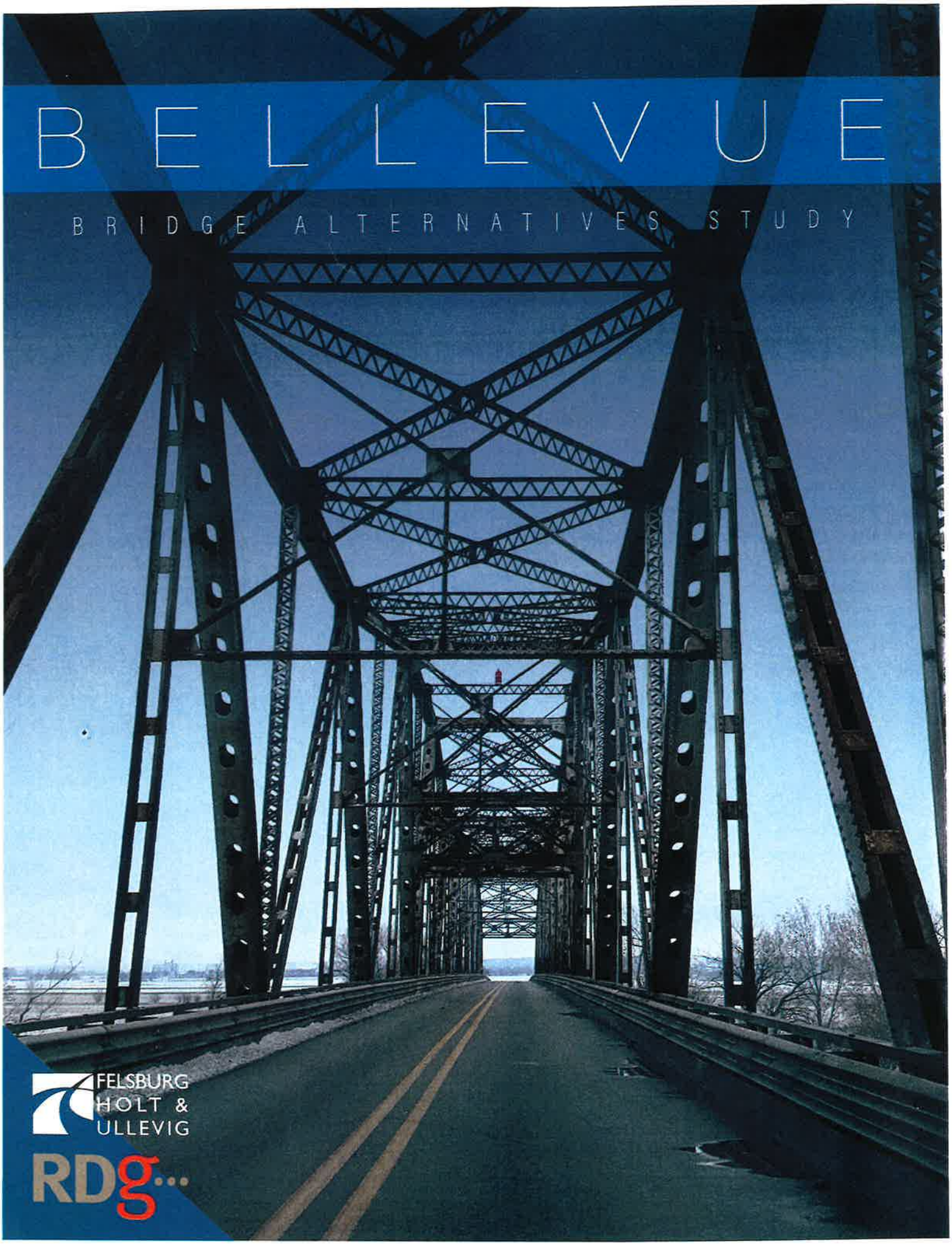
Bellevue City Council Special Joint Meeting
Tuesday, February 4, 2020 5:00 PM
Bellevue City Hall
1500 Wall Street
Bellevue, NE 68005

1. CALL TO ORDER AND ROLL CALL
2. OPEN MEETINGS ACT - Posted in the Entry to the Council Chambers
3. APPROVAL OF AGENDA
4. PRESENTATION AND DISCUSSION ON THE BRIDGE STUDY AS PERFORMED BY MAPA
5. ADJOURNMENT

BELLEVUE

BRIDGE ALTERNATIVES STUDY



FELSBURG HOLT & ULLEVIG

RDg...

Bellevue Bridge Alternatives Study

Bellevue, NE

Project No: MAPA-5002(3)
Control No: 22755

Prepared for:

Bellevue Bridge Commission
Bellevue, NE

Metropolitan Area Planning Agency
2222 Cuming Street
Omaha, NE 68102-4328
402.444.6866

Prepared by:

Felsburg Holt & Ullevig
11422 Miracle Hills Drive, Suite 115
Omaha, NE 68154
402.445.4405
Project Manager: Mark Meisinger, PE, PTOE

In Association with:

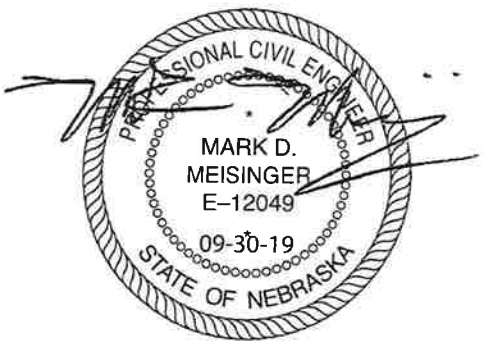
RDG Planning and Design
Omaha, NE

FHU Reference No.: 18-015

September 2019

TABLE OF CONTENTS

Appendices



List of Figures

List of Tables

List of Acronyms and Abbreviations

ADT	Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
APE	area of potential effect
ARC	Archeological Research Center
BGPA	Bald and Golden Eagle Protection Act
BMP	best management practices
CWA	Clean Water Act
DOT	Department of Transportation
DNR	Department of Natural Resources
EJ	Environmental Justice
EPA	US Environmental Protection Agency
ESA	environmental study area
FEMA	Federal Emergency Management Agency
FHU	Felsburg Holt & Ullevig
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
FRS	Facility Registry Service
GAR	Grand Army of the Republic
GIS	Geographic Information System
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HSM	Highway Safety Manual
IER	Initial Environmental Review
LOS	Level of Service
LUST	leaking underground storage tank
LWCF	Land and Water Conservation Fund
LOMR	Letter of Map Revision
M	Million
MAPA	Metropolitan Area Planning Agency
MBTA	Migratory Bird Treaty Act
MOE	Measures of Effectiveness
mph	miles per hour
MPO	Metropolitan Planning Organization
MTIS	Metropolitan Travel Improvement Study
NDOT	Nebraska Department of Transportation
NEPA	National Environmental Policy Act
NGPC	Nebraska Game and Parks Commission
NRCS	Natural Resources Conservation Service
NRD	Natural Resources District
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OPPD	Omaha Public Power District
ROW	right-of-way
SHPO	State Historic Preservation Office
SIRE	Southwest Iowa Renewable Energy
SWPPP	Storm Water Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
USACE	United States Army Corps of Engineers
USDA	US Department of Agriculture
USFWS	United States Fish and Wildlife Services
UST	underground storage tank
V/C	volume to capacity
WOUS	Waters of the US

1. INTRODUCTION

1.1 Project Description and Project Background

The Metropolitan Area Planning Agency (MAPA), in conjunction with the Bellevue Bridge Commission approved a study to examine the potential of the Bellevue Grand Army of the Republic Memorial Bridge (Bellevue Bridge). The Bellevue Bridge was formerly designated as Highway 370 and spans the Missouri River to connect Olde Towne Bellevue with Mills County Iowa, including access to Interstate 29. Since the completion of the Highway 34 Missouri River Bridge in 2014, the Bellevue Bridge has seen a decrease in traffic volumes of about 50 percent.

The purpose of the Bellevue Bridge Alternatives Study is to provide MAPA and the Bellevue Bridge Commission with a determination of whether future conditions in the area will warrant replacement of the Bellevue Bridge, alternatives for reconstruction, and the impacts of closing the bridge. At the outset of the project, the project steering committee developed a Methods and Assumptions document. The Methods and Assumptions document ensured agency agreement on the fundamental methods to be used for completion of the study. **Appendix A** includes the Methods and Assumptions document.

The Bellevue bridge, Structure Number S370 01918, is a 1,968-foot long steel truss bridge that was completed in 1952 and spans the Missouri River. The bridge has two 10-foot wide travel lanes and does not meet Nebraska DOT's current design standards for bridges. The Bellevue Bridge is owned and operated by the Bellevue Bridge Commission and the Bridge Study Location Maps are shown in **Figure 1.1(a) and Figure 1.1(b)**. The Commission has sufficient funding to maintain the bridge for the foreseeable future. Replacement of the bridge will eventually become necessary and conceptual plans were previously designed for a new bridge in 2007. The useful life of the Bridge was determined to expire in roughly 20 to 25 years. However, there is no current plan to obtain funding for the significant expense that would be required to reconstruct the bridge. This study will guide the Commission and adjacent communities to form the long-term plans for the bridge's future.

As part of the analysis, consideration will be given to the Bellevue Bridge's importance as a farm to-market route, bicycle connection, an access route for Olde Towne Bellevue, and a connection to Offutt Air Force Base. Stakeholder and public input are essential to weighing these factors and is a priority of this project.

The Bellevue Bridge Commission requested a study focusing on:

- A planning process for the future of the Bellevue Bridge
- Identification of items related to the bridge and the approaching roadways not in compliance with current design standards
- Identification of bridge needs and remaining service life of the bridge.

The study fulfills the following objectives:

- Identify items not in compliance with current design standards under both the current and predicted future traffic conditions for the bridge and the approaching roadways

- Develop a feasible life cycle of solutions for each of the Bellevue Bridge alternatives that will take it to the end of its service life (time of replacement) while keeping the bridge in a state of good repair for as long as practical.
- Create a final product for use by the Bellevue Bridge Commission which will guide the implementation of recommended improvements.

A total of six (6) bridge alternatives were evaluated. The alternatives include:

- Preservation & Maintenance of Existing Facility
- Bridge Closure (Demolition)
- New Bridge Construction
- Bridge Conversion to a Recreational Trail Facility
- Upgrade to Separate Lanes for Vehicles and Trail
- Expansion of Existing Piers (Phased Construction)

Flow of traffic on adjacent Missouri River bridges within a ten-mile radius of the Bellevue Bridge were evaluated for this study. The Missouri River bridges that were evaluated are as follows:

- Bob Kerrey Pedestrian Bridge
- I-480/US 6 Bridge
- I-80 Bridge
- US 275 Veterans Memorial Bridge
- Bellevue Bridge
- US 34 Bridge
- Plattsmouth Bridge

The project team conducted case study research, a traffic analysis, a structural analysis, a thorough market analysis including both quantitative and qualitative measures, environmental review, project funding source research, stakeholder interviews, and a public open house. The details of these activities are outlined in the following report and were used to narrow down the alternatives and serve as a guide to the Bridge Commission as they discuss the future of the Bellevue Bridge.

1.2 Purpose and Need for the Project

Bridges and other types of structures are necessary for roadway travel to cross obstacles without delay caused by long detours, wait times, reduced clearances, or reduced load limits. As the local economy depends upon an intact transportation system, a disruption of the system that would be caused by an unplanned closure or load restriction of the Bellevue Bridge or other Missouri River bridges could be detrimental to stakeholders on both sides of the bridge in Iowa and Nebraska. The purpose of this study is to determine whether future conditions in the area warrant replacement of the bridge, alternatives for reconstruction, and the impacts of closing the bridge.

1.3 Study Process and Report Format

This report is intended to provide a high-level summary of the study activities and findings. Much of the technical information is included in the Appendices at the end of the report. At the two Stakeholder

Workshops, packets of technical information and analysis were provided and are included in the meeting minutes in **Appendix B**. The Bellevue Bridge Commission and MAPA have been provided with technical documentation and results throughout the study process.

1.3.1 Steering Committee

A steering committee was established at the outset of the project to guide the study process and make decisions regarding study findings and direction. The steering committee met on a bi-monthly basis throughout the project and is comprised of the following members:

Representative	Organization
Donald Fenster	Bellevue Bridge Commission
Mike Hall	Bellevue Bridge Commission
Joe Mangiamelli	City of Bellevue, NE (retired)
Jim Ristow	City of Bellevue, NE
Court Barber	Metropolitan Area Planning Agency
Greg Youell	Metropolitan Area Planning Agency
Mark Meisinger	Felsburg Holt & Ullevig (Project manager)
Jennifer Thompson	Felsburg Holt & Ullevig
Cary Thomsen	RDG Planning & Design

