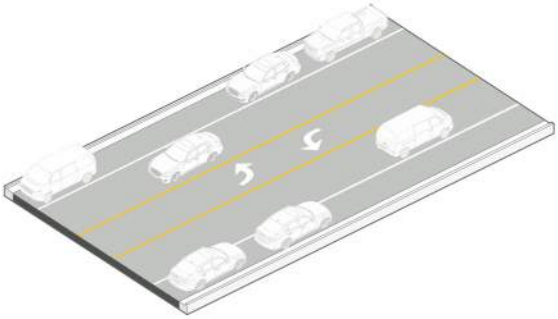


Figure PA-3: *Recommended Roadway Design Concept*

Alternative Travel Mode

The alternative travel mode options present different configurations of pedestrian and bicycle facilities to support a multi-modal, Complete Streets corridor for Woodson Road. Each alternative scores similarly in the three evaluation categories: feasibility, connectivity, and impacts. Because the corridor has a significant right of way, and the roadway is being reconfigured to a three-lane section, the directional protected bike lane alternative offers an enhanced experience for both walking and biking (Figure PA-4). Additional design consideration will be required to develop a smooth transition between the directional bikeway and the shared use path included in the preferred alternative for connecting Woodson Road to the airport. A final decision on the type of walking and biking facilities should include input from residents and adjacent businesses. Any of the alternatives proposed would serve the community well.

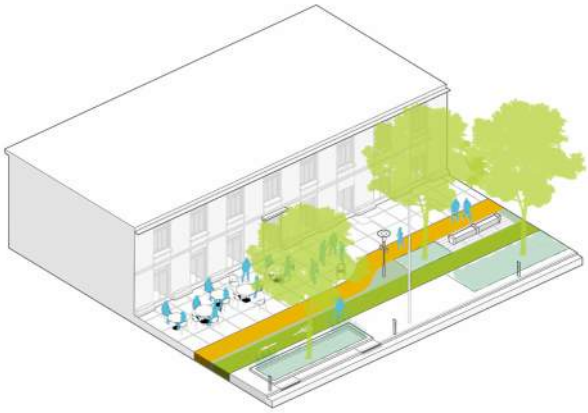


Figure PA-4: *Recommended Alternate Mode Design Concept*

Corridor Development

The final element of the Woodson Road Corridor concept is related to corridor redevelopment and how land use will relate to the transportation. The recommended design concept for corridor development is the nodal emphasis alternative (Figure PA-5). This concept focuses on key nodes of potential development along Woodson Road that will draw people from the airport and Natural Bridge Road down Woodson Road in defined and clearly recognizable activity areas. This alternative has significant positive impacts for Woodson Terrace and can be scaled to planned development and redevelopment of the corridor.

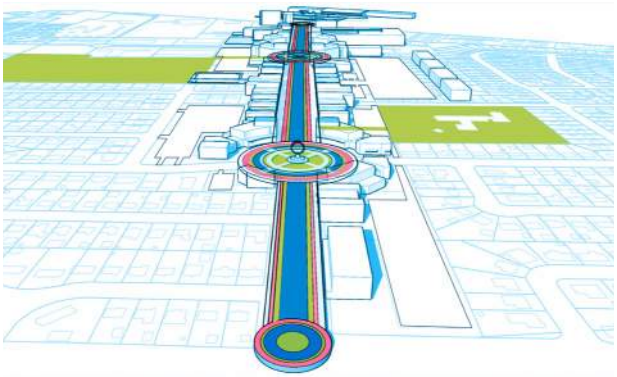


Figure PA-5: *Recommended Corridor Development Concept*

The recommended Woodson Road corridor cross section is shown in Figures PA-6. It is recommended that the recommended design concept be the subject of a community engagement process to solicit feedback from the community, MoDOT, and other stakeholders such as the City of St. John. The recommended design concept would likely lead to the transfer of maintenance of this state road the Cities of Woodson Terrace and St. John. This will require additional coordination and discussions of these three entities to move any reconfiguration of Woodson Road forward.

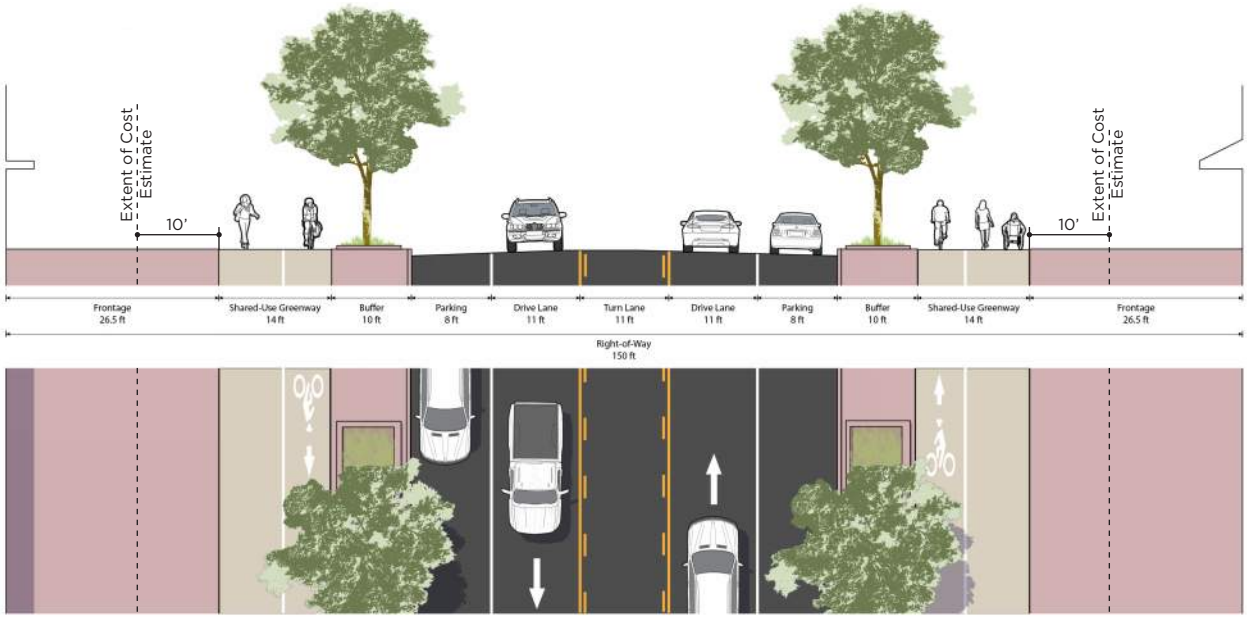


Figure PA-6: *Recommended Corridor Design Conecpt Cross Section*

Page Intentionally Blank

Next Steps

With the recommendations for the connection of Woodson Road to the airport and reconfiguration of Woodson Road in hand, the City should develop a communication plan to share the results of this study with to key stakeholders identified as the target audience in the project purpose section of the report. These communications will be critical to building support for the project/projects.