Figure 1.1(a). Bellevue Bridge Study Location Map

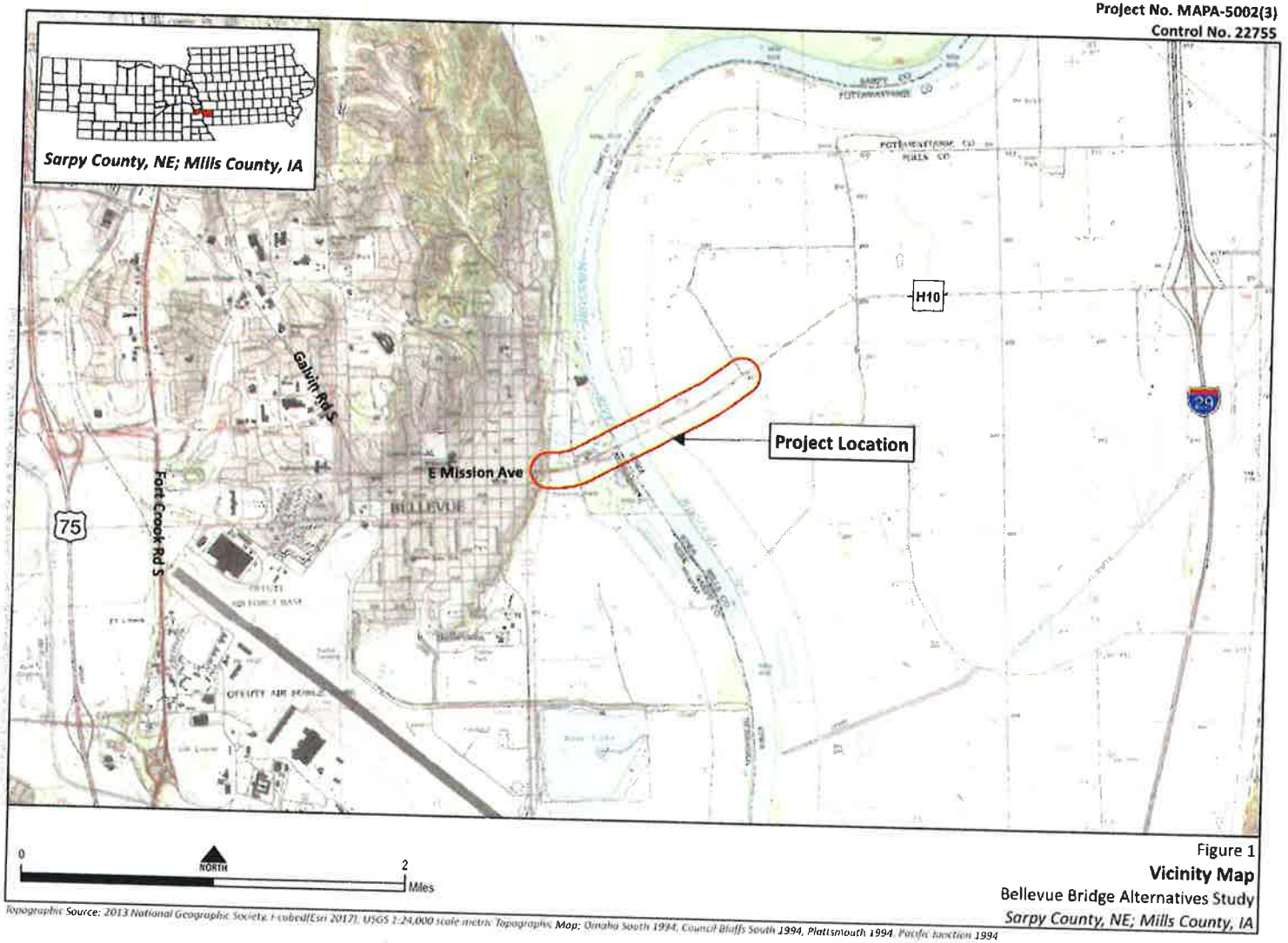
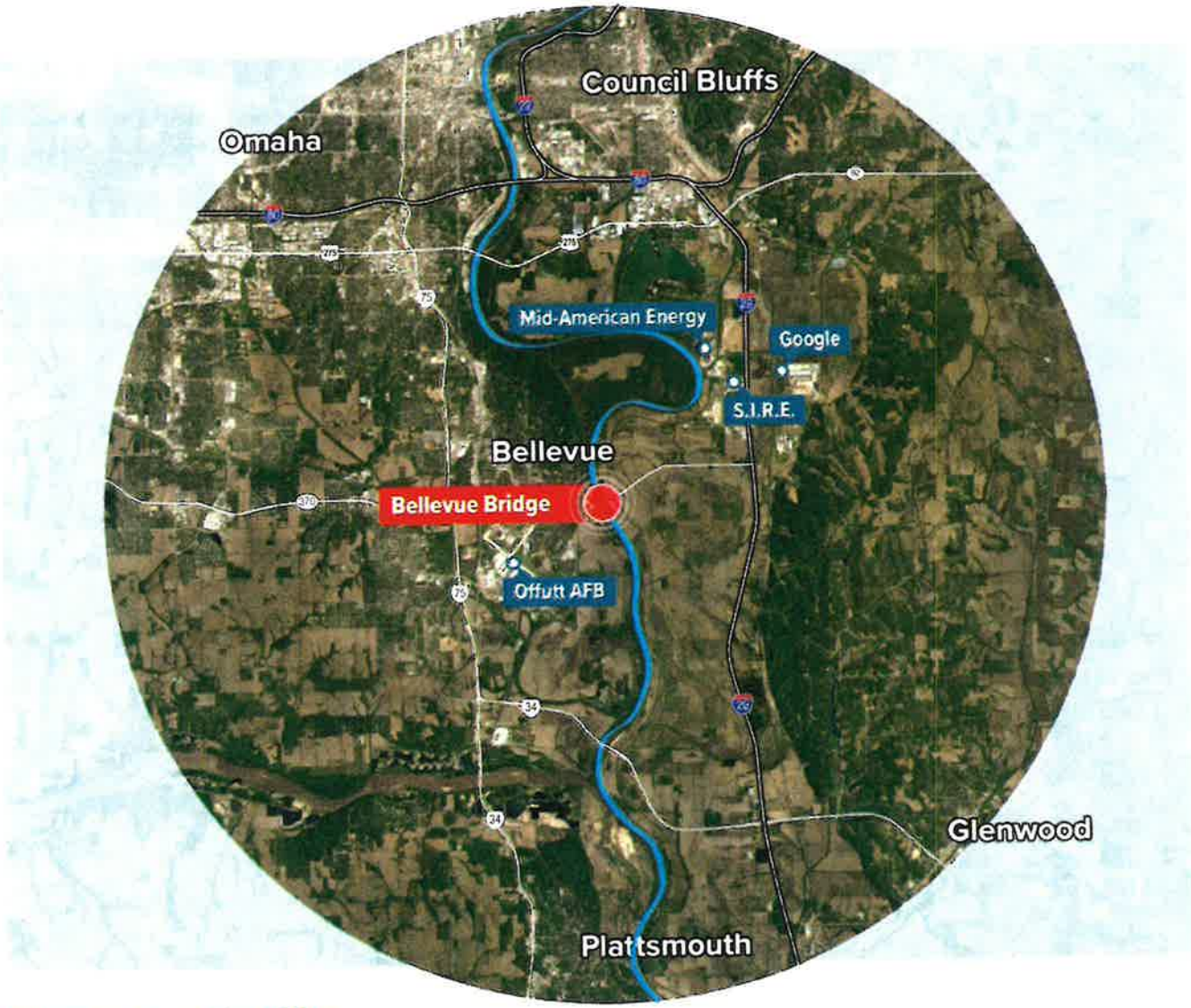


Figure 1
Vicinity Map
Bellevue Bridge Alternatives Study
Sarpy County, NE; Mills County, IA

Topographic Source: 2013 National Geographic Society, i-cubed (Esri 2017); USGS 1:24,000 scale metric Topographic Map: Omaha South 1994, Council Bluffs South 1994, Plattsmouth 1994, Pacific Junction 1994

Figure 1.1(b). Bellevue Bridge Study Location Map



Bellevue Bridge over Missouri River

Structure #S370 01918

2. CASE STUDIES

Five bridge projects were considered as case studies for the Bellevue Bridge project as examples of bridges similar to the Bellevue Bridge that solve a transportation connection need across a body of water. These case studies were used to develop the six bridge alternatives for evaluation in this study. Of the five case studies, three are on the Mississippi River, one is on the Missouri River, and one is on the Des Moines River. Two include demolition of the old bridge and construction of a new bridge with pedestrian and bicycle amenities. Two maintain the old bridge for bicycle and pedestrian use when a new adjacent bridge is built.

These bridge case studies underscore the importance of including pedestrian and bicycle facilities separate from vehicular traffic in any new bridge construction, whether it's providing ample space on the new bridge or retaining the old bridge solely for that purpose.

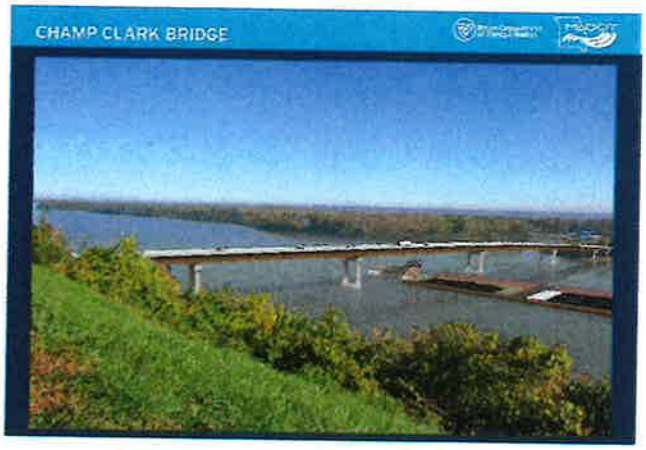
For each of the case studies quantitative impacts considered when narrowing down the bridge alternatives included project costs, right-of-way needs, floodplain locations, land uses, travel times and vehicle counts, emergency service operations, public school services, business impacts, noise impacts, archaeological sites, and bicycle/pedestrian access. Qualitative considerations included public input, visual quality of the bridge in its surroundings, and social impacts.

2.1 Case Study 1: Champ Clark Bridge

The Champ Clark Bridge connects Louisiana, Missouri to Pike County, Illinois across the Mississippi River via US Highway 54. Bridge deterioration and a series of expensive rehabilitations necessitated the plan to build a new bridge which would include a 10-foot shoulder for bicycle and pedestrian accessibility.

Original Champ Clark Bridge
(photo credit: Missouri Department of Transportation)

The original bridge had estimated traffic counts between 3,800 and 4,065 vehicles per day from 2007 to 2014. The volume was expected to increase to 4,630 vehicles per day by 2033. A closure of the bridge would cause one-way detours of 77 miles, therefore the importance of replacement for vehicular traffic was obvious. Commercial truck traffic averaged almost 17 percent of the total traffic on the bridge.The decision to replace the bridge in its entirety resulted after comparison of several alternatives as part of a grant award: no-build, two reuse options and seven new bridge alternatives. The screening factors included project cost, public input, right-of-way impacts, right-of-way considerations, environmental considerations (floodway and floodplain, endangered species, etc.), socioeconomic/community considerations (travel time, emergency services, bicycle/pedestrian access,



Rendering of future Champ Clark Bridge
(photo credit: champclarkbridge.com)

etc.) and potential cultural resource considerations. Ultimately, it was determined demolition of the old bridge and construction of a new bridge was the best option unless a group came forward to maintain the original historic bridge.

The new bridge is currently under construction and the old one will be torn down when the new bridge opens as no group with the ability to finance maintenance came forward. It has a width of 44 feet with 12-foot drive lanes and two 10-foot shoulders, more than doubling the original 20-foot width of the original bridge. Despite requests from a local advocacy group to provide separated bicycle and pedestrian lanes, it was determined the cost would not be justified by the relatively little traffic crossing the bridge. While no actual counts were done, it was determined through a visual study that with just corn fields and no trails on the northeast side of the bridge, there would be little reason for bicycles or pedestrians to cross. If, however, they need or want to, the 10-foot shoulders on either side provide the space away from vehicular traffic to do so.

2.2 Case Study 2: Sauk Rapids Bridge

The Sauk Rapids Bridge spans the Mississippi River, connecting Benton and Stearns County in Minnesota. As the two-lane bridge, originally built in 1948, neared the end of its lifespan, an environmental assessment was completed with several options for reconstruction. The new bridge opened in 2007 for $20.46M. The old bridge was dismantled in 2008 after the opening of the new bridge.

Newly constructed Sauk Rapids Bridge (photo credit: SRF Consulting)

Included with the new construction was a separated pedestrian and bicycle lane with a helix design ramp connection to the bike trail. The alignment of the new bridge was discussed thoroughly to ensure no negative impacts to the local businesses occurred. The original design included a bypass of Sauk Rapids downtown, causing concern for the economic success of the commercial area. The final plan had the bridge exit onto 2nd Street with the relocation of a few businesses nearby.

2.3 Case Study 3: Chain of Rocks Bridge

The Chain of Rocks bridge is a historic structure built in 1929 spanning the Mississippi River from St. Louis, Missouri to Madison, Illinois. The bridge once carried traffic on Route 66 with tolls to pay for maintenance and repairs. Interstate 270 was opened just north of the bridge in 1967 leading to the closure of the Chain of Rocks bridge just a few years later. Without funds to demolish, the bridge sat and deteriorated for decades, until Trailnet began cleaning and repair work in 1989 for pedestrian and bicycle use. It was reopened in 1999 and connected more than 300 miles of trails on both sides of the river. Since the bridge connects farmland on the east to

Chain of Rocks Bridge (photo credit: Wikipedia)

low-density housing on the west, it serves more of a recreational and tourism purpose, rather than as an economic driver.

The bridge is currently maintained by the Great Rivers Greenway, the St. Louis region park district, as part of its regional system of greenways. The organization, whose operations are funded through two sales taxes, became the primary operator in 2015. There are no daily operational costs for the bridge, but the organization is working through phased repairs recommended in the conditions analysis when they took over.

Eagle Days on the Chain of Rocks Bridge (photo credit: Great Rivers Greenway)

While the Great Rivers Greenway does not actively promote events on and through the bridge, the bridge serves as a tourist and visitor draw. Programs put on by various local groups include the Eagle Days in the spring, a fall October Fest, Classic Car show, occasional weddings, and 20-30 classic car and motorcycle crossings annually as part of cross-country tourist trips on Route 66.

2.4 Case Study 4: High Trestle Trail Bridge

The High Trestle Trail bridge is a rails-to-trails bridge project in central Iowa north of the Des Moines metropolitan area. The bridge is a half mile long and connects the High Trestle Trail between Madrid and Woodward. The bridge sits atop 13 story piers that cross the Des Moines River, originally built for the rail line. Planning for the High Trestle Trail began as early as 2005 with a vision for connecting several communities in central Iowa.

The bridge acts as the main feature of the trail system and the trail system in central Iowa. More than $3M in improvements had to be made to the bridge itself, with 80 percent of the funding coming from public grants. The Vision Iowa Challenge Grant of $1,750,000 was matched with $550,000 in private donations. Stakeholders understood the need for creating much more than a bridge but rather a visual and artistic attraction. The bridge was completed in 2011 and has since attracted regional, national, and international attention. A study completed in 2011 on the fiscal impact of trails in Iowa estimated the High Trestle Trail to generate $807,611 in expenditures the year it opened with an estimated 91,774 trail users. As of 2016, the Iowa Natural Heritage Foundation estimates that in the summer the bridge attracts more than 40,000 riders a month resulting in several new local businesses along the route. Taking this rider estimate with the expenditures per trail user, the bridge itself would generate approximately $352,000 a month in local spending.

High Trestle Bridge with sculpture elements lit (photo credit: RDG)

While the High Trestle Bridge does not represent a vehicle to bicycle bridge conversion, it does represent the potential impact of bicycle tourism. For Bellevue, the importance of a conversion scenario from a vehicle to bicycle only bridge lies in creating a destination that attracts the regional population. Connections to the Wabash Trace trail and other systems are essential, however, investing in the destination opens the potential for people to travel to local trailheads from the broader region rather than usage by only residents.

2.5 Case Study 5: Meridian Highway Bridge and Discovery Bridge

The Meridian Highway bridge spans the Missouri River, connecting rural Cedar County, Nebraska to Yankton, South Dakota. The Meridian bridge is a double deck bridge that was completed in 1924 as a toll facility. It was originally designed for trains on the lower level and vehicles on the top level, with a lift mechanism in the center span. In 1953 tolls were removed and the bridge was converted for the top level carrying northbound traffic on US Highway 81 into South Dakota from Nebraska and the lower level carrying southbound traffic into Nebraska from South Dakota.

Meridian Bridge for pedestrians and bicycles (photo credit: Mark Meisinger)

The process for planning and design of a new bridge was initiated in the 1990's in a joint effort between the Nebraska and South Dakota DOTs. In 2008, the Discovery Bridge opened approximately 1,000 feet to the west of the Meridian Bridge and became the new US Highway 81 route to connect vehicular traffic from Nebraska to South Dakota. The Discovery Bridge construction cost was approximately $23.9M.

In 2011, The Meridian Bridge reopened as a pedestrian and bike trail. Both of these bridges span a section of the Wild and Scenic Rivers, as designated by the National Park Service. A pedestrian plaza has been constructed on the South Dakota bridge touchdown in downtown Yankton. Recreational trails have been constructed on both the Nebraska and South Dakota sides of the river. The Meridian Bridge has become a popular destination for both local residents and tourists with events occurring throughout the calendar year.

Discovery Bridge for vehicular traffic (photo credit: Mark Meisinger)

2.6 Application to Bellevue Bridge Project

The five case studies all have some relevance to the Bellevue Bridge project and provide useful information to consider when developing options to move forward. The Champ Clark Bridge and Sauk Rapids bridges both involved constructing a new bridge with separate bicycle and pedestrian facilities and demolition of

the original bridge. The Chain of Rocks bridge and Meridian Highway bridge involved the construction of a new bridge for vehicular traffic only and maintenance of the original bridge for bicyclists and pedestrians.

The Champ Clark bridge had similar daily vehicular traffic as the Bellevue Bridge and the case was made for replacement, however, the Champ Clark bridge would have created one-way detours of 77 miles if closed. Similarly, the closure of the Meridian Bridge without replacement would have created a one-way 50-mile detour. The Bellevue Bridge would only create approximately a 5-mile detour if it were closed to traffic.

The Chain of Rocks and Meridan/Discovery Bridges have similar land uses as the Bellevue Bridge. They all have farmland with lower-density development on the rural side and a larger urban environment nearby. Additionally, the Chain of Rocks and Meridan/Discovery bridges provide major trail connections, something the Bellevue Bridge has potential for given the relative proximity of the Keystone Trail in Nebraska and the Lewis & Clark Bike route and Wabash Trace Trail in Iowa.

While the High Trestle Trail Bridge was not a vehicular bridge prior to conversion, it has applicability for the kind of investment required to make a bicycle/pedestrian bridge successful when converted. Without a strong campaign to promote the bridge and trail connections, it is doubtful it would have generated 40,000 monthly riders and spawned local businesses. If the conversion option is chosen for the Bellevue Bridge, this should be considered.

3. STAKEHOLDER OUTREACH

Many stakeholders were involved in the Bellevue Alternatives Bridge Study. The stakeholders participated in project meetings, data collection, traffic projections, concept development, evaluation, and selection. Throughout the study process, information was collected from and disseminated to the stakeholders group, which included:

Representative	Organization
Kyle Anderson	Felsburg Holt & Ullevig (Principal in Charge)
Court Barber	Metropolitan Area Planning Agency (MAPA)
Thomas Burns	Bellevue City Council
Larry Chandler	Bellevue Tire and Auto
Donald Fenster	Bellevue Bridge Commission
Bruce Fountain	Sarpy County
Amy Haase	RDG Planning & Design
Mike Hall	Bellevue Bridge Commission
Christine Hatter	Offutt Air Force Base
Paula Hazlewood	Advance Southwest Iowa
Rusty Hike	Hike Real Estate, Mayor of Bellevue
Trudy Johannsen	MidAmerican Energy
Frank Kumor	Erwin Jewelers
Dennis Lincoln	M&P Missouri River Levee District
John Jungers	Hike Real Estate
Joe Mangiamelli	City of Bellevue, NE
Kevin Mayberry	Mills County Engineer
Mark Meisinger	Felsburg Holt & Ullevig (Project manager)
Andrew Rainbolt	Sarpy County Economic Development Corporation
Jim Ristow	City of Bellevue, NE
Scott Schram	Iowa Department of Transportation
Justin Schultz	Pottawattamie County
Laura Schultz	SIRE
Alan Stone	Bunge
Scott Suhr	Iowa Department of Transportation
Cary Thomsen	RDG Planning & Design
Jennifer Thompson	Felsburg Holt & Ullevig (Deputy project manager)
Sam Wagner	MidAmerican Energy
Tim Weander	Nebraska Department of Transportation
Eric Williams	Papio Missouri River NRD
Larry Winum	Glenwood State Bank Mills County
Mike Wolf	Google
Greg Youell	Metropolitan Area Planning Agency (MAPA)

A series of stakeholder meetings were conducted throughout the study as listed below. From these stakeholders, a smaller Steering Committee Team was also formed to guide the study through completion and included representatives from FHU, RDG Planning and Design, MAPA, Bellevue Bridge Commission and the City of Bellevue. **Appendix B** includes stakeholder contacts and meeting minutes from the following:

- Kickoff Meeting – July 18, 2018
- Stakeholder Workshop #1 – September 18, 2018

- Focus Group Interviews – October 2018
- Steering Committee Meeting – November 2, 2018
- Stakeholder Workshop #2 – November 27, 2018
- Steering Committee Meeting – January 23, 2019
- Public Open House – February 25, 2019
- Steering Committee Meeting – July 2019

3.1 Focus Group Interviews

In October 2018 there were a series of focus group stakeholder interviews held with local businesses and associations and advocacy groups. From those discussions the following themes were uncovered. Questions and responses are included in **Appendix C**:

- The current bridge is inadequate to serve heavier industrial uses which have larger axles trucks that are overweight
- The bridge is a convenience for employees at businesses in Iowa to visit restaurants in Bellevue, however, is generally not the primary point of access for employees commuting to work
- Impact of the bridge closure would be greater for Olde Towne businesses than the industries in Iowa
- If bicycle and pedestrian use were prioritized on the bridge or on a new bridge, a better trail connection would be necessary along Bunge Avenue

Focus Groups:

- **Bunge**
- **Google**
- **Offutt Air Force Base**
- **Olde Towne Business Association**
- **Olde Towne Business Owners**
- **Southwest Iowa Renewable Energy (SIRE)**
- **Mid-America Energy Power Plant**
- **Bellevue Bicycle Club**

3.2 Public Open House

A public open house was held on February 25, 2019 from 4 pm to 7 pm and drew over 30 individuals interested in learning more about the project and future of the bridge. Local news outlets were also present and broadcast stories about the Bellevue Bridge project on local television. The project team answered questions as attendees moved around the room reading the information boards on display. Comments were also received via social media, email, and comment cards by individuals unable to attend the public meeting.

Most attendees were supportive of keeping the bridge standing beyond 2040. Many felt the bridge would make a great regional trail connection if preserved and either converted only to bicycle and pedestrian access or if a new bridge were constructed with separate facilities. A few attendees felt strongly that the bridge should be kept open to vehicles with mixed support for an increased toll. **Appendix C** includes comments received from attendees of the open house.

4. DATA GATHERING

4.1 Inventory of Existing Conditions

An inventory of current conditions in the study area was completed and existing data was made available for the study. This information includes the following items and some documents of interest are included in **Appendix D**:

- Previous studies and reports
- Current ordinances and guidelines
- City and County development practices
- Land Use information
- GIS information
- Existing development plans
- Existing street and roadway design standards of applicable agencies
- Design plans
- Vehicular classification data as needed
- Improvement project data for future projects
- Historical patterns and local knowledge – as applicable
- Bicycle and pedestrian facilities, connections and needs
- Watercraft desires and needs where applicable
- US Army Corps of Engineers and US Coast Guard plans and requirements

4.2 Traffic Study

A traffic analysis for the study area includes a detailed intersection analysis and a high-level planning capacity analysis for both the existing 2018 conditions and for the future year 2040 traffic conditions. The study considered the future land uses in the study area and the impacts of the proposed alternatives to the Bellevue Bridge. MAPA provided Year 2040 traffic projects which are used for the opening year and future year traffic analysis.

Historic count data from several sources including the City of Bellevue, Bellevue Bridge Commission, NDOT, Iowa DOT, and MAPA were requested for this Study. To supplement historic counts, 24-hour and 4-hour peak period turning movement counts were conducted in the immediate vicinity of the bridge at key locations on both the Nebraska and Iowa sides of the river in August 2018 when Bellevue Public Schools were in session.

24-hour turning movement counts were conducted at the following intersections and are included in **Appendix E**:

- E. Mission Avenue with S. 15th Street/Payne Drive just west of the Bellevue Bridge
- Mills County Highway H10/Bunge Avenue with the I-29 Frontage Road

4-hour AM and PM peak period turning movement counts were conducted at the following intersections and are included in **Appendix E**:

- E. Mission Avenue with Franklin Street (Harvell Drive connection)
- E. Mission Avenue with Hancock Street (Harlan Lewis Road connection)
- Harlan Lewis Road with US 34
- County Highway H10/Bunge Avenue with I-29 Southbound Ramps
- County Highway H10/Bunge Avenue with I-29 Northbound Ramps

A planning level capacity analysis evaluated the regional east-west vehicular movements between Nebraska and Iowa to determine existing and future demand. A screen line along the river including all bridge crossings between I-480/US 6 and Plattsmouth Bridge were developed for the existing daily vehicle demand to gain insight into vehicle flows potentially affected by a change to the Bellevue Bridge.

Future traffic forecasts at the same screen line locations were prepared using the Omaha-Council Bluffs Metropolitan Area Planning Agency regional travel demand model and forecasts prepared for the Nebraska DOT Metropolitan Travel Improvement Study (MTIS) to understand future travel demand. These evaluations considered the total vehicular flows as well as bridge specific forecasts to understand the future volumes and available capacity at crossings expected to be impacted by changes to the Bellevue Bridge. MAPA completed transportation model runs and provided future year ADT data for the following roadways within the 10-mile screen line area:

- I-29 from US 34/Platteview Road to I-480
- US 75 from US 34/Platteview Road to I-80
- I-480 from I-29 to I-80
- I-80 from US 75/I-480 to I-29
- US 275/NE 92/Veterans Memorial Highway from US 75 to I-29
- US 34/Platteview Road from US 75 to I-29

The 2018 base year traffic volumes that were used to develop 2040 traffic forecasts using the MAPA transportation model are seen in **Appendix E.** The existing planning level (2018) Average Daily Traffic Volumes are shown in **Figure 4.1** and the future planning level (2040) Average Daily Traffic Volumes are shown in **Figure 4.2**.

Figure 4.1. 2018 Existing Average Daily Traffic Volumes

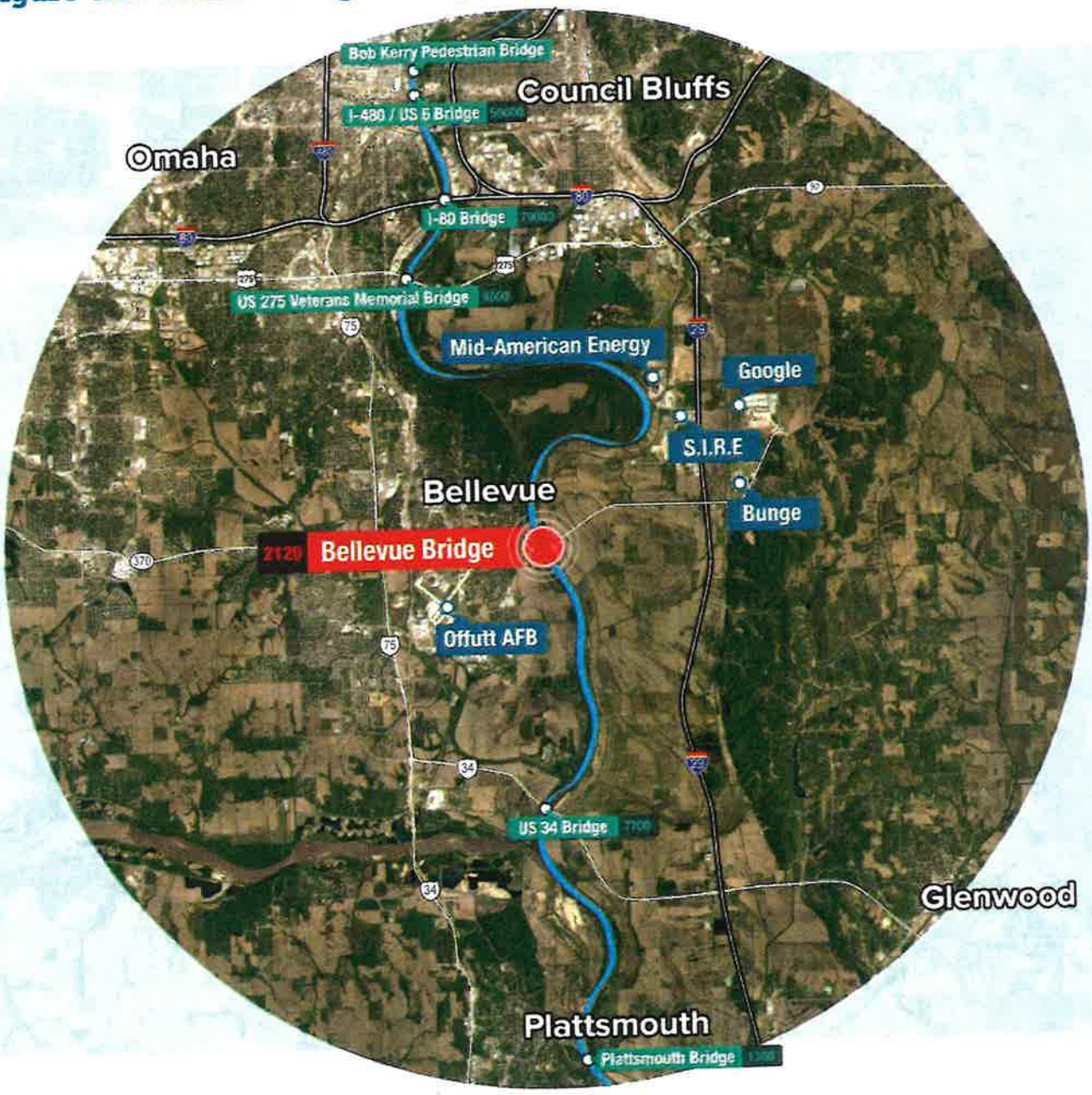
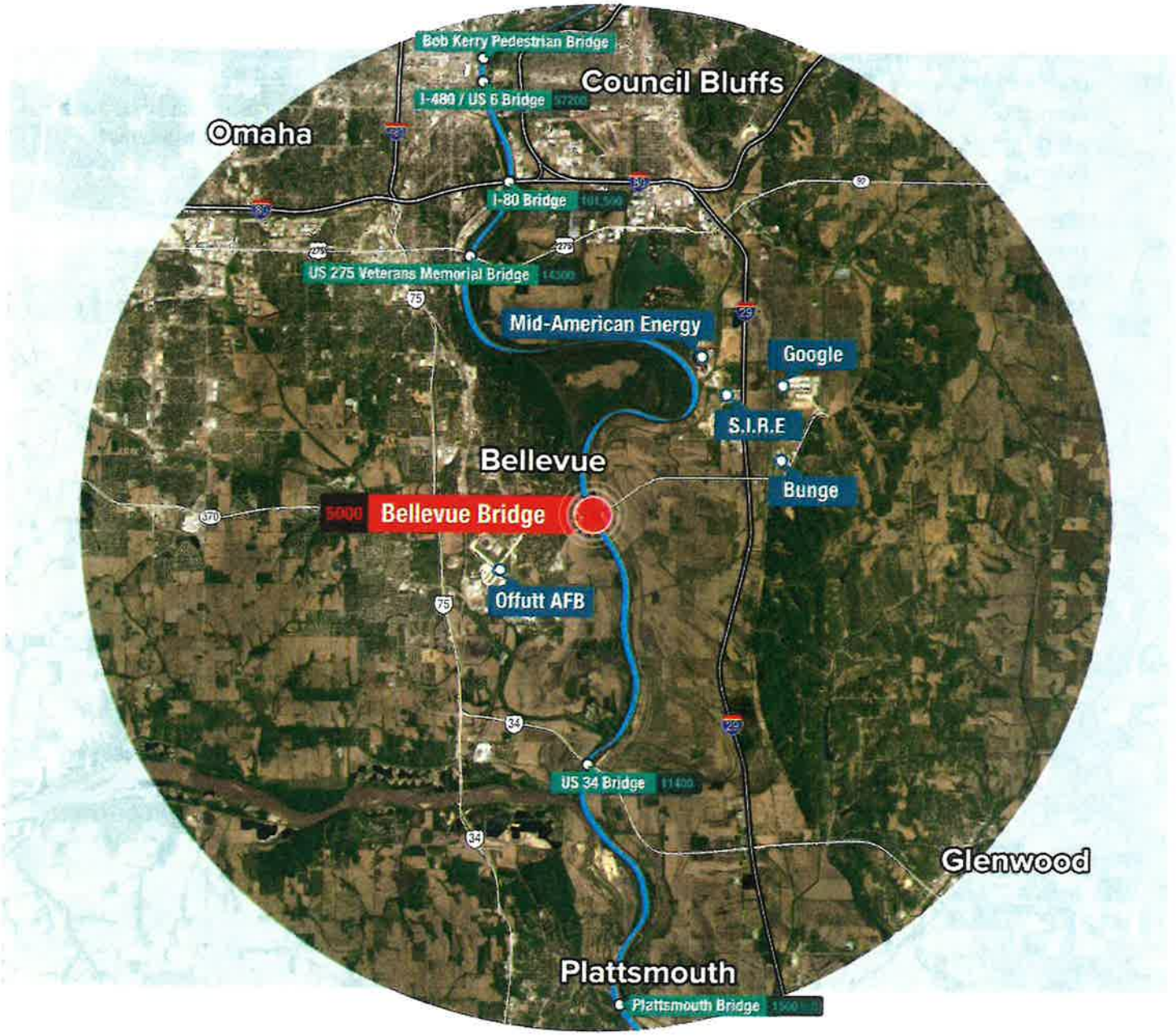


Figure 4.2. 2040 Future Average Daily Traffic Volumes



4.3 Structural Conditions

The Bellevue bridge, Structure Number S370 01918, is a 1,968-foot long steel truss bridge that was built in 1952 and spans the Missouri River. See **Appendix F** for the Elevation and Plan Views of this bridge. The Load Rating Summary for this Bridge is also attached in **Appendix F**. Recommendations from the Load Rating Summary advise that the Bellevue Bridge be posted at 26 tons. The bridge is currently not posted and it is recommended that a posting for SU4, SU5, SU6 and SU7 trucks be added in the future to ensure that overweight vehicles are not utilizing this bridge and thus adding to more rapid degradation.

The most current bridge inspection reports were provided by the Bellevue Bridge Commission and NDOT, as seen in **Appendix F**. The inspection cycle is typically bi-annual in the odd years on the bridge. The bridge inspection in 2017 was rated as fair to satisfactory in many areas due to recent repairs from 2004 through 2012 which included repairing deck rails and joints, abutment bearings, truss gusset plate and floor beams and replacing the deck and approach slabs.

Load carrying capacity was verified using NDOT's existing rating files (AASHTO Bridge Rating) to ensure that bridge widening or other modifications would not cause a reduction in capacity. Deterioration rates were estimated using NDOT element inspection history.