Additional engineering of the concepts should be carried forward to address detailed questions stakeholders may have with the preferred alternatives, as well as provide the detail necessary for successful grant application and participation in a variety of funding programs. These may include East West Gateway's Transportation Improvement Program (TIP) for the St. Louis Region, MoDOT's Cost Share Program (for up to 50% of project costs), the Governor's Economic Development Program, and even the USDOT's BUILD Discretionary Grants Program. Any of these funding options will require support from multiple partners for success in the implementation of the alternatives.

Estimate of Costs

PREFERRED ALTERNATIVES / CONCEPTS COST SUMMARY

Rough Order of Magnitude Planning Cost Estimate

Woodson Road Airport Connection Cost Estimate Summary	Project Cost
I-70 Reconstruction	$22,212,000
Woodson & Natural Bridge Roundabout & Underpass	$2,636,000
Woodson Road Airport Connection Cost Total	**$24,848,000**
Woodson Road Corridor Cost Estimate Summary	
Woodson to Bataan, 3-Lane	$8,152,000
Aero Space, Guthrie & Bataan Roundabouts ($536,985 per Intersection	$1,611,000
Woodson Road Corridor Cost Estimate Total	**$9,763,000**
Preferred Alternative / Concept Cost Estimate Total	**$34,611,000**

Page Intentionally Blank

RENDERINGS

WOODSON ROAD & NATURAL BRIDGE ROAD AERIAL OF EXISTING INTERSECTION

LOOKING NORTHEAST

WOODSON ROAD & NATURAL BRIDGE ROAD AERIAL OF PROPOSED ROUNDABOUT INTERSECTION

LOOKING NORTHEAST

EYE-LEVEL VIEW OF WOODSON ROAD & NATURAL BRIDGE ROAD EXISTING INTERSECTION

LOOKING NORTHEAST

EYE-LEVEL VIEW OF WOODSON ROAD & NATURAL BRIDGE ROAD PROPOSED ROUNDABOUT INTERSECTION

LOOKING NORTHEAST

EXISTING LAMBERT INTERNATIONAL BOULEVARD SIGNAL FOR TERMINAL 2 PARKING GARAGE EXIT

LOOKING SOUTHWEST

WOODSON ROAD & LAMBERT INTERNATIONAL BOULEVARD INTERSECTION VIEW OF PROPOSED I-70 UNDERPASS

LOOKING SOUTHWEST

EYE-LEVEL VIEW OF WOODSON ROAD & NATURAL BRIDGE ROAD EXISTING INTERSECTION

LOOKING WEST

EYE-LEVEL VIEW OF PROPOSED ROUNDABOUT INTERSECTION FROM NATURAL BRIDGE ROAD

LOOKING WEST

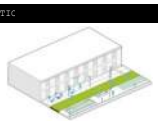
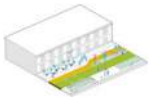
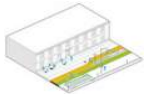
WOODSON ROAD & ST. WILLIAMS COURT EXISTING INTERSECTION

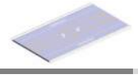
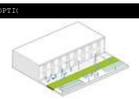
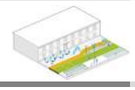
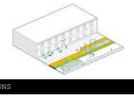
LOOKING SOUTHEAST

WOODSON ROAD & ST. WILLIAMS COURT PROPOSED TOWN CENTER ENTRY

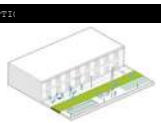
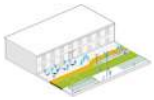
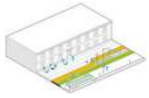
Page Intentionally Blank

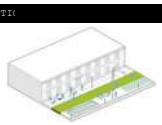
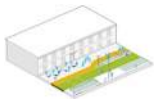
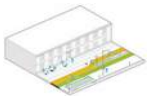