5. ALTERNATIVES ANALYSIS

Using a series of potential impacts, each of the six (6) bridge alternatives were evaluated for the future of the Bellevue Bridge. The analysis was based on various factors such as:

- Traffic Operations
- Life Cycle Cost Analysis
- Environmental Review Analysis
- Market Analysis
- Bridge Alternatives Evaluation
- Benefit-Cost Analysis

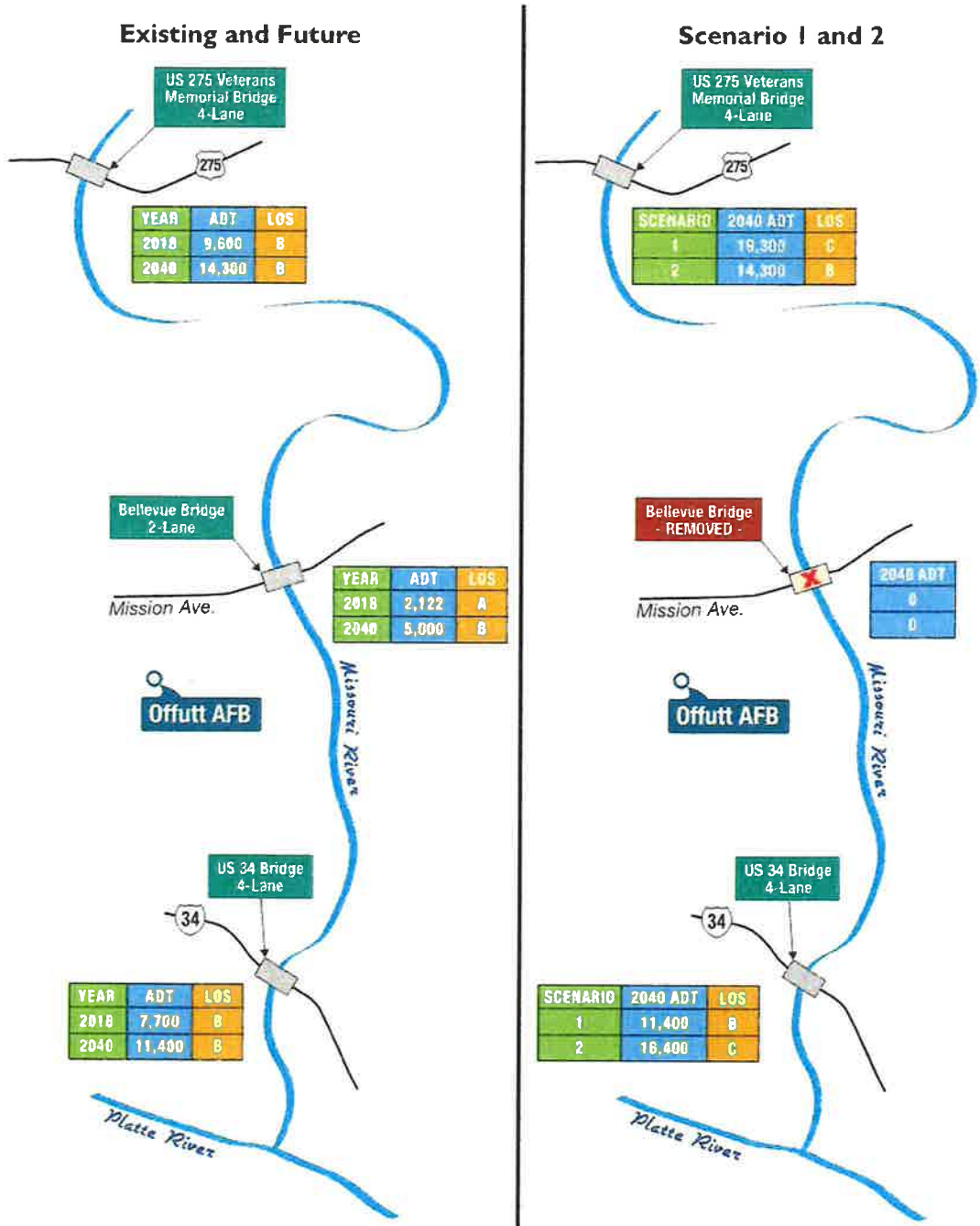
5.1 Traffic Operations

The Bellevue Bridge alternatives were evaluated using capacity calculations based on the Highway Capacity Manual (HCM 6th edition) methodology. The resulting level of service was reported for highway segments and intersections within the study area. The preferred traffic operations goals within the study roadways were identified as LOS D for Principal and Minor Arterials, and LOS C for rural highway segments, which is consistent with the AASHTO Green Book and the Nebraska DOT Road Design Manual. Level of service results were used for comparison purposes and to verify that the adjacent US 275 and US 34 bridges operate acceptably with the demolition alternative.

As seen in **Figure 5.1**, the roadway networks operate better during the proposed build alternative than the demolition alternative; however, if Bellevue Bridge were demolished, alternate routes along US 275 to the north or US 34 to the south will still operate at an acceptable LOS in the future. For the purposes of this analysis, a 100% diversion to either the north or south was assumed.

Appendix G includes the Roadway Capacities Analysis as well as other helpful documentation related to Travelsheds from the Bellevue Bridge and Travelsheds from the Highway 34 Bridge. Also included in **Appendix G** is the Time Cost of Closure of the Bellevue Bridge that uses an origin and destination analysis to conclude the additional amount of travel time for certain trips if the Bellevue Bridge was closed.

Figure 5.1. Bellevue Bridge Roadway Capacities and Level of Service Analysis (LOS)



5.2 Life Cycle Cost Analysis

A life cycle cost analysis for the bridge and related roadway was conducted to determine the remaining useful life of the bridge.

There are three primary considerations in estimating the remaining useful life of the bridge: structural strength, structural fatigue, and serviceability of the bridge deck.

- Structural strength – An investigation into the through-truss sections shows that modern vehicle loading can be safely carried by the existing structure.
- Structural fatigue – An investigation into the through-truss sections shows that modern vehicle loading should not create fatigue failures in the primary truss sections.
- Bridge deck serviceability – The current deck was replaced in 2004 and is approximately 14 years into its service life. Research supports the assumption that corrosive agents make first contact with steel reinforcement approximately 16 years into service life. Therefore, the current deck has essentially passed through the first phase of its useful life. The bridge deck steel reinforcement is epoxy-coated, which will mitigate corrosion and prolong the deck's service life. Generally, bridge decks with epoxy-coated reinforcing are expected to remain serviceable for about 40 years. Thus, given the deck's age, we expect about 25 more years of service.

However, extenuating circumstances could decrease this expected life and it should be recognized that while the first phase of the deck's service life is generally maintenance-free, as the deck ages, repairs will increase at an approximately exponential rate in both size and cost, on an annual basis. An estimate to remove the current deck at the end of its useful life and replace with a new deck is $7M (2040 dollars), which is roughly the same size as the Bellevue Bridge Commission's current cash reserves. Thus, when the current deck needs to be replaced, the Bellevue Bridge Commission reserves will be exhausted by a replacement and this event is likely the determinant of the remaining useful life of the bridge.

Bellevue Bridge (photo credit: Mark Meisinger)

Bellevue Bridge traveling east (photo credit: Mark Meisinger)

The bridge structural capacity is currently controlled by the floor system supporting the deck on the through-truss spans. Over the bridge's service life, deck deterioration led to water and corrosion agents attacking this floor system and aggressively reducing various structural steel members. Currently, since the new deck installation, this corrosion method has been eliminated. However, as the deck continues to age

and deteriorate, corrosive agents will once again find their way into contact with the floor system and corrosion will progress. While our current opinion is that the rate of deck deterioration will exceed the rate of floor system deterioration, it is possible that if the deck is not maintained and repaired that the floor system will corrode to a point that the bridge becomes no longer serviceable. However, under assumed circumstances, even this scenario would provide a remaining service life of approximately 20 years or more.

At this point in the structure's life, each year is anticipated to bring about more maintenance and repair costs. The lack of protective paint on most of the structural surfaces for many years and exposure to elements has already produced structural damage requiring repair and several maintenance costs. With increasing age and accelerating traffic demand, the bridge will continue to deteriorate at an accelerating rate. The bridge deck is a key component to mitigating the rate of decay. The longer the deck can be preserved and remain serviceable, the longer the floor system will enjoy a large measure of protection from corrosive agents and thus, the longer the bridge will remain serviceable. The action which extends the current deck the furthest into the future is closing the bridge to vehicular traffic, especially large trucks and special handling vehicles as they cause the most damage to the deck and the structure. A longer-term solution is to prohibit all vehicular traffic and convert the bridge to a pedestrian/trail facility. In this scenario, the useful deck service life increases by a decade or more and the existing structural capacity is preserved because the largest demands are reduced to essentially no demand.

Bellevue Bridge looking north (photo credit: Mark Meisinger)

5.3 Environmental Review Analysis

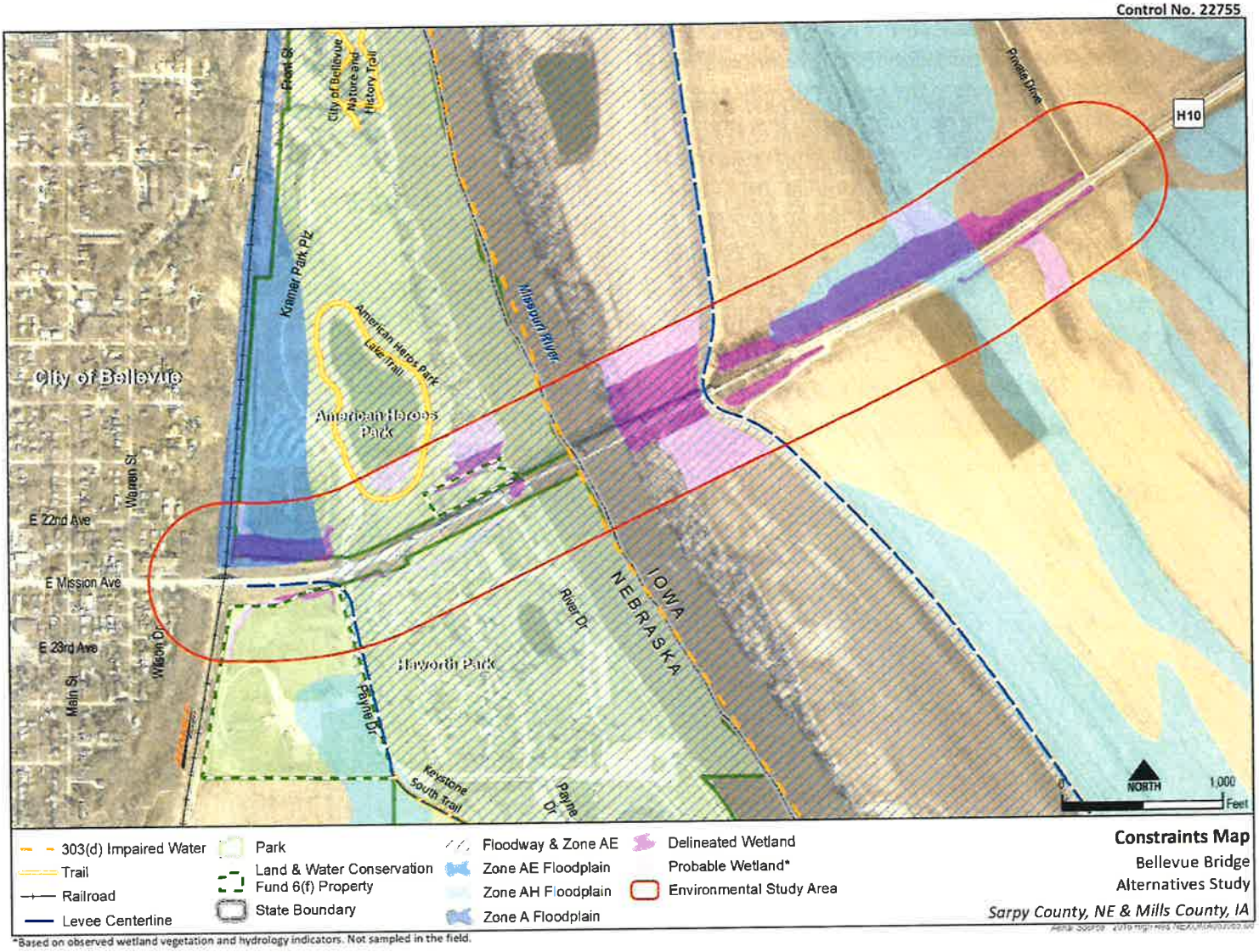
An Environmental Resource Review was conducted to provide MAPA with planning level information for the Bellevue Bridge project. The review was primarily based on a desktop evaluation of readily available and ascertainable information for environmental resources. A site reconnaissance visit was also conducted to delineate wetlands in the project vicinity and identify other potential environmental resources that may not be apparent in the desktop review. The intent of the Environmental Resource Review is to provide with reasonable assurance the major environmental resources present near the structure and the likelihood of potential impacts to those resources from the potential improvements. This review does not contain detailed quantitative information on environmental impacts—that information will be gathered and discussed during subsequent project development phases. Information pertinent to the environmental review is attached in **Appendix H**, including the *Initial Environmental Review* document which summarizes the potential impacts and permitting requirements for the project. The following is a list of environmental resources that were reviewed:

- Threatened, Endangered, and Protected Species
- Section 4(f) Recreational Resources
- Section 6(f) Land and Water Conservation Fund Properties
- Historic and Archeological Sites
- Wetlands
- Wild & Scenic Rivers
- Water Quality
- Hazardous Materials
- Floodplains and Floodways
- Potential Residential and Business Displacements
- Environmental Justice
- Airports
- Farmland Classification

The Environmental Resource Review identified a number of environmental resources in the vicinity of the bridge that could potentially be impacted by the project (see the environmental constraints map in **Figure 5.2**). Additionally, there are a number of permits and clearances that would be required for the project (see the *Initial Environmental Review* in **Appendix H**). If the project receives federal funding, it would require compliance with the National Environmental Policy Act (NEPA). This could be an Environmental Impact Statement (if impacts are considered significant), an Environmental Assessment, or Categorical Exclusion. Even without federal funds, certain federal permits also require NEPA documentation. Ultimately, the level of impacts to resources and the required permits will depend on what alternative is implemented.

Figure 5.2. Environmental Constraints Map

Project No. MAPA-5002(3)
Control No. 22755

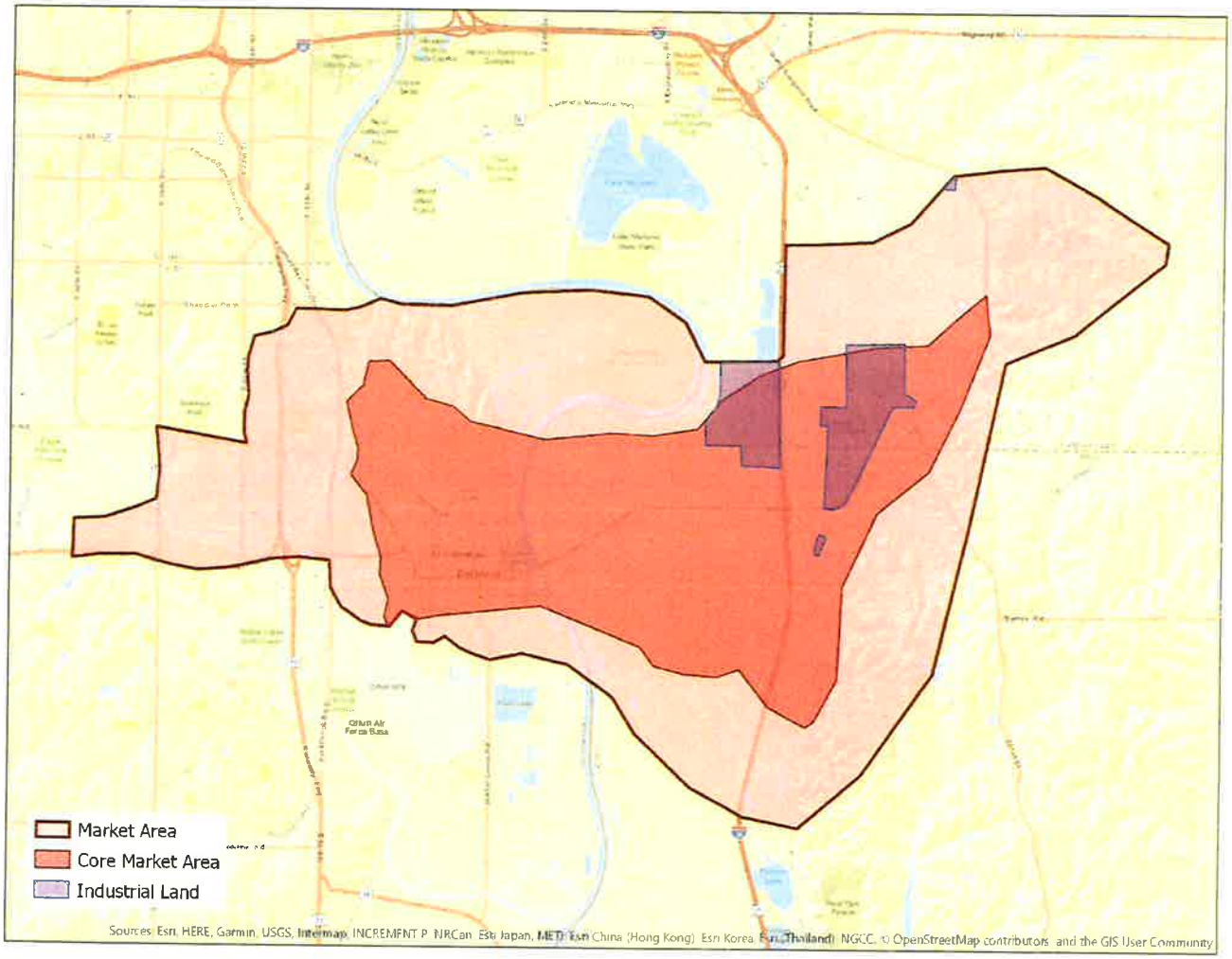


*Based on observed wetland vegetation and hydrology indicators. Not sampled in the field.