APPENDIX

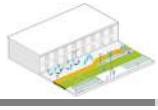
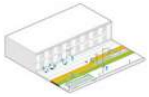
Woodson Road Evaluation Criteria Rating	Feasibility								
	Physical Feasibility	Utilities	I-70 Impact	Stakeholder	Capital Costs	Maintenance and Operations	Constructability	Funding Opportunities	
1	Not Feasible	Utilities Impede the Concept	Required Changes to I-70 Are Not Feasible	No Stakeholder Support and Interest	Too Significant Cost to Benefits	High Operations and Maint. (Responsible Partners Committed to Ongoing Funding)	Is Not Feasible to Implement	Sole City of Woodson Terrace Funding	
2	Some elements are feasible, others are in question	Utilities can be Moved at High Cost	Significant Changes to I-70 Are Required	Low Stakeholder Support and Interest	Can Be Funded Through Traditional Infrastructure Sources, Moderate Cost/Benefit	Basic Operations and Maint. Defined (City only is committed to ongoing funding)	Will take a significant amount of time, coordination, and complex installation. Major delays to regional and local transportation movements	Joint City and Public Grant Funding	
3	Alternative is feasible	Utilities can be Moved at Reasonable Cost	Moderate Changes to I-70 Are Required	Moderate Stakeholder Support and Interest	High Benefit to Cost, Competitive in Traditional Infrastructure Sources with Other Public Funding Available	Basic Operations and Maint. Defined (Responsible partners committed to ongoing funding)	Will take greater than average time, coordination, and resources. Some delays to regional and local travel movements	Public/Private Funding Partnership	
4	Alternative is feasible and addresses several future infrastructure needs	No Utility Impediments	Minimal to No Changes to I-70 Are Required	Full Stakeholder Support and Interest	Public and Private Funding Sources Available, Very High Benefit to Cost	Operations and Maint. Fully Funded Through Alternative Sources	Can be coordinated with related projects to reduce time and resources. Minimal impacts to regional or local travel	Full Private Funding	
CROSSING OPTIONS									
CROSSING OPT A: Suspension Bridge 	3	3	3	3	2	3	3	3	72%
CROSSING OPT B: Hair Pin Bridge 	3	3	3	3	2	3	3	2	69%
CROSSING OPT C: Walk/Bike Underpass 	3	2	2	3	2	3	2	2	59%
CROSSING OPT D: Auto Underpass 	4	2	2	3	4	3	2	3	72%
ROADWAY OPTIONS									
ROADWAY OPT A: 3-Lanes 	3	4	NA	3	2	3	4	2	75%
ROADWAY OPT B: Boulevard 	4	3	NA	3	2	1	3	2	64%
WALK/BIKE REALM OPTIC									
WALK/BIKE OPT A: Shared Facilities 	3	3	NA	3	2	3	4	2	71%
WALK/BIKE OPT B: Separated Facilities 	3	3	NA	3	2	3	4	2	71%
WALK/BIKE OPT B: Bi-Directional PBL 	3	3	NA	3	2	3	4	2	71%
URBAN DESIGN OPTIONS									
CORRIDOR OPT A: 3-Lane Commercial	3	4	NA	3	3	3	4	2	79%
CORRIDOR OPT B: Boulevard	4	4	NA	3	2	3	3	2	75%
CORRIDOR OPT C: Nodal Emphasis	2	3	NA	3	4	2	2	3	68%

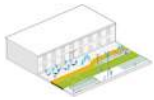
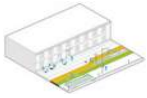
Woodson Road Evaluation Criteria Rating		Existing Plans					Access and Circulation												
			Woodson Terrace Comp Plan	MODOT STIP	Airport Master Plan		Vehicle		Transit -Metrobus		Transit -Metrolink		Bicycle/Micro Mobility		Walking		Shuttle		
		PEL Improvements					Access	Circulation	Access	Circulation	Access	Circulation	Access	Circulation	Access	Circulation	Access	Circulation	
1		Plan Does Not Support Improvements	Plan Does Not Support Improvements	Plan Does Not Support Improvements	Plan Does Not Support Improvements		Reduces access to services & destinations	Reduces operational efficiency, options & emergency circulation	Reduces user access to service & destinations	Reduces existing operational efficiency & emergency circulation	Reduces user access to service	Increases travel time & level of service to transit stations	Reduces access to services & destinations	Increases level of travel stress & limits efficient direct routes for users	Reduces access to services & destinations	Increases level of travel stress & limits efficient direct routes for users	Reduces operator access to service & destinations	Reduces existing operational efficiency & emergency circulation	
2		Indirect Connection or Support	Indirect Connection or Support	Indirect Connection or Support	Indirect Connection or Support		No impact to user access to services & destinations	No impact to operations	No impact to user access to service & destinations	No impact to operations	No impact to user access to service	No impact to travel time or level of service	No impact to user access to services & destinations	No impact to level of travel stress or user efficiency	No impact to user access to services & destinations	No impact to level of travel stress or user efficiency	No impact user access to service & destinations	No impact to operations	
3		Direct Connection or Support	Direct Connection or Support	Direct Connection or Support	Direct Connection or Support		Improves user access to services & destinations	Improves operational efficiency, options & emergency circulation	Improves user access to service & destinations	Improves existing operational efficiency & emergency circulation	Improves user access to service	Improves travel time & level of service to transit stations	Improves user access to services & destinations	Reduces level of travel stress & improves efficient direct routes for users	Improves user access to services & destinations	Reduces level of travel stress & improves efficient direct routes for users	Improves user access to service & destinations	Improves existing operational efficiency & emergency circulation	
4		Specific Plan Recommendation	Specific Plan Recommendation	Specific Plan Recommendation	Specific Plan Recommendation		Significantly improves user access to services & destinations	Significantly improves efficiency, options & emergency circulation	Significantly improves user access to service & destinations	Provides new circulation options benefiting operational efficiency & emergency circulation	Significantly improves user access to service	Significantly improves travel time & level of service to transit stations	Significantly improves user access to services & destinations	Significantly reduces level of travel stress & improves efficient direct routes for users	Significantly improves user access to services & destinations	Significantly reduces level of travel stress & improves efficient direct routes for users	Significantly improves user access to service & destinations	Provides new circulation options benefiting operational efficiency & emergency circulation	
CROSSING OPTIONS																			
CROSSING OPT A: Suspension Bridge		2	4	3	3	75%	2	3	3	2	3	3	3	3	3	3	3	2	69%
CROSSING OPT B: Hair Pin Bridge		2	4	3	3	75%	2	2	3	2	3	3	3	3	3	3	3	2	67%
CROSSING OPT C: Walk/Bike Underpass		2	4	3	3	75%	2	2	3	2	4	3	3	4	3	4	3	2	73%
CROSSING OPT D: Auto Underpass		3	5	3	3	88%	4	4	4	4	4	4	3	4	3	4	4	4	96%
ROADWAY OPTIONS																			
ROADWAY OPT A: 3-Lanes		NA	2	3	NA	63%	3	2	2	2	2	2	2	2	2	2	2	2	52%
ROADWAY OPT B: Boulevard		NA	2	3	NA	63%	1	2	2	2	2	2	2	2	2	2	2	2	48%
WALK/BIKE REALM OPTI																			
WALK/BIKE OPT A: Shared Facilities		NA	4	3	NA	88%	2	2	3	3	2	2	3	3	3	2	2	2	60%
WALK/BIKE OPT B: Separated Facilities		NA	4	3	NA	88%	2	2	3	3	2	2	3	4	3	3	2	2	65%
WALK/BIKE OPT B: Bi-Directional PBL		NA	4	3	NA	88%	2	2	3	3	2	2	4	4	3	3	2	2	67%
URBAN DESIGN OPTIONS																			
CORRIDOR OPT A: 3-Lane Commercial		NA	4	3	2	75%	4	2	3	2	2	2	3	2	3	3	2	2	63%
CORRIDOR OPT B: Boulevard		NA	4	3	2	75%	3	2	3	2	2	2	3	2	3	3	2	2	60%
CORRIDOR OPT C: Nodal Emphasis		NA	3	3	3	75%	4	3	4	3	2	3	4	4	4	3	3	3	83%