5.4 Market Analysis

The market area chosen for the Bellevue Bridge project was based on vehicular drive times and the service area for the bridge. The boundaries are the breaking point for drivers to choose either the South Omaha Veterans Memorial Bridge (Highway 275) 5.8 miles to the north or the Highway 34 bridge 4.8 miles to the south, as seen in **Figure 5.3**. The defined boundaries are roughly 4 miles southeast of the bridge, 8 miles northeast, 3.25 miles north, and 5.5 miles west. Given the terrain and existing infrastructure, the market area, encompassing 30,939 acres, is not a neatly defined shape, but a series of protrusions from the bridge location. The total number of employees in the market area is 13,591 with 1,024 businesses. The core service area for the bridge has only 437 businesses with a total of 5,006 employees.

Figure 5.3. Market Area



5.5 Bridge Alternatives Evaluation

A total of six (6) bridge alternatives were evaluated. The alternatives include:

- Preservation & Maintenance of Existing Facility (**Figure 5.4**)
- Bridge Closure (Demolition)
- New Bridge Construction (**Figure 5.5**)
- Bridge Conversion to a Recreational Trail Facility (**Figure 5.6**)
- Upgrade to Separate Lanes for Vehicles and Trail (**Figure 5.7**)
- Expansion of Existing Piers (Phased Construction) (**Figure 5.8**)

These six bridge alternatives were compared through a list of benefits and shortcomings for each alternative, along with an estimated construction cost for each alternative. Using a planning decision matrix, the bridge alternative scenarios were screened for fatal flaws to determine which scenarios are feasible to be included within a preliminary list of solutions.

During the bridge alternatives evaluation stage, the alternatives were screened and ranked according to the following categories of criteria, as seen in **Table 5.1**:

- Property Impacts
- Environmental Resource Impacts
- Traffic Operations
- Construction Phasing and Costs
- Pedestrian and Bicycle Connectivity
- Economic Impacts

Appendix I includes more detail related to how the construction costs for each alternative were derived for the initial construction costs projected for 2040 as listed in **Table 5.1** below.