Page Intentionally Blank

Woodson Road Evaluation Criteria Rating		Connectivity							
		Land Use					Neighborhood Amenities and Community Facilities		
		Parking	Lodging	Retail/ Commercial	Dining				
1		Reduces access & circulation to existing & future land uses	Reduces access & circulation to existing & future land uses	Reduces access & circulation to existing & future land uses	Reduces access & circulation to existing & future land uses		Limits connectivity		
2		No impact to access & circulation to existing & future land uses	No impact to access & circulation to existing & future land uses	No impact to access & circulation to existing & future land uses	No impact to access & circulation to existing & future land uses		No impact to connectivity		
3		Improves access & circulation to existing & future land uses	Improves access & circulation to existing & future land uses	Improves access & circulation to existing & future land uses	Improves access & circulation to existing & future land uses		Improves connectivity		
4		Significantly improves access & circulation to existing & future land uses	Significantly improves access & circulation to existing & future land uses	Significantly improves access & circulation to existing & future land uses	Significantly improves access & circulation to existing & future land uses		Significantly improves connectivity		
CROSSING OPTIONS									
CROSSING OPT A: Suspension Bridge		2	3	3	3	69%	3	75%	72%
CROSSING OPT B: Hair Pin Bridge		2	3	3	3	69%	3	75%	71%
CROSSING OPT C: Walk/Bike Underpass		2	3	3	3	69%	3	75%	73%
CROSSING OPT D: Auto Underpass		4	4	4	4	100%	4	100%	96%
ROADWAY OPTIONS									
ROADWAY OPT A: 3-Lanes		3	2	2	2	56%	2	50%	55%
ROADWAY OPT B: Boulevard		3	2	1	1	44%	1	25%	45%
WALK/BIKE REALM OPTI									
WALK/BIKE OPT A: Shared Facilities		2	3	3	3	69%	3	75%	73%
WALK/BIKE OPT B: Separated Facilities		2	3	3	3	69%	3	75%	74%
WALK/BIKE OPT B: Bi-Directional PBL		2	3	3	3	69%	3	75%	74%
URBAN DESIGN OPTIONS									
CORRIDOR OPT A: 3-Lane Commercial		3	2	3	3	69%	3	75%	70%
CORRIDOR OPT B: Boulevard		3	2	2	3	63%	3	75%	68%
CORRIDOR OPT C: Nodal Emphasis		3	4	4	4	94%	4	100%	88%

Woodson Road Evaluation Criteria Rating		Security and Surveillance		Economic Development					
				Tourism	Jobs	Revenue	Development Catalyst	Investment Potential	
	1	Poor Visibility/Sense of Security		No Potential to Promote Tourism	No Potential to Promote Job Growth	No Potential to Generate Revenue	No Potential to Promote Future Development	No Investment Potential	
	2	Low Visibility/Sense of Security		Low Potential to Promote Tourism	Low Potential to Promote Job Growth	Low Potential to Generate Revenue	Low Potential to Promote Future Development	Moderate Local/Low Regional Investment Potential	
	3	Moderate Visibility/Sense of Security		Moderate Potential to Promote Tourism	Moderate Potential to Promote Job Growth	Moderate Potential to Generate Revenue	Moderate Potential to Promote Future Development	High Local/Moderate Regional/Low National Investment Potential	
	4	High Visibility/Sense of Security		High Potential to Promote Tourism	High Potential to Promote Job Growth	High Potential to Generate Revenue	High Potential to Promote Future Development	High Local/High Regional/Moderate National Investment Potential	
CROSSING OPTIONS									
CROSSING OPT A: Suspension Bridge		4	100%	3	2	2	3	3	65%
CROSSING OPT B: Hair Pin Bridge		3	75%	2	2	2	2	3	55%
CROSSING OPT C: Walk/Bike Underpass		3	75%	2	2	2	2	3	55%
CROSSING OPT D: Auto Underpass		4	100%	3	4	4	4	4	95%
ROADWAY OPTIONS									
ROADWAY OPT A: 3-Lanes		4	100%	1	1	1	3	3	45%
ROADWAY OPT B: Boulevard		3	75%	1	1	1	2	3	40%
WALK/BIKE REALM OPTI									
WALK/BIKE OPT A: Shared Facilities		4	100%	2	2	2	3	3	60%
WALK/BIKE OPT B: Separated Facilities		4	100%	2	2	2	2	3	55%
WALK/BIKE OPT B: Bi-Directional PBL		4	100%	2	2	2	2	3	55%
URBAN DESIGN OPTIONS									
CORRIDOR OPT A: 3-Lane Commercial		4	100%	3	3	3	3	3	75%
CORRIDOR OPT B: Boulevard		3	75%	3	2	3	2	2	60%
CORRIDOR OPT C: Nodal Emphasis		4	100%	4	4	4	4	4	100%

Woodson Road Evaluation Criteria Rating		User Experience						
		Local Residents	Regional Visitors	National/International Visitors	Available Options	Inclusion	Equity	
	1	Inconvenient Time & Effort, Difficult to Navigate	Inconvenient Time & Effort, Difficult to Navigate, Minimal Amenities &/or Services	Inconvenient Time & Effort, Difficult to Navigate, Minimal Amenities &/or Services	Only provides travel options for users with vehicles or high level of experience	ADA Minimum	Opportunities do not consider socio-economics	
	2	No Change in Time & Effort, Comfortable to Navigate	No Change in Time & Effort, Comfortable to Navigate, Necessary Amenities &/or Services	No Change in Time & Effort, Comfortable to Navigate, Necessary Amenities &/or Services	Limited travel options for users without vehicles or a moderate level of experience	Meets ADA and Other Physical or Mental Needs	Some opportunities for a limited socio-economic range	
	3	Convenient Time & Effort, Easy to Navigate	Convenient Time & Effort, Easy to Navigate, Moderate Amenities &/or Services	Convenient Time & Effort, Easy to Navigate, Moderate Amenities &/or Services	Limited travel options for users without vehicles or a low level of experience	Meets ADA Standards and Enhances Inclusion of All Abilities	Opportunities represent more than half the socio-economic spectrum	
	4	Saves Time & Effort, Intuitive to Navigate	Saves Time & Effort, Intuitive to Navigate, Substantial Amenities &/or Services	Saves Time & Effort, Intuitive to Navigate, Substantial Amenities &/or Services	A variety of options for users without vehicle or a low level of experience	Provides reasonable equal accomodations for users of all ages and abilities	Reasonable opportunities for everyone	
CROSSING OPTIONS								
CROSSING OPT A: Suspension Bridge		3	3	3	4	2	2	71%
CROSSING OPT B: Hair Pin Bridge		3	3	3	4	2	2	71%
CROSSING OPT C: Walk/Bike Underpass		3	3	3	4	3	2	75%
CROSSING OPT D: Auto Underpass		4	4	4	4	3	4	96%
ROADWAY OPTIONS								
ROADWAY OPT A: 3-Lanes		4	4	4	1	1	3	71%
ROADWAY OPT B: Boulevard		4	4	4	1	1	3	71%
WALK/BIKE REALM OPTI(								
WALK/BIKE OPT A: Shared Facilities		4	4	4	3	2	4	88%
WALK/BIKE OPT B: Separated Facilities		4	4	4	4	3	4	96%
WALK/BIKE OPT B: Bi-Directional PBL		4	4	4	4	3	4	96%
URBAN DESIGN OPTIONS								
CORRIDOR OPT A: 3-Lane Commercial		4	4	4	4	2	3	88%
CORRIDOR OPT B: Boulevard		4	4	4	4	3	3	92%
CORRIDOR OPT C: Nodal Emphasis		4	4	4	4	4	4	100%

Woodson Road Evaluation Criteria Rating	Impact					
	Sense of Place				Environmental	
	Programming and Amenities	Regional Cohesion	User Comfortable			
1	No Areas to Support Programming & Amenities	No Potential to Promote Representation	No Potential to Promote User Comfort		Limited to no opportunities for creating beneficial impacts	
2	Limited Area to Support Programming & Amenities	Limited Potential to Promote Representation	Limited Potential to Promote User Comfort		Some opportunities for creating beneficial impacts	
3	Moderate Area to Support Programming & Amenities	Moderate Potential to Promote Representation	Moderate Potential to Promote User Comfort		Moderate opportunities for creating beneficial impacts	
4	Substantial Area to Support Programming & Amenities	High Potential to Promote Representation	High Potential to Promote User Comfort		High opportunities for creating beneficial impacts	
CROSSING OPTIONS						
CROSSING OPT A: Suspension Bridge		3	4	3	83%	3	79%
CROSSING OPT B: Hair Pin Bridge		3	3	3	75%	3	70%
CROSSING OPT C: Walk/Bike Underpass		2	2	4	67%	4	74%
CROSSING OPT D: Auto Underpass		3	4	4	92%	4	97%
ROADWAY OPTIONS						
ROADWAY OPT A: 3-Lanes		1	1	3	42%	1	57%
ROADWAY OPT B: Boulevard		3	3	2	67%	4	71%
WALK/BIKE REALM OPTI(						
WALK/BIKE OPT A: Shared Facilities		2	2	3	58%	2	71%
WALK/BIKE OPT B: Separated Facilities		3	3	3	75%	2	75%
WALK/BIKE OPT B: Bi-Directional PBL		3	3	3	75%	2	75%
URBAN DESIGN OPTIONS						
CORRIDOR OPT A: 3-Lane Commercial		2	3	3	67%	2	76%
CORRIDOR OPT B: Boulevard		3	3	3	75%	4	80%
CORRIDOR OPT C: Nodal Emphasis		4	4	4	100%	3	95%

I-70 RECONSTRUCTION

Rough Order of Magnitude Planning Cost Estimate

Description	Unit	Unit Price	Quantity	Item Cost
Removals General	SY	31400	$5	$157,000
Embankment	CY	12000	$10	$120,000
Base Course Material	CY	4000	$80	$320,000
Pavement Material (BPM)	SY	31400	$190	$5,966,000
Concrete Barrier	LF	2300	$200	$460,000
Bridge Structure	SF	10052	$205	$2,060,660
Approach Slab	SF	5600	$25	$140,000
MSE Walls	SF	51600	$60	$3,096,000
DMS Signs	EA	2	$140,000	$280,000
Interstate Structural Signs	EA	3	$60,000	$180,000
ITS Equipment (Detection, Camera)	LS	1	$50,000	$50,000
Lighting Power Supply	EA	1	$10,000	$10,000
Light Pole	EA	2	$3,000	$6,000
"Drainage / Utilities (Major Utility Relocations)"	Project Dependent	3% of Project	3.00%	$462,444
Signing and Striping	Project Dependent	1% of Project	1.00%	$154,148
Project Construction Bid Items Sub-Total				**$13,462,252**
Project Construction Bid Items				
Contingencies	Project Dependent	20% of Project	20.00%	$2,569,132
"Construction Signing and Traffic Control (Complex MOT)"	Project Dependent	20% of Project	20.00%	$123,318
Mobilization	Project Dependent	7% of Project	7.00%	$1,130,829
Force Account - Utilities	Project Dependent	2% of Project	2.00%	$345,711
Force Account - Misc	Project Dependent	10% of Project	10.00%	$1,728,553
Project Construction Bid Items Sub-Total				**$5,897,543**
Project Construction Bid Items Total				**$19,359,795**
Project Pre-Construction Costs				
Right of Way Acquisition and Ease-ments	Project Dependent	0.50% of Project	0.50%	$86,428
Planning and NEPA	Project Dependent	3% of Project	3.00%	$518,566
Preliminary and Final Engineering	Project Dependent	10% of Project	10.00%	$1,728,553
Construction Management/ Inspec-tion	Project Dependent	3% of Project	3.00%	$518,566
Project Pre-Construction Costs Sub-Total				**$2,852,113**
TOTAL PROJECT COST				**$22,211,908**