Figure 5.4. Existing Bellevue Bridge

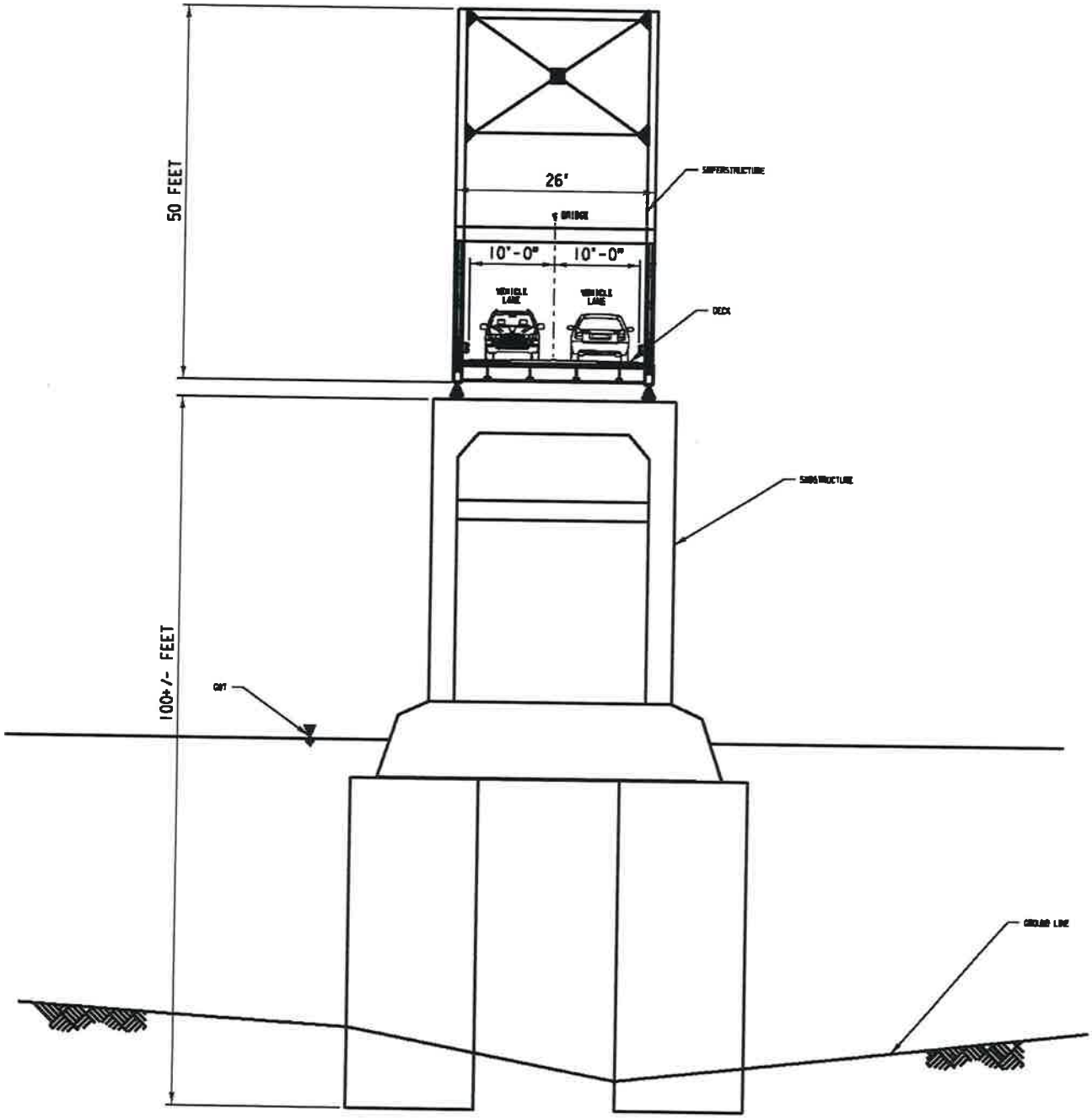


Figure 5.5. New Bridge Construction

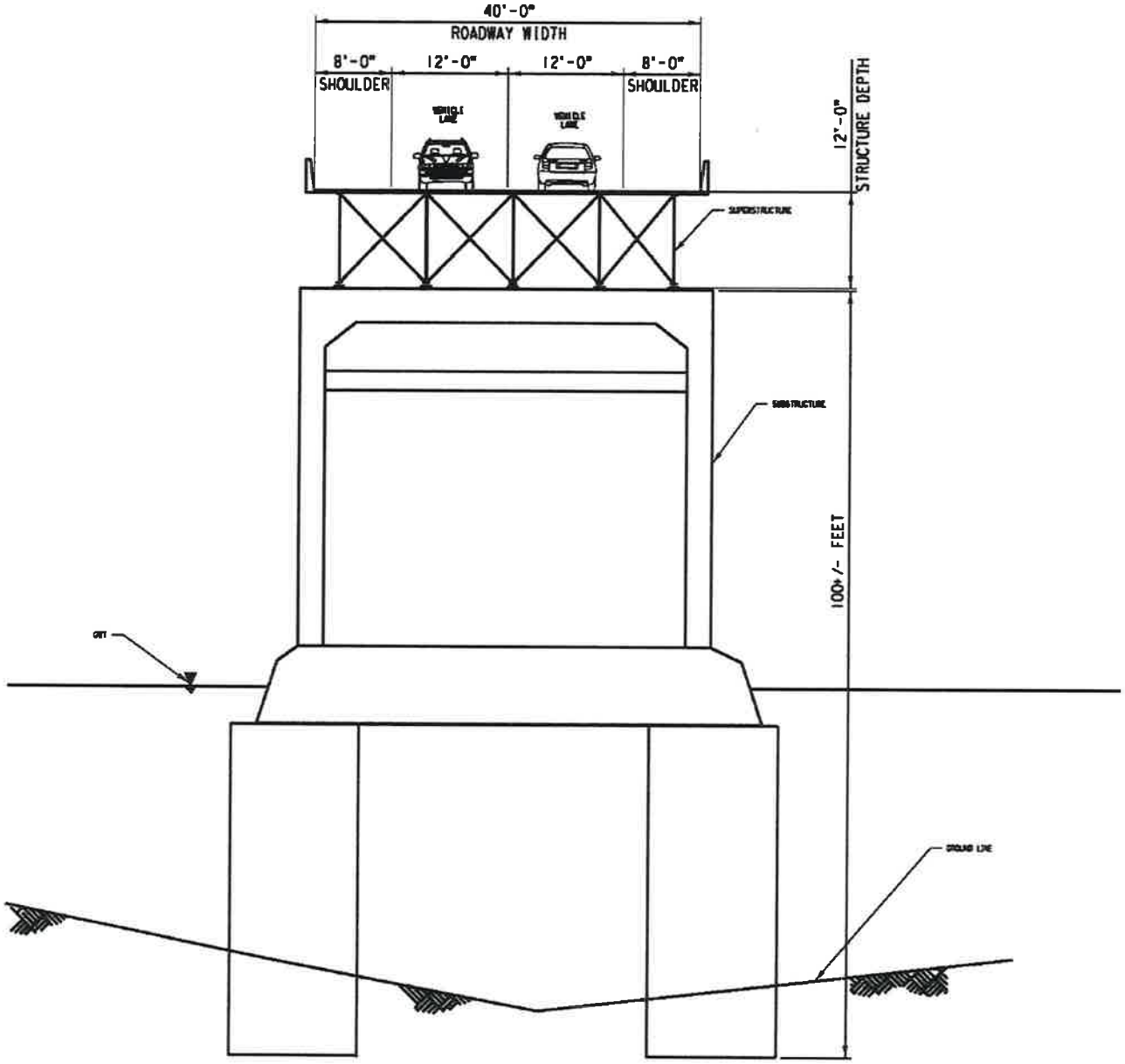


Figure 5.6. Bridge Conversion to Recreational Trail Facility

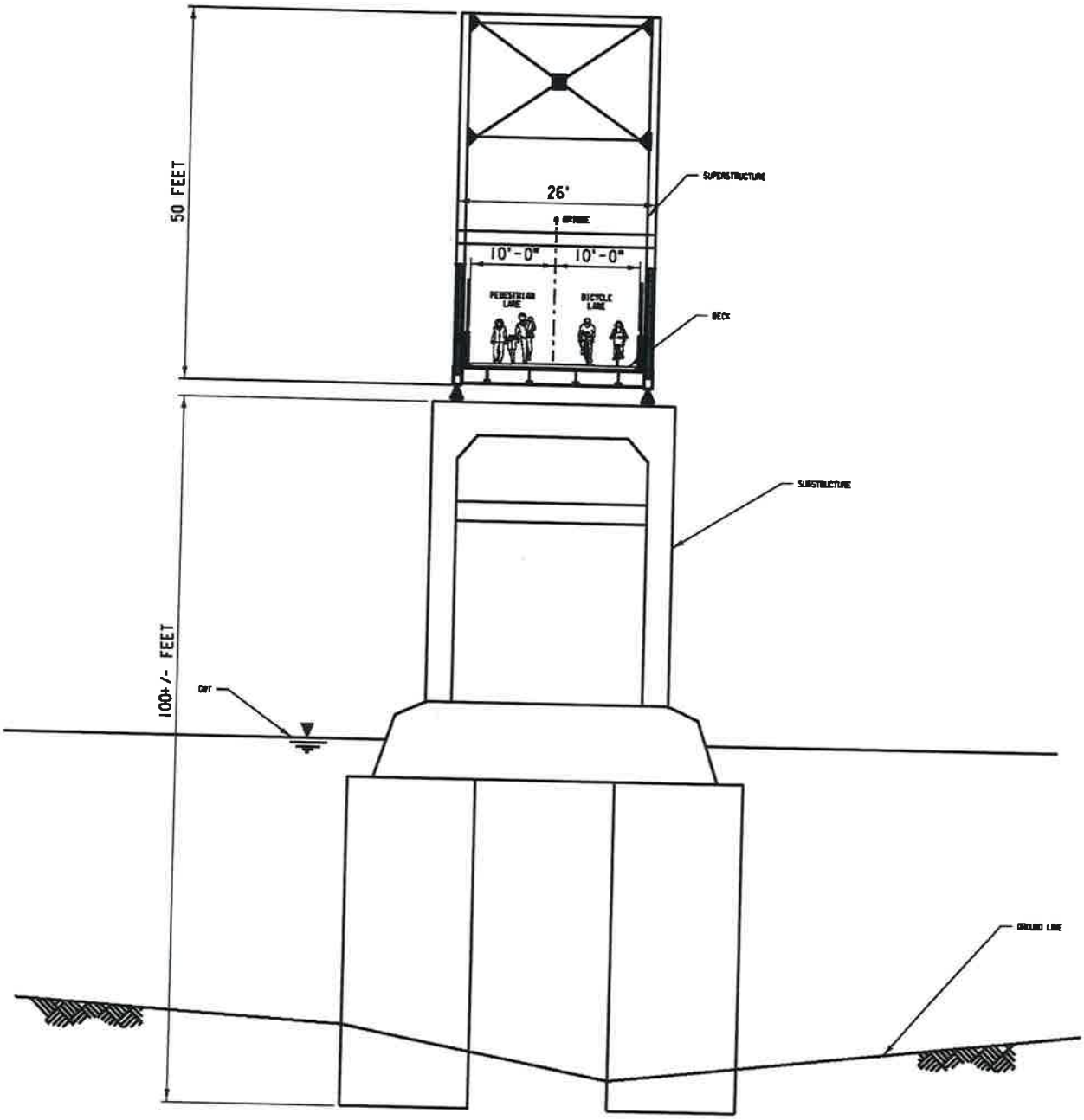


Figure 5.7. Upgrade Bridge to Separate Lanes for Vehicles and Trail

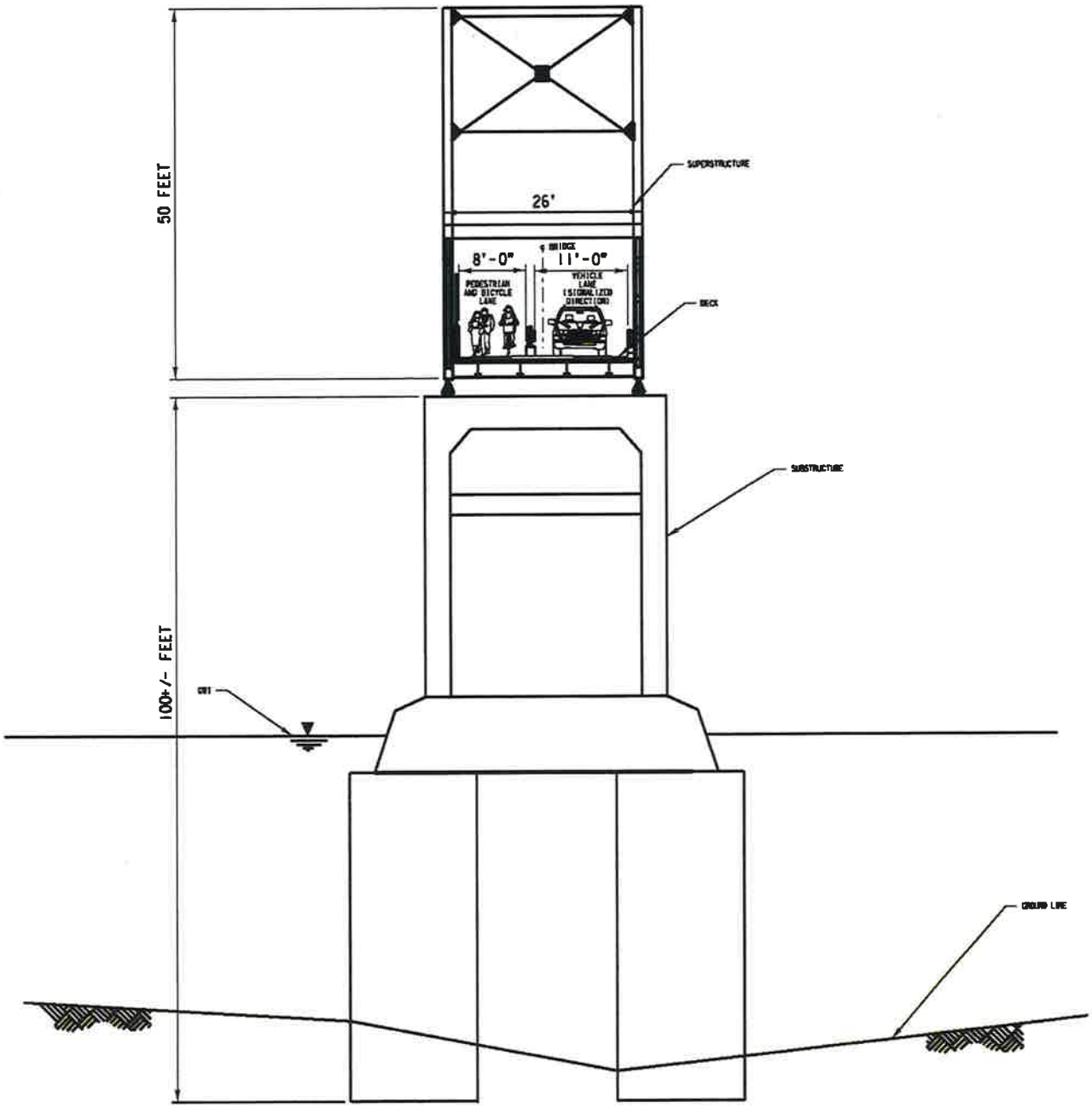


Figure 5.8. Bridge Expansion of Existing Piers

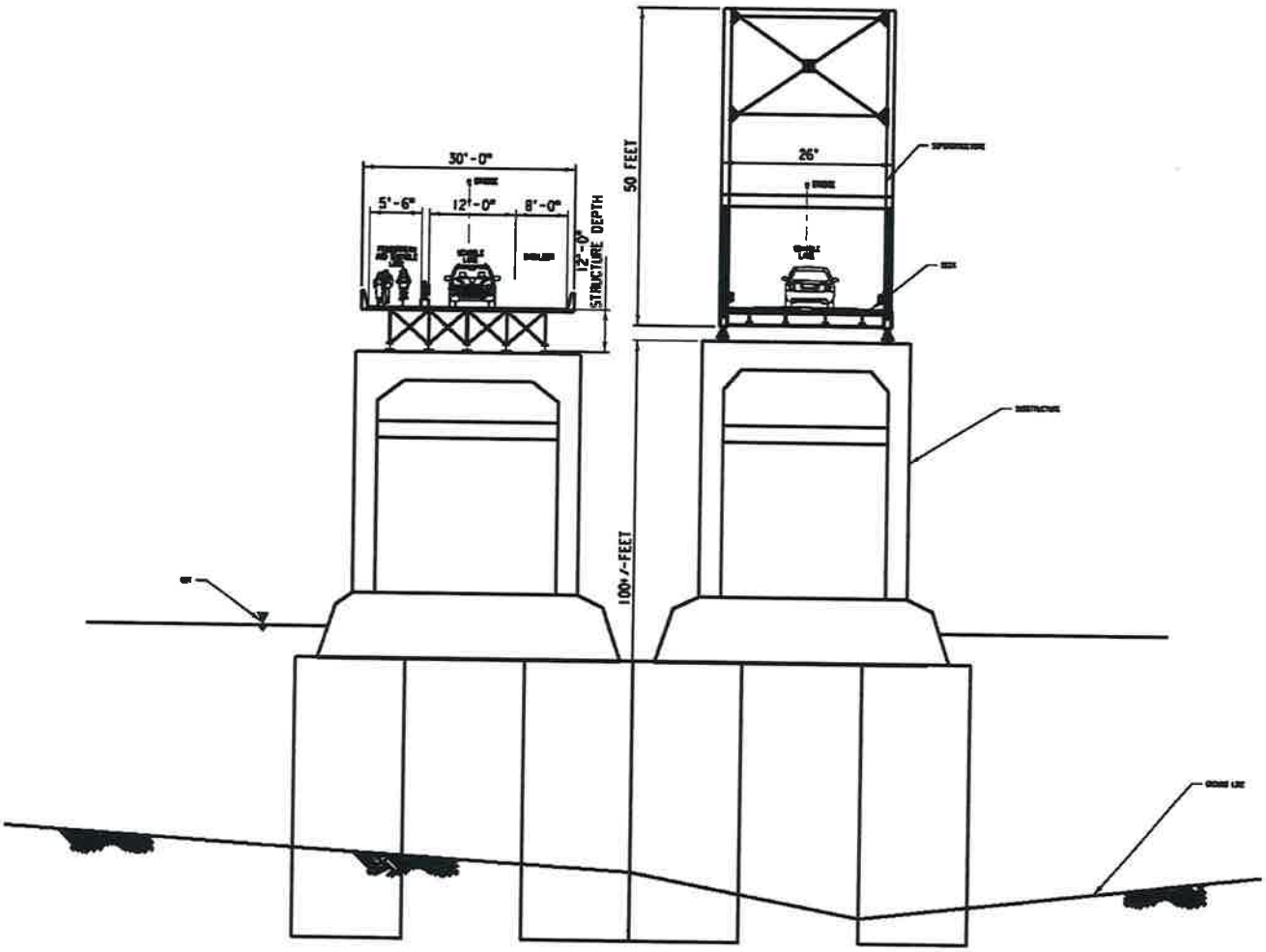


Table 5.1. Bellevue Bridge Alternatives Evaluation Matrix

Evaluation Factors	Preservation & Maintenance	Demolition	New Bridge	Conversion to Recreational Trail Facility	Upgrade to Separate Lanes for Vehicles and Trail	Expansion of Existing Piers / Phased Construction
Property Impacts						
Right-of-Way Acquisition (Acres)	-	0.00	0.00	0.00	0.00	0.00
Environmental Resources						
Meets Purpose and Need (Maintain IA-NE Link)	Not for long term	No	Yes	Yes, bike/ped only	Yes	Yes
Hazardous Materials	-	Waste Materials Mgmt	Waste Materials Mgmt	Waste Materials Mgmt	Waste Materials Mgmt	Waste Materials Mgmt
Floodplain & Floodway	-	Minimal impacts to FP	Possible CLOMR	Permit required	Permit required	Possible CLOMR
Wetlands / WOUS	-	NWP	IP & Mitigation	NWP	NWP	IP & Mitigation
Section 4(f) (Recreational) Resources	-	4(f) exception	4(f) deMinimis	4(f) exception	4(f) exception	4(f) deMinimis
U.S. Coast Guard Section 9 Bridge Permit	-	USCG Approval	Permit Required	USCG Approval	USCG Approval	USCG Approval
U.S. Army Corps Section 10 Permit	-	Permit Required	Permit Required	No Permit	No Permit	Permit Required
U.S. Army Corps Section 408 Levee Permit	-	Categorical Permission	Section 408 Permit	Categorical Permission	Categorical Permission	Section 408 Permit
Traffic Operations						
Traffic Operations - 2045 Volumes	LOS A	No traffic	LOS A	No traffic	LOS C or Better	LOS A
Breakdown Year - LOS D or worse	2045 or until failure	2040	>2045	>2045	>2045	>2045
Farm Equipment / Oversized Loads	Requires special flagging / operations	No	Allows for Access	No	No	Allows for Access
Superstructure/Substructure						
Initial Construction Cost (2040 Dollars)	-	$8,564,000	$62,060,000	$6,715,000	$7,119,000	$43,405,000
Annual Maintenance & Operations through 2040 (2040 Dollars)	$16,864,000	-	-	-	-	-
River Navigation	maintained	maintained	coordinate with USCG	maintained	maintained	coordinate with USCG
Sustainability	Yes	Not Salvage Materials!	TBD	Yes	Yes	Yes
Construction						
Serviceability - Maintain Access During Construction	-	No	Able to construct bridge off-alignment	Crossroad would need to be closed	One lane maintained during construction	Able to construct bridge off-alignment
Funding Opportunities	Paid by Existing Toll Revenue	Paid by Existing Toll Revenue	Grant or Federal Funds	Paid by Existing Toll Revenue	Paid by Existing Toll Revenue	Grant or Federal Funds
Expandability						
Ability to Meet Vehicle Traffic Growth	Until 2040	No	Will Accommodate	No	yes, with additional delay	Will Accommodate
Bicycle/Pedestrians						
Dedicated Facility	Shared lane for Bicycles	No	trail separated by barrier	exclusive bicycle and pedestrian facilities	trail separated by barrier	trail separated by barrier
Economic Impact						
Destination Value (context)	Status Quo	No	possible	opportunities for bicycle tourism, historical	Historical value	possible
Economic Development Potential	Status Quo	No	possible increase	limited	may decrease mobility	possible increase
Evaluation Rating						
Status	PREREQUISITE FOR ALL	ADVANCED	ADVANCED	ADVANCED	ELIMINATED	ELIMINATED

Rating Scale
Highly Positive
Moderately Positive
Neutral
Moderately Negative
Highly Negative

5.5.1 Alternatives Refinement

At Stakeholder Workshop #2, each of the alternatives and resultant costs were presented along with the pros and cons of each based on the evaluation criteria established at the outset of the study. After some discussion, the stakeholders determined that the following alternatives would be advanced to the refinement stage:

- Alternative 1: Demolition
- Alternative 2: Conversion to Recreational Trail Facility
- Alternative 3a: New Bridge (Keep Existing Bridge as Recreational Trail Facility)
- Alternative 3b: New Bridge (Demolish Existing Bridge)

These alternatives are discussed in detail in the following pages. Each alternative would include approximately $17M (2040 dollars) in ongoing preservation and maintenance of the existing bridge until 2040 when the useful life has been reached. In the case of the Alternatives 1 and 2 that involve demolition or closure of the existing bridge, emergency management routes will use Missouri River bridges to the north and south.

Eliminated Alternative: Upgrade to Separate Lanes for Vehicles and Trail

One of the eliminated alternatives for the Bellevue Bridge is to upgrade the existing bridge to provide separate lanes for vehicles and trails. This alternative would include a traffic signal or gate system on either end of the bridge to limit vehicle traffic to one lane, allowing for a pedestrian and bicycle trail in the adjacent lane behind a barrier. The estimated cost for this alternative is $7.1M in 2040 dollars. In the alternatives analysis, it was determined that this alternative would limit oversized loads, and decrease the mobility and vehicle carrying capacity of the bridge. It was also discussed that pedestrians walking on the bridge may feel uncomfortable due to vibrations and movement when large trucks were using the adjacent travel lane.

Eliminated Alternative: Expansion of Existing Piers / Phased Construction

One of the eliminated alternatives for the Bellevue Bridge is to expand the existing bridge piers and build a "twin" bridge with a new travel lane for vehicles and a trail. This alternative would include modification of the existing bridge to provide a single travel lane and shoulder in the opposite direction. The estimated cost for this alternative is $43.4M in 2040 dollars. In the alternatives analysis, it was determined that this alternative would also require Federal funding including extensive coordination with Federal agencies and environmental documentation. The stakeholders agreed that if the Federal process needed to be followed, pursuit of an entirely new bridge was more desirable so as not to be reliant on a rehabilitated structure and the associated higher long-term maintenance and upkeep costs.

Alternative 1: Demolition

The first alternative for the Bellevue Bridge is to demolish the bridge without building a replacement at the existing site. The estimated cost for demolition is $8.6M in 2040 dollars. No economic benefits would be realized in this scenario. Indirect costs to demolition include the added travel time for the estimated 2,122 vehicles traveling across the bridge today and potentially a small loss in spending to downtown Bellevue.

Given the low average daily traffic counts across the bridge, the amount of money spent at local businesses in Bellevue as a direct result of the bridge connection is relatively low.

Alternative 2: Conversion to Recreational Trail (Bike / Ped)

Alternative 2 involves converting the existing bridge to bicycle and pedestrian use only for recreational use. This would have the lowest cost—$6.7M in 2040 dollars—while creating benefits for the adjacent communities. The estimated cost includes approach work on both sides of the river, main river bridge fencing, lighting, spot painting, and $1.5M in roadway upgrades (mostly bridge resurfacing).

While the bridge is not immediately adjacent to a trail on the east side of the river, there is potential to make connections to the existing Lewis & Clark Bike route and Wabash Trace Trail in Iowa (as seen in **Figure 5.9**). As demonstrated in the Case Studies, this alternative has the potential to generate more pedestrian and bicycle traffic through Bellevue, boosting local revenues. However, this would only be possible if a trail was developed to link the bridge to other trails in Iowa.

Figure 5.9. Pedestrian and Bicycle Connectivity

Alternatives 3a and 3b: New Bridge Construction

Alternative 3 is broken into two options, 3a and 3b which both involve the construction of a new bridge. Alternative 3a includes building a new bridge and converting the existing one to a recreational trail for pedestrian and bicycle only. Alternative 3b involves demolishing the old bridge and a new bridge with an 8-foot shoulder for bicyclists and pedestrians.

Construction costs for the new bridge is estimated at $62M (2040 dollars) and would include 40 foot of roadway width for 2 vehicle lanes extending 2,200 feet long. This would accommodate 12-foot vehicle lanes and 8-foot shoulders on either side. Alternative 3a would cost a total of $68.7M which includes $62M to build the new bridge and the $6.7M in additional costs to convert the old bridge to pedestrian and bicycle only. Alternative 3b would cost $70.6M which includes the $62M for the new bridge and the $8.6M cost to demolish the old bridge. Of the two options that maintain vehicle access in this location, Alternative 3a is cheaper and provides a completely separated bridge for bicyclists and pedestrians, whereas Alternative 3b only provides an 8-foot shoulder to traverse and costs an additional $1.9M.

6. BENEFIT-COST ANALYSIS

Determining a benefit-cost analysis for the Bellevue Bridge project is unique because of the existing land use and conditions surrounding the property on the east side of the river. Over half the market area is within some sort of flood hazard area, with 24% in the 100-year floodplain. This would require filling in the floodplain to properly elevate the buildings and obtaining approval from FEMA through a LOMR-F, making any new development costly. Recent flooding in 2011 and 2019 illustrate the danger of developing this area and the impact that development has on expanding the flooding risk. The remaining land could be developed, and this development could create demand for additional bridge access but easy access to other bridges may still offset the cost of construction.

6.1 Qualitative Analysis

When considering the best alternative for the future bridge, numbers are not the only way to determine the optimum solution. Additional qualitative (non-numbers based) factors will also have a large impact on the future function of the bridge. Qualitative factors to consider include the impact on health for nearby residents, the ability to develop, and the environmental impacts that result from each scenario.

The likelihood of development on the east side of the river is decreased because of the floodplain. While this does not necessarily mean development will not occur, it does increase the cost of development. Areas outside the floodplain will be around the I-29 interchange creating easy access to other bridges that offer more free-flowing traffic patterns on the Nebraska side.

Conversion of the existing bridge to a bike and pedestrian only crossing would have increased health benefits and no environmental impacts. Current non-vehicular access on the bridge is dangerous as vehicles have limited site of bicyclists or pedestrians crossing the bridge in the vehicle lanes. Not only would a bridge devoted to bicycle and pedestrian traffic increase health by providing safer crossings, it would also encourage nearby residents and visitors to engage in active recreation.