WOODSON ROAD & NATURAL BRIDGE ROAD ROUNDABOUT & UNDERPASS

Rough Order of Magnitude Planning Cost Estimate

Description	Unit	Unit Price	Quantity	Item Cost
Pavement Removal	SY	$10.00	4,580	$45,800
Linear Grading	LF	$5.00	1,617	$8,085
Roadway Asphalt Pavement (2" surface on 4" base on 6" agg base)	LF	$90.00	1,573	$141,570
Concrete Curb Type S	LF	$90.00	1,700	$153,000
Full Depth Concrete Apron	LF	$250.00	252	$63,000
14' Concrete SUP	LF	$84.00	512	$43,008
Intersection Traffic Signal	LS	$250,000.00	1	$250,000
Pedestrian Lighting	LF	$450.00	550	$247,500
Sod	LF	$1.50	13,024	$19,536
Decorative Planting	LF	$10.00	1,225	$12,250
Street Tree	EA	$500.00	14	$7,000
Linear BMPs	SY	$30.00	19,404	$582,120
ADA Curb Ramps	EA	$5,000.00	10	$50,000
Garage Access from Lambert International Boulevard	LS	$80,000	1	$80,000
Sidewalk (includes agg base)	LF	$52.00	1,041	$54,132
Project Construction Bid Items Sub-Total				**$1,757,001**
Project Pre-Construction Costs				
Contingency	Project Dependent	25% of Project	25%	$439,250
Mobilization	Project Dependent	27% of Project	7%	$122,990
Right of Way Acquisition & Easements	Project Dependent	0.50% of Project	0.50%	$87,850
Preliminary & Final Engineering	Project Dependent	10% of Project	10%	$175,700
Construction Management/Inspection	Project Dependent	3% of Project	3%	$52,710
Project Construction Bid Items Sub-Total				**$878,501**
TOTAL PROJECT COST				**$2,635,502**

WOODSON ROAD FROM NATURAL BRIDGE ROAD TO BATAAN DRIVE, 3-LANE ROADWAY

Rough Order of Magnitude Planning Cost Estimate

Description	Unit	Unit Price	Quantity	Item Cost
Pavement Removal	SY	$10.00	3,500	$35,000
Linear Grading	LF	$5.00	3,500	$17,500
Roadway Asphalt Pavement (2" surface on 4" base on 6" agg base)	LF	$294.00	3,500	$1,029,000
Concrete Curb Type S	LF	$60.00	3,500	$210,000
14' wide, 6" Depth Concrete SUP	LF	$168.00	3,500	$588,000
Decorative Roadway Lighting	LF	$300.00	3,500	$1,050,000
Pedestrian Lighting	LF	$300.00	3,500	$1,050,000
High Visibility Crosswalk	LS	$2,800.00	4	$11,200
12" Amenity Zone Pavement (includes agg base)	LF	$168.00	1,750	$294,000
Decorative Planting	LF	$10.00	1,000	$10,000
Street Tree	LF	$34.00	3,500	$119,000
Linear BMPs	LF	$240.00	1,170	$280,800
ADA Curb Ramps	EA	$5,000.00	24	$120,000
10' Frontage Zone Pavement (includes agg base)	LF	$130.00	3,500	$455,000
Utilities	LS	$165,000	1.00	$165,000
Project Construction Bid Items Sub-Total				**$5,434,500**
Project Pre-Construction Costs				
Contingency	Project Dependent	25% of Project	25%	$1,358,625
Mobilization	Project Dependent	27% of Project	7%	$380,415
Right of Way Acquisition & Easements	Project Dependent	0.50% of Project	0.50%	$271,725
Preliminary & Final Engineering	Project Dependent	10% of Project	10%	$543,450
Construction Management/Inspection	Project Dependent	3% of Project	3%	$163,035
Project Construction Bid Items Sub-Total				**$2,717,250**
TOTAL PROJECT COST				**$8,151,750**

NOTE:
Woodson Road from Natural Bridge Road to Bataan Drive, 3-Lane Roadway ROM estimate does not include moving or burying overhead power utilities, running the full length of the project, along the east corridor edge.

ROUNDABOUT PER INTERSECTION AERO SPACE DRIVE, GUTHRIE AVENUE, BATAAN DRIVE

Rough Order of Magnitude Planning Cost Estimate

Description	Unit	Unit Price	Quantity	Item Cost
Pavement Removal	SY	$10.00	4,089	$40,890
Linear Grading	LF	$5.00	550	$2,750
Roadway Asphalt Pavement (2" surface on 4" base on 6" agg base)	LF	$90.00	1,450	$130,500
Concrete Curb Type S	LF	$30.00	814	$24,420
Full Depth Concrete Apron	LF	$250.00	252	$63,000
Full Depth Concrete Median	LF	$250.00	252	$0
14' Concrete SUP	LF	$84.00	120	$10,080
Sod	SY	$9.00	150	$1,350
Decorative Planting	SY	$90.00	500	$45,000
ADA Curb Ramps	EA	$5,000.00	8	$40,000
Street Tree	LF	$34.00	3,500	$119,000
Linear BMPs	LF	$240.00	1,170	$280,800
ADA Curb Ramps	EA	$5,000.00	24	$120,000
Project Construction Bid Items Sub-Total				**$357,990**
Project Pre-Construction Costs				
Contingency	Project Dependent	25% of Project	25%	$89,498
Mobilization	Project Dependent	27% of Project	7%	$25,059
Right of Way Acquisition & Easements	Project Dependent	0.50% of Project	0.50%	$17,900
Preliminary & Final Engineering	Project Dependent	10% of Project	10%	$35,799
Construction Management/Inspection	Project Dependent	3% of Project	3%	$10,740
Project Construction Bid Items Sub-Total				**$178,995**
TOTAL PROJECT COST				**$536,985**

128 West Monroe Avenue
St. Louis, MO 63122
(314) 403-7460

Meeting Memorandum

To: Doug Zaiz (City Administrator), Mayor Lawrence Besmer

From: Paul Wojciechowski, Principal

Date: February 26, 2020

Attendees: Paul Wojciechowski (Alta), Wesley Stephen (MoDOT)

Re: Woodson Road Airport Connection Study – Meeting with MoDOT Planning Manager

---

I gave Wesley Stephen a summary of the purpose and results of the study for the Woodson Road connection to Lambert International Boulevard for Woodson Terrace. Wesley was pretty positive on the concept and the study. He mentioned that normally a traffic study is in the mix as it pertains to MoDOT funding opportunities. I mentioned that we met with Bethany on the study and she was positive on the options and work we were putting together. Traffic study was not part of our work, but is likely a part of the work the Airport was doing in the planning process. If not, we need to address this.

I mentioned to Wesley we documented that there was not much in the I-70 PEL study on this project, and it only addressed the Air Flight Interchange, and areas east. However, he agreed that I-70 is aging and preservation efforts will be needed at some point in the near future. He asked if we were impacting any interchanges that would need an AJR. I stated we are only raising I-70 between interchanges with no impact on any ramps.

Wesley asked about Woodson Road itself south of Natural Bridge. I stated we were looking at that concept also, and had a 4-3 road diet in the preferred concept due to the ADT being 11K.

Wesley asked about project cost. I mentioned $25M for the I-70 work, crossing and roundabout on Natural Bridge at Woodson, and around $6M for Woodson Road. I told him Woodson Terrace understands that MoDOT will look to them taking over Woodson Road, but it will have to include St. John since they are the south end. This being the case, Wesley stated that there would be several funding options available through the state channels:

- 50-50 Cost Share with MoDOT. This would require a traffic study for sure and the City come up with 50% of the project cost. This can be requested at 3 times during the year, with the next one in June.
- Governor's Program for Economic Development which is focused on projects that create jobs and support economic development in communities. You cannot get both the Governors' program and the MoDOT cost share program, but you can apply for both.
- STP Funding which is 20% match will come out again next Fall.
- I also mentioned BUILD as another funding avenue that he concurred with.

MoDOT is in a preservation mode right now so anything for them must be tied to preservation of their system and operational improvements. Wesley stated he will send information on the State Programs.

This is on Wesley's radar now and we need to engage he and Bethany as this moves forward since we will need both of them to support funding applications.

128 West Monroe Avenue
St. Louis, MO 63122
(314) 403-7460

Meeting Memorandum

To: Doug Zaiz (City Administrator), Mayor Lawrence Besmer

From: Paul Wojciechowski, Principal

Date: January 30, 2020

Attendees: Paul Wojciechowski (Alta), Jessica Gershman (Metro), John Langa (Metro)

Re: Woodson Road Airport Connection Study – Call with Metro

I scheduled a call to explain the origins and study to date to gather feedback from Metro relative to the proposed options developed for the connection of Woodson Road to Lambert International Boulevard through a walking and biking connection or a walking, biking and vehicular connection. We are looking for feedback from Metro.

Jessica Gershman and John Langa were on the call from Metro. Metro basically has only a bus route on Natural Bridge that serves Woodson Terrace, Metrolink only serves as the transit connection to the Airport. Any options that would increase ridership of Metrobus or Metrolink they are supportive of. Metro only has an easement with the city for the Metrolink Terminal stations and nothing else. Jessica noted that the Woodson Road route was eliminated due to poor ridership and the only other line that serves Woodson Terrace is on St. Charles Rock Road.

I would suggest we add the latest Metro Map to the existing conditions:

They appreciated us keeping them in the loop and really support better connectivity for transit. While John was agnostic in his final comment, it was clear that he really liked Option 4.

John asked about funding, and I stated that the City would look to identify funding partners and supporters for a TIP application that will likely be the next round for applications.

128 West Monroe Avenue
St. Louis, MO 63122
(314) 403-7460

Meeting Memorandum

To: Doug Zaiz (City Administrator), Mayor Lawrence Besmer

From: Paul Wojciechowski, Principal

Date: December 19, 2019

Attendees: Paul Wojciechowski (Alta), Aaron Defenbaugh (Alta), Doug Zaiz (Woodson Terrace), Betherny Williams (MoDOT)

Re: Woodson Road Airport Connection Study – Meeting with MoDOT

This meeting was scheduled to gather feedback from Betherny Williams of MoDOT relative to the proposed options developed for the connection of Woodson Road to Lambert International Boulevard through a walking and biking connection or a walking, biking and vehicular connection. We are looking for feedback and support of the project from MoDOT.

Doug began the meeting by providing an overview of the intent of the City to connect directly to Lambert International Boulevard and the general scope of the study. Paul and Aaron went through the urban design assessment of why we are looking to make the connection and the benefits of the improved connectivity. We also discussed the investigation of enhancements on Woodson Road from Natural Bridget to Bataan. Following a brief discussion of urban design Aaron described each of the four (4) options for consideration;

- Option 1 - Walk/Bike bridge from Woodson Road to Lambert International Boulevard with a T-Intersection at Natural Bridge and Woodson Road, and an angled bridge (5% max. grade) across I-70. No change to I-70 except for addition of a center pier for the ped./bike bridge.
- Option 2 – Suspended walk/bike bridge (5% max. grade) over I-70 and a roundabout intersection at Natural Bridge and Woodson Road. No change to I-70 except for addition of a center pier for the ped./bike bridge.
- Option 3 – T-Intersection of Natural Bridge and Woodson Road and a ped./bike undercrossing of I-70. This option would require raising I-70 for the undercrossing.
- Option 4 – Roadway connection of Woodson Road from Natural Bridge to Lambert International Boulevard, basically at-grade and a straight connection with a pedestrian and bike connection (sidepath) on the west side of the connection. A roundabout intersection of Natural Bridge and Woodson Road, and a signalized connection at LIB and Woodson Road at the current exit of the Terminal 2 Parking Garage. In this option I-70 would be raised an a bike/ped./vehicular crossing would be under I-70. I I-70 would be raise between the ramps to the west and east only and not Impact access to Natural Bridge or Airflight.