Environmental factors should be considered as part of the analysis since they can lead to qualitative effects. The new bridge construction alternatives have the potential to create major impacts for the nearby waterways and would encroach on floodplains and floodways. Additionally, more permitting and approvals from agencies like the USCG is required.

6.2 Quantitative Analysis

As illustrated in **Table 6.1**, costs and benefits were calculated for each alternative over a 20-year period beginning in 2040. It is recognized that at the end of the 20-year period, the new bridge has not significantly deteriorated and will continue to function properly and benefit drivers and/or trail users into the future. General assumptions in **Table 6.1** include the following:

- Fiscal benefits including:
  - 100 average daily vehicular trips spending $25 per day in downtown Bellevue
  - 100 average daily bicycle trips spending $25 per day six months out of the year in downtown Bellevue
- Societal benefits including:

- Increased CO2 emissions from detoured vehicles ($0.02 per mile for cars and $0.07 per mile for trucks)
- Increased time spent driving ($22.42 per hour for cars and $29.92 per hour for trucks) due to route diversion to either adjacent Missouri River bridges at US 275 or US 34
- Additional vehicle operation costs ($0.62 per mile for cars and $1.09 per mile for trucks) due to route diversion to either adjacent Missouri River bridges at US 275 or US 34

- Maintenance Costs:
  - Assumed $210,000 annually with 2.5% inflation for the rehabilitated bridge (after conversion to Bike Ped use)
  - Assumed $40,000 annually with 2.5% inflation for a new bridge
  - The BCA did not include insurance, salary or inspection fees

Table 6.1. Benefit Cost Analysis (2040-2060)

Alternative	Estimated Cost of Construction	Total Costs*	Benefits	Net Benefits	Benefit-Cost Ratio
1: Demolition	$8.6M	$10.8M	$0	($10.8M)	0.00
2: Conversion to Rec Trail (Bike Ped)	$6.7M	$7.5M	$2.1M	($5.4M)	0.28
3a: New Bridge, Convert Old to BP	$68.7M**	$73.7M	$223.5M	$150M	3.03
3b: New Bridge, Demolish Old	$70.6M***	$74.7M	$223.5M	$149M	2.99

*Total costs include the estimated cost of construction, demolition or conversion if applicable, maintenance, carbon and time costs, and lost revenue

**Includes estimated $6.7M to convert the existing bridge to a bike/pedestrian facility

***Includes $8.6M demolition cost of old bridge

6.2.1 BCA Summary

Table 6.1 demonstrates the different costs and benefits that could be achieved through the four scenarios that have been advanced through the process. Demolition would net zero benefits and would create a benefit-cost of zero over the twenty-year span. Converting the existing bridge to a bicycle/pedestrian only bridge has a benefit-cost ratio of 0.28 because the societal costs (carbon output, commuting time, lost revenues) of closing the bridge.

Given the bridge proximity to the South Omaha Veterans Memorial Bridge (US 275) 5.8 miles to the north and the US 34 bridge 4.8 miles to the south, the loss or reconstruction of the Bellevue Bridge would have an economic impact on the market area due to diversion of existing traffic. These impacts are demonstrated in Alternatives 3a and 3b as benefits over the 20-year analysis period from 2040 to 2060.

After all alternatives were considered, the construction of a new bridge seems most logical and cost effective. The most beneficial scenario from a monetary analysis would be to construct a new bridge and convert the existing bridge to a bicycle/pedestrian path, which results in a benefit-cost ration of 3.03. This

outweighs a new bridge with demolition of the existing bridge benefit-cost ratio of 2.99 because of the higher added costs of demolition. **Appendix I** includes the Annual Net Benefit of keeping the Bellevue Bridge in terms of value of time, vehicle operation and CO_2 Values. **Appendix I** also includes Benefit Cost Analysis for the four scenarios including economic impacts.

6.2.2 Property Value

In a typical market analysis, property values in the surrounding area would be evaluated to determine the potential gains in local tax revenue. In some case studies, construction of a new bridge increased property values within the vicinity, spurring new development and generating additional revenues. The situation with the Bellevue Bridge is unique, however, and property values cannot reliably be used to determine increased revenues within the market area. The major issue is that property tax revenue is already dedicated to other taxing entities such as the counties or school districts.

6.2.3 Potential Tax Revenue

The floodplain limits development in much of the vacant land on the east side of the Missouri River near the bridge. The floodplain would require 24% of the land on the east side of the river to remain as agriculture. Assuming every parcel not in the floodplain was developed as industrial property, annual property tax gains could be roughly $47M more than current tax income. Again, the $47M in property taxes would not go to the bridge, but to the existing taxing jurisdictions. Additionally, it would be unlikely that all the vacant land is developed as industrial and any resulting development would likely be from proximity to the I-29 interchange, a higher capacity roadway, not by access resulting from upgrades to the Bellevue Bridge.

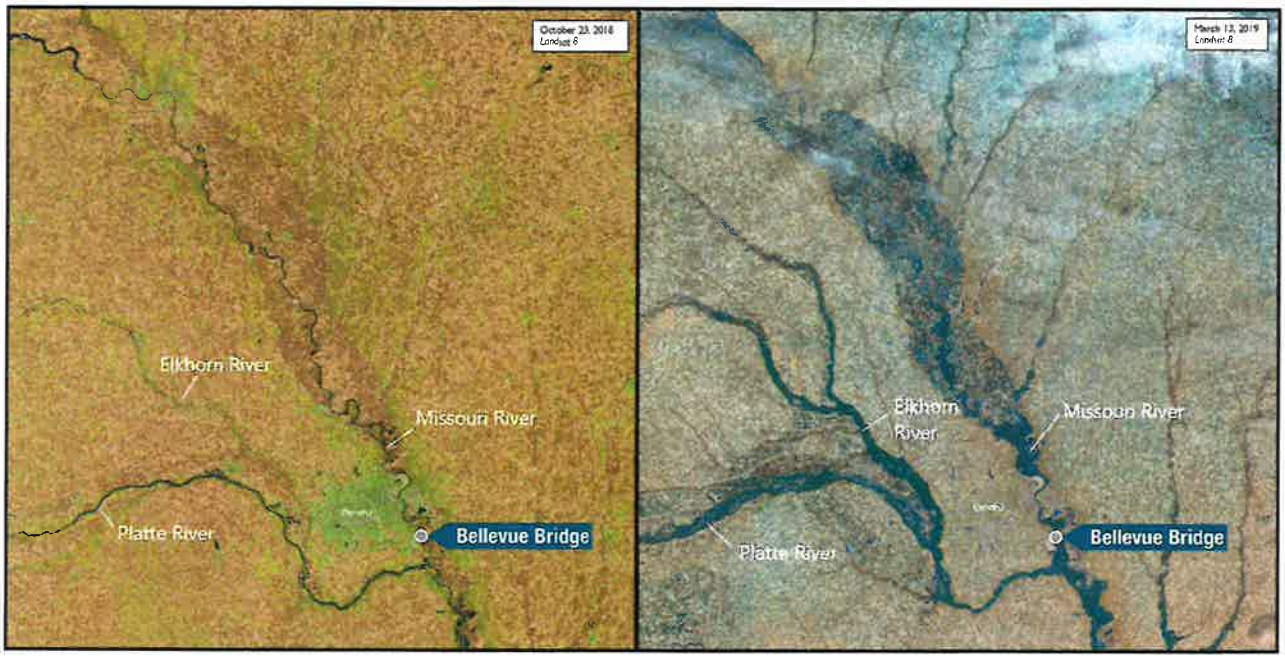
A more likely option to fund the bridge reconstruction would be to adopt a local tax levy, however, as demonstrated it would still fall short of paying for the total cost of the bridge and additional funding would be necessary. For example, if a $2M levy were enacted over a 20 year period, it would require $1.5 billion in property valuation from the market area to cover the estimated $62M cost of the new bridge. This would be equivalent to approximately 54 operations like the existing Bunge site (currently valued at $28,917,768). Therefore, a higher levy or a longer payment period would be needed.

Like property taxes, increases in sales tax revenue would be minimal with the construction of a new bridge or conversion to a bicycle/pedestrian bridge. The low number of auto trips across the bridge currently do not result in a great amount of local spending in Bellevue. If a bicycle/pedestrian bridge were created and a large campaign was undertaken to make it an attractive visitor destination like the High Trestle Bridge, it is possible that a few businesses catering to trail users could result. Additionally, a few new jobs would be created from new business ventures. These increased revenues would take well over 100 years to pay back the construction costs of all three scenarios which involve maintaining bridge access.

7. 2019 FLOODING EVENTS

Starting in mid-March 2019, Nebraska and Iowa experienced major flooding along the Missouri River and its tributaries. These historic flooding events led to the closure of multiple Missouri River bridges, including the US 34 Bridge and Plattsmouth Toll Bridge within the project study area. During the flooding, and months following, the Bellevue Bridge served as a critical alternative route. Throughout this time period, the Bellevue Bridge was the southern-most route available to cross the Missouri River in Nebraska. The five Missouri River bridges south of Bellevue at some point during 2019 all experienced long-term closures. **Figure 7.1** illustrates before and after satellite imagery of the flood impacts in the study area.

Figure 7.1. Nebraska-Iowa Flooding Spring 2019



7.1 Bridge & Roadway Closures

Figure 7.2 depicts the road network and closures during the flooding and afterword within the larger four-state region of Nebraska, Iowa, Missouri, and Kansas. Both the US 34 Bridge and Plattsmouth Toll Bridge closed in mid-March 2019. The US 34 Bridge opened back up in late-May 2019 and the Plattsmouth Toll Bridge reopened in late-June 2019. The bridges at Nebraska City, Brownville, and Rulo remain closed as of July 2019 and the US 34 Bridge is reduced to one lane. The Bellevue Bridge was closed for only three full days, March 16 – March 18, and a half day on March 19, 2019.

I-29 in Iowa and Missouri has had intermittent closures between I-680 and St. Joseph, MO since March 2019. I-29 from US 34 to St. Joseph, MO was closed to traffic from March to May, and again in June. Exit and entrance ramps along this stretch remain closed as of July 2019. To the north, I-29 was closed during the same two time periods between I-680 near Crescent and I-680 at Loveland. The specific dates of closures are shown in **Table 7.1**. Additionally, **Figure 7.2** maps out the bridge and roadway closures at the height of the two flood events, March 25 and May 30, 2019.

Table 7.1. Missouri River Bridge/Roadway Closures, 2019 Flooding

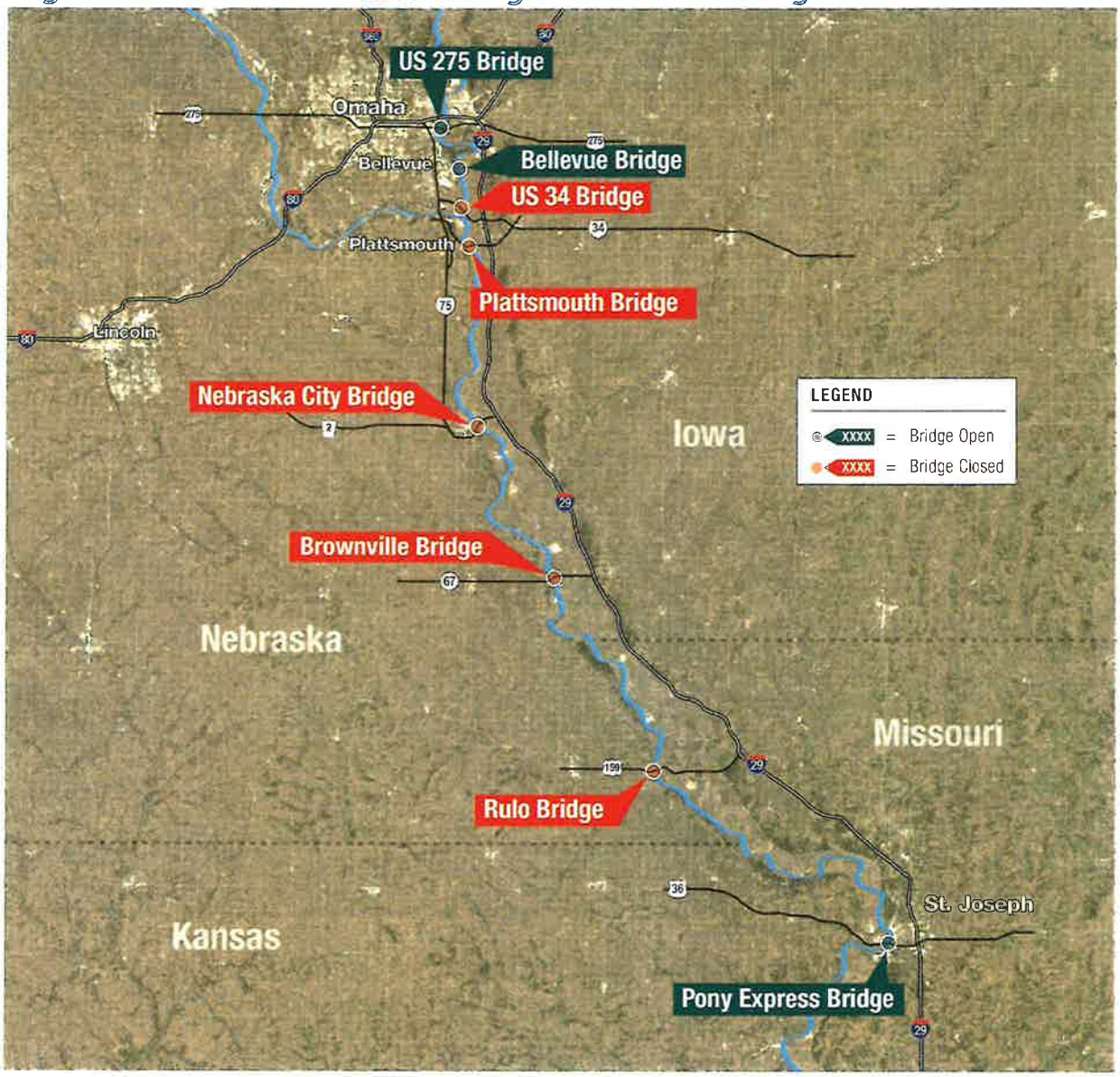
	Bridge/Roadway	First Closure	Reopened	Second Closure	Reopened	Comments
BRIDGES	I-80 Bridge	Remained Open				
	US 275 Bridge	Remained Open				
	Bellevue Bridge	**16-Mar-19**	**19-Mar-19**	-	-	
	US 34 Bridge	16-Mar-19	24-May-19	28-May-19	28-Jun-19	Single-lane Open
	Plattsmouth Toll Bridge	16-Mar-19	16-Apr-19	30-May-19	19-Jun-19	
	Nebraska City Bridge	15-Mar-19	10-May-19	28-May-19	-	Remains Closed
	Brownville Bridge	27-Mar-19	-	-	-	Remains Closed
	Rulo Bridge	17-Mar-19	-	-	-	Remains Closed
ROADWAYS	I-29 (I-680W to I-680E)	-	-	29-May-19	17-Jun-19	
	I-29 (CB to I-680W)	14-Mar-19	23-Mar-19	28-May-19	12-Jun-19	
	I-29 (US 34 to CB)	15-Mar-19	23-Mar-19	-	-	
	I-29 (MO to US 34)	15-Mar-19	9-May-19	28-May-19	18-Jun-19	Multiple Ramps Remain Closed
	I-680 (Omaha to I-29)	13-Mar-19	2-Apr-19	28-May-19	12-Jun-19	
	I-80 Bridge	16-Mar-19	19-Mar-19			
	US 275 Bridge	16-Mar-19	24-May-19	28-May-19	28-Jun-19	

*CB: Council Bluffs, MO: St. Joseph, MO

**Dates were collected from news reports and state DOT websites

***Table is current as of the writing of this report (July 2019)

Figure 7.2. Missouri River Bridge Closures during 2019 Flood Events



7.2 Effect of Closures on Traffic Volumes

During the two-month period following the initial flood event, March 20 – May 15, 2019, the Bellevue Bridge saw traffic volumes increase by 2.7 times the pre-flood rate and toll revenue increased by 2.9 times. **Figure 7.3** depicts the 2019 volume and sale numbers immediately before and after the flooding occurred. After the US 34 Bridge opened in 2014, the Bellevue Bridge saw its total traffic volumes decrease by roughly 50% from 4,000 ADT in 2010 to 2,122 ADT in 2018. By comparison, during the 2019 flood traffic volumes were approximately three times 2018 levels, at 6,000 ADT. **Table 7.2** shows the Average Daily Traffic for 2010, 2018, and April through July 2019.