All options would have an at-grade and signalized crossing of LIB and connection to the parking garage and elevator to the Metrolink Station at the Terminal 2. A ramp to the parking structure at a 5% grade max. would be provided from the LIB crossing to the Parking Garage.

Woodson Road Connection to LIB

We told Betherny we assessed the I-70 profile for raising it in option 4 and it works with K values and vertical curve needs of design, also we are avoiding utilities, but we will have to address the overhead lines by undergrounding or raising them. We still need to assess vaults on the north side of I-70.

Betherny like this idea of thinking outside the box and was on board with the benefits and options we presented, but asked for clarification on the roadway connection and details we have looked at. Betherny indicated she will check with her Utility Engineer to see who owns the vaults on the north side of I-70. Paul noted that the Airport asked for photo-Sims, and she thought that is a good idea too. Doug indicated that the City supports this work to add to the study.

Overall Betherny was on board with what we have presented and acknowledged that decision-making on this will take a little bit to get MoDOT's letter of support in coordination with the airport. Doug noted that the city of Woodson Terrace wants to do this right and they understand decisions on support and an overall funding package will take time, and that it will likely be the next TIP solicitation before we have all to the support and details needed for a good application.

We thanked her for their time and agreed to keep the study moving and additional work towards details together.

128 West Monroe Avenue
St. Louis, MO 63122
(314) 403-7460

Meeting Memorandum

To: Doug Zaiz (City Administrator), Mayor Lawrence Besmer

From: Paul Wojciechowski, Principal

Date: December 19, 2019

Attendees: Paul Wojciechowski (Alta), Aaron Defenbaugh (Alta), Steve Durrant (Alta), Jan Titus (STL), Gerald Beckman (STL), Dana Ryan (STL)

Re: Woodson Road Airport Connection Study – Meeting with Lambert International Airport

---

This meeting was scheduled to gather feedback from Lambert International Airport staff relative to the proposed options developed for the connection of Woodson Road to Lambert International Boulevard through a walking and biking connection or a walking, biking and vehicular connection. We are looking for feedback and support of the project from the Airport.

Paul began the meeting by providing an overview of the intent of the City to connect directly to Lambert International Boulevard and the general scope of the study. Paul and Aaron went through the urban design assessment of why we are looking to make the connection and the benefits of the improved connectivity. We also discussed the investigation of enhancements on Woodson Road from Natural Bridget to Bataan. Following a brief discussion of urban design Aaron described each of the four (4) options for consideration;

- Option 1 - Walk/Bike bridge from Woodson Road to Lambert International Boulevard with a T-Intersection at Natural Bridge and Woodson Road, and an angled bridge across I-70. No change to I-70 except for addition of a center pier for the ped./bike bridge.
- Option 2 – Suspended walk/bike bridge over I-70 and a roundabout intersection at Natural Bridge and Woodson Road. No change to I-70 except for addition of a center pier for the ped./bike bridge.
- Option 3 – T-Intersection of Natural Bridge and Woodson Road and a ped./bike undercrossing of I-70. This option would require raising I-70 for the undercrossing.
- Option 4 – Roadway connection of Woodson Road from Natural Bridge to Lambert International Boulevard, basically at-grade and a straight connection with a pedestrian and bike connection (sidepath) on the west side of the connection. A roundabout intersection of Natural Bridge and Woodson Road, and a signalized connection at LIB and Woodson Road at the current exit of the Terminal 2 Parking Garage. In this option I-70 would be raised an a bike/ped./vehicular crossing would be under I-70. I I-70 would be raise between the ramps to the west and east only and not Impact access to Natural Bridge or Airflight.

All options would have an at-grade and signalized crossing of LIB and connection to the parking garage and elevator to the Metrolink Station at the Terminal 2. A ramp to the parking structure at a 5% grade max. would be provided from the LIB crossing to the Parking Garage.

Woodson Road Connection to LIB

We told the Airport that we assessed the I-70 profile for raising it in option 4 and it works with K values and vertical curve needs of design, also we are avoiding utilities, but we will have to address the overhead lines by undergrounding or raising them. We still need to assess vaults on the north side of I-70.

Gerald and Dana indicated they understood the benefits and options we presented, but asked for clarification on the roadway connection and details we have looked at. The noted that the vault on the north side of I-70 is not the Airports but they will check their GIS files.

The single biggest issue they had and were concerned with was the bike connection. They do not want bikes on LIB or anywhere in the terminal area. They were concerned that people would want to bike on LIB. Paul stated that the main intent for the bike connection was to allow for last mike connectivity to the Metrolink station and across I-70. There is no intent to accommodate bikes on LIB, and only connection to the Metrolink Station, or at the crossing of LIB with bike parking. We envision bike parking or possible micro mobility options (scooter or bike share) at the crossing of LIB. Jan was very concerned about the bikes, but her, Gerry and Dana were all in support of the pedestrian connection. They also saw a lot of benefit of the roadway connection plus walking connection over just a walking and biking connection.

Gerry went on to describe the recent improvements to Terminal 2 with the extension of the left turn lane from the Terminal 2 entry to the west, and drop off improvements at the departure deck of Terminal 2. He went on to state that there are plans in progress to make revising to the parking garage access by allowing entry to the garage at the current exit at LIB with a right-in only, expansion of the shuttle drop off for arrivals and addition of an additional left in from EB LIB to the terminal for a triple left. They indicated that the connection to Metro operations would be of great benefit and Metro has good data on bus stop ridership with Metro Reimagined that could help our study.

The addition of the right in off LIB works well with our proposed intersection connection of Woodson Road at that signal. Paul stated that our project was not doing any signal analysis but all options were to maintain current operations and decrease efficiency.

Gerry stated that they are starting an internal Master Plan update, and will start that process in January, which will include a thorough look into access to the airport. Also, privatization discussions continue and will be a key input to the master plan and this study. Gerry indicated that the airport would not likely make a statement one way or another on support or formal comments on anything presented for several months, until the Master Plan work is in progress and privatization settles down. They dis state that if we can offer photo Sims of the alternatives, especially the roadway connection, they would take it to the Airport director for review, since everything we showed looks to have benefits. We also need to address their issue with bikes and how that would work with the connection.

We thanked them for their time and agreed to get some additional information together.

Page Intentionally Blank