Figure 7.3. Bellevue Bridge Traffic Volume & Toll Revenue, Spring 2019

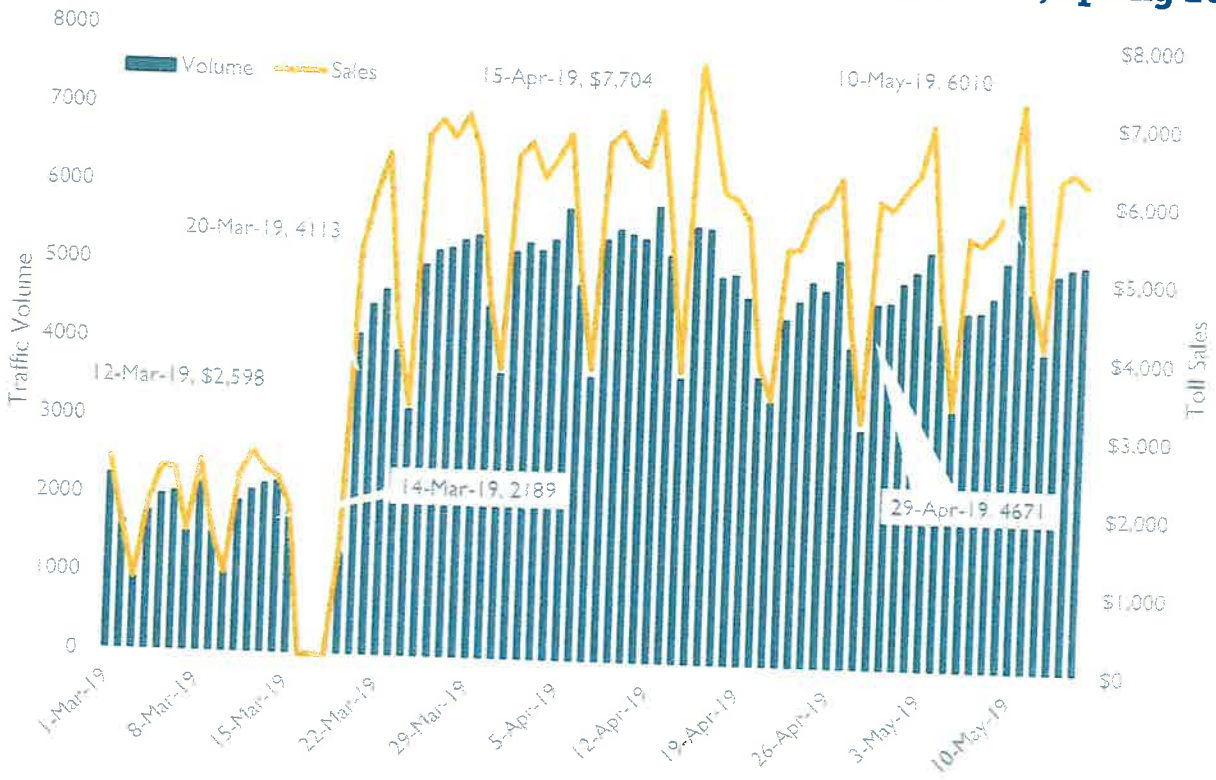


Table 7.2. Bellevue Bridge Average Daily Traffic (ADT)

	2010 (Pre US 34 Bridge)	2018 (Post US 34 Bridge)	2019			
			April	May	June	July
Average Daily Traffic (ADT)	4,000	2,122	4,849	4,574	5,181	2,173

*Traffic volumes provided by the Bellevue Bridge Commission

**ADT for the month of July is the average through the writing of this report (July 22, 2019)

The closures during the 2019 Flooding forced large volumes of traffic from I-29 onto both state highways and local roadways. Much of this traffic detoured to US 75, just 3 miles west of the Bellevue Bridge. The combination of Missouri River bridge closures and I-29 being closed led to large volume increases at the Bellevue Bridge. **Figures 7.4** and **7.5** show the traffic that was backed up to cross the Bellevue Bridge eastbound on April 29th, 2019.

Figure 7.4 Traffic Queue at Bellevue Bridge, Looking East (4/29/19)

Figure 7.5 Traffic Queue at Bellevue Bridge, Looking West (4/29/19)

A capacity analysis was presented in **Chapter 5** that showed the adjacent US 275 and US 34 bridges would be able to accommodate the diverted traffic if the Bellevue Bridge were closed. As seen in **Table 7.3**, a reverse analysis was done to examine if the Bellevue Bridge could accommodate traffic from the two other bridges in circumstances such as the 2019 Flooding Events. For the purposes of this analysis, a 10% diversion from US 275 and a 40% diversion from US 34 were assumed. Level of service results were used for comparison purposes and to verify performance of the Bellevue Bridge under each scenario.

Noted at the bottom of **Table 7.3**, the service rate of the toll booth might be limiting capacity of the bridge to less than half of the MAPA LOS E threshold. The 2019 Flood Event caused traffic to consistently back up, at times over a mile, in order to cross the bridge. The average daily traffic for mid-March to May 2019 was 4,789 vehicles and the highest daily traffic peak day in May 2019 was 6,010 vehicles. Based on a service rate of 30 seconds per vehicle, the capacity threshold would be 5,760 vehicles per day; this was verified in the field as a probable capacity based on observed queues.

From mid-March through June 2019, the Bellevue Bridge served as a critical access for interstate commerce between Nebraska and Iowa. Five Missouri River bridges were closed during this period, and some are still closed at the writing of this report, south of Bellevue. The Bellevue Bridge became the southern-most bridge that spanned the Missouri River in Nebraska that was open to traffic. During the previous major flooding event that occurred in 2011, the US 34 Bridge was not yet constructed. The 2019 flooding identified the need for a secondary Missouri River crossing in the Bellevue area due to the potential for US 34 Bridge closure. Keeping the Bellevue Bridge in working condition and/or construction of a new structure in this location would ensure that daily traffic, freight, and emergency vehicles have a secondary access point in the case of an emergency such as the flooding that occurred.

Table 7.3 Roadway Capacity Analysis of Bellevue Bridge during US 275 & US 34 Bridge Closures

Bellevue Bridge Study										
Location	Scenario	Facility Type / Diversion	Speed Limit	ADT 2018	V/C Ratio	LOS 2018	ADT 2040	V/C Ratio	LOS 2040	MAPA LOS E Threshold (upper limit)*
E. Mission Ave / Bellevue Bridge	Existing	2 - Lane Urban Bridge	35 MPH	2,122	0.16	A	5,000	0.37	B	13,400
	Scenario 1	10% of US 275, 0% of US 34	35 MPH	3,082	0.23	A	6,430	0.48	B	13,400
	Scenario 2	0% of US 275, 40% of US 34	35 MPH	5,202	0.39	B	9,560	0.71	D	13,400
	Scenario 3	10% of US 275, 40% of US 34	35 MPH	6,162	0.46	B	10,990	0.82	D	13,400
Highway 275 River Crossing	Existing	4 - Lane Urban Bridge	45 MPH	9,600	0.32	B	14,300	0.48	B	30,000
	Scenario 1	Open	45 MPH	9,600	0.32	B	14,300	0.48	B	30,000
	Scenario 2	Bridge Closed	45 MPH	-	0.00	A	-	0.00	A	-
	Scenario 3	Bridge Closed	45 MPH	-	0.00	A	-	0.00	A	-
Highway 34 River Crossing	Existing	4 - Lane Urban Bridge	65 MPH	7,700	0.26	B	11,400	0.38	B	30,000
	Scenario 1	Bridge Closed	65 MPH	-	0.00	A	-	0.00	A	-
	Scenario 2	Open	65 MPH	7,700	0.26	B	11,400	0.38	B	30,000
	Scenario 3	Bridge Closed	65 MPH	-	0.00	A	-	0.00	A	-

*The capacity of the bridge may be limited due to the toll booth operation itself; it was assumed the toll booth processes vehicles at a rate of 30 seconds per vehicle. This results in a threshold capacity of 5,760 vehicles per day, less than half of the assumed MAPA threshold of 13,400.

8. FUNDING OPTIONS

A path forward for the Bellevue Bridge needs to be chosen, with options ranging from demolition, new bridge construction, and conversion to a recreational trail facility. As part of the alternatives study, potential funding options were explored for each scenario. Construction of a new Bellevue Bridge, in particular, is a large project and state and local sources would be insufficient to fund the replacement of the bridge. The following is a list of potential funding sources that could be applicable to fund the construction of a new bridge; however, some will be more difficult to obtain.

Federal Grants (highly competitive national process):

- USDOT Infrastructure Grants:
  - $1.5 billion in grants available
  - Requires a 20% local match
  - Requires environmental documentation through the National Environmental Policy Act (NEPA)
  - Need to show performance and accountability program objective, project readiness, and benefit-cost analysis
  - Need to show purpose and need (such as significant traffic need or significant economic need)
- FHWA's Highway Bridge Program Grant
  - $224M for highway bridge replacement and rehabilitation projects
  - Requires a 20% local match
  - Requires environmental documentation through the National Environmental Policy Act (NEPA)
  - Must demonstrate cost savings through bundling 2 or more similar bridge projects
  - Only State DOT's can apply

State Programs: the three programs below were explored; however, it was determined the funding was too small to substantially fund the project.

- County Bridge Match Program
- Recreational Trails Program
- Transportation Alternative Program

Local Funding Options:

- Increasing the bridge toll by the appropriate amount to match funding goals. For instance, raising the toll by $1/vehicle would raise $22M over 20 years.
- Tax levy
- Fundraising through trail user groups or the Papio Missouri River Natural Resources District (this would require completing a trail facility)

Other Options:

- Public-Private Partnerships (PPP) where a private entity would fund, construct, and operate a bridge. This would likely involve tolling as a revenue source.

9. IMPLEMENTATION PLAN

The purpose of this study is to consider the alternatives available for the future of the Bellevue Bridge based on research, data, and analysis. Three alternatives (1. Demolition, 2. Conversion to a Recreational Trail, and 3. New Bridge Construction) were advanced for further consideration. After all alternatives were considered, the construction of a new bridge seems most logical and cost effective based upon the benefit-cost analysis.

At the direction of the steering committee at the conclusion of Workshop #2, the New Bridge Construction Alternative was broken into two sub-alternatives. Alternative 3a is New Bridge Construction and existing bridge Conversion to a Recreational Trail. Alternative 3b is New Bridge Construction and existing bridge Demolition. An implementation plan has been developed for each of the final alternatives as described below.

9.1 Preservation & Maintenance of Existing Facility

The Preservation & Maintenance of Existing Facility alternative for the Bellevue Bridge is a prerequisite to all alternatives and would have the Bridge Commission continue to operate the bridge with bi-annual inspections for the next 10 years (2020-2030). At the end of the initial 10-year period a decision and path forward for the bridge would need to be made. Ideally a path forward is chosen as soon as possible, so that strategic steps can be taken to ensure the success of the chosen alternative.

9.2 Alternative 1. Bridge Closure (Demolition)

With the Bridge Closure (Demolition) alternative, the Bridge Commission should continue to operate the bridge with bi-annual inspection for the next 10 years (2020-2030) and establish a dollar amount for demolition ($8.6M in **Table 6.1**). Dedicate portion of bridge proceeds to a demolition fund until $8.6M is raised before 2040. When projected maintenance of bridge exceeds demolition fund (after 2030), begin process of bridge decommissioning. Solicit bids for demolition, notify various state agencies. Identify schedule and demolish bridge by 2040. An implementation plan is provided below:

- Step 1: by Year 2020
    - Establish a savings plan from toll sales, that will take place for the next 20 years, to put aside into a fund for demolition ($8.6M). Regularly evaluate the plan to ensure goals are being met.
        - Assuming demolition is completed with 100% local funds, an average of $430,000 should be set aside every year from 2020 to 2040.
        - Current toll revenues are approximately $740,000 and current bridge expenditures are approximately $570,000, leaving approximately $170,000 to set aside per year.
        - The difference of $260,000 could be accomplished by increasing tolls. A 25 cent increase in tolls should bring in around $270,000 additional dollars per year if assuming an average of 3,000 ADT over the next 20 years which is a conservative approach when the projected ADT is 5,000 by 2040.

        - Bonding against future toll revenues is also another option to raise additional funds.
    - Decide if the New Bridge Construction alternative will be pursued, in addition to demolition of the existing bridge. If so, proceed to the plan highlighted within Section 9.3 - New Bridge Construction.
- Step 2: by Year 2030
    - Continue bi-annual inspections of the bridge
    - Evaluate status of savings plan to ensure that target goal of $8.6M for demolition is met.
    - If projected maintenance costs for the existing bridge exceed the amount being put aside for demolition, begin process of bridge decommissioning. This should be evaluated on a continuous basis from 2030 henceforth.
- Step 3: by Year 2034
    - Assess status of demolition fund, maintenance costs, and ensure that target goal is being met.
- Step 4: by Year 2038
    - If not already started, begin planning the demolition of the bridge.
    - Notify various state agencies, solicit bids for demolition, and establish schedule.
- Step 5: by Year 2040
    - Demolish bridge

This alternative can be completed independently or in tandem with the New Bridge Construction alternative. The combination of the two alternatives is discussed in Section 9.4 - New Bridge Construction.

9.3 Alternative 2. Bridge Conversion to a Recreational Trail Facility

With the Bridge Conversion to a Recreational Trail Facility alternative, the Bridge Commission would continue to operate the bridge with bi-annual inspections for the next 10 years (2020-2030). Establish a dollar amount for conversion to a recreational trail facility ($6.7M in **Table 6.1**). Dedicate a portion of bridge proceeds to a fund for conversion until $6.7M is raised by 2040. Develop a plan and solicit bids for conversion to a recreational trail facility, working with various state agencies and regional partners. Identify schedule to convert bridge to a recreational trail facility bridge by 2040. An implementation plan is provided below:

- Step 1: by Year 2020
    - Establish a savings plan from toll sales, that will take place for the next 20 years, to put aside for conversion to a recreational trail facility. Regularly evaluate the plan to ensure goals to raise $6.7M are met. Assuming 100% local funds would used, at least $335,000 should be set aside every year from 2020 to 2040.
        - Current toll revenues are approximately $740,000 and current bridge expenditures are approximately $570,000, leaving approximately $170,000 to set aside per year.

- The difference of $165,000 could be accomplished by increasing tolls. A 25 cent increase in tolls should bring in around $270,000 additional dollars per year if assuming an average of 3,000 ADT over the next 20 years which is a conservative approach when the projected ADT is 5,000 by 2040.
- Bonding against future toll revenues is also another option to raise additional funds.

  - A dedicated campaign should be undertaken to make the proposed recreational bridge a regional destination; some qualitative benefits and a minimal amount of quantitative benefits could result.
  - Decide if the New Bridge Construction alternative will be pursued, in addition to conversion to a recreational trail facility of the existing bridge. If so, proceed to the plan highlighted within Section 9.4 - New Bridge Construction.

- Step 2: by Year 2030
  - Continue bi-annual inspections of the bridge, having started in 2020.
  - Evaluate status of savings plan to ensure that target goal of $6.7M for conversion to a recreational trail facility is being met.
  - Continue maintenance of the existing bridge. Plans for conversion to a recreational trail facility should be evaluated on a continuous basis from 2030 henceforth.
- Step 3: by Year 2034
  - Assess status of conversion to a recreational trail facility savings plan, maintenance costs, and ensure that target goal is being met.
- Step 4: by Year 2038
  - If not already started, begin planning the conversion to a recreational trail facility of the bridge.
  - Notify various state agencies, solicit bids for conversion to a recreational trail facility, and establish schedule.
- Step 5: by Year 2040
  - Convert bridge to a recreational trail facility

This Conversion to Recreational Trail Facility alternative is graphically depicted in **Figure 9.1** and can be completed independently or in tandem with the New Bridge Construction alternative. The combination of the two alternatives is discussed in Section 9.4 - New Bridge Construction.

Figure 9.1 Bridge Conversion to a Recreational Trail Facility Rendering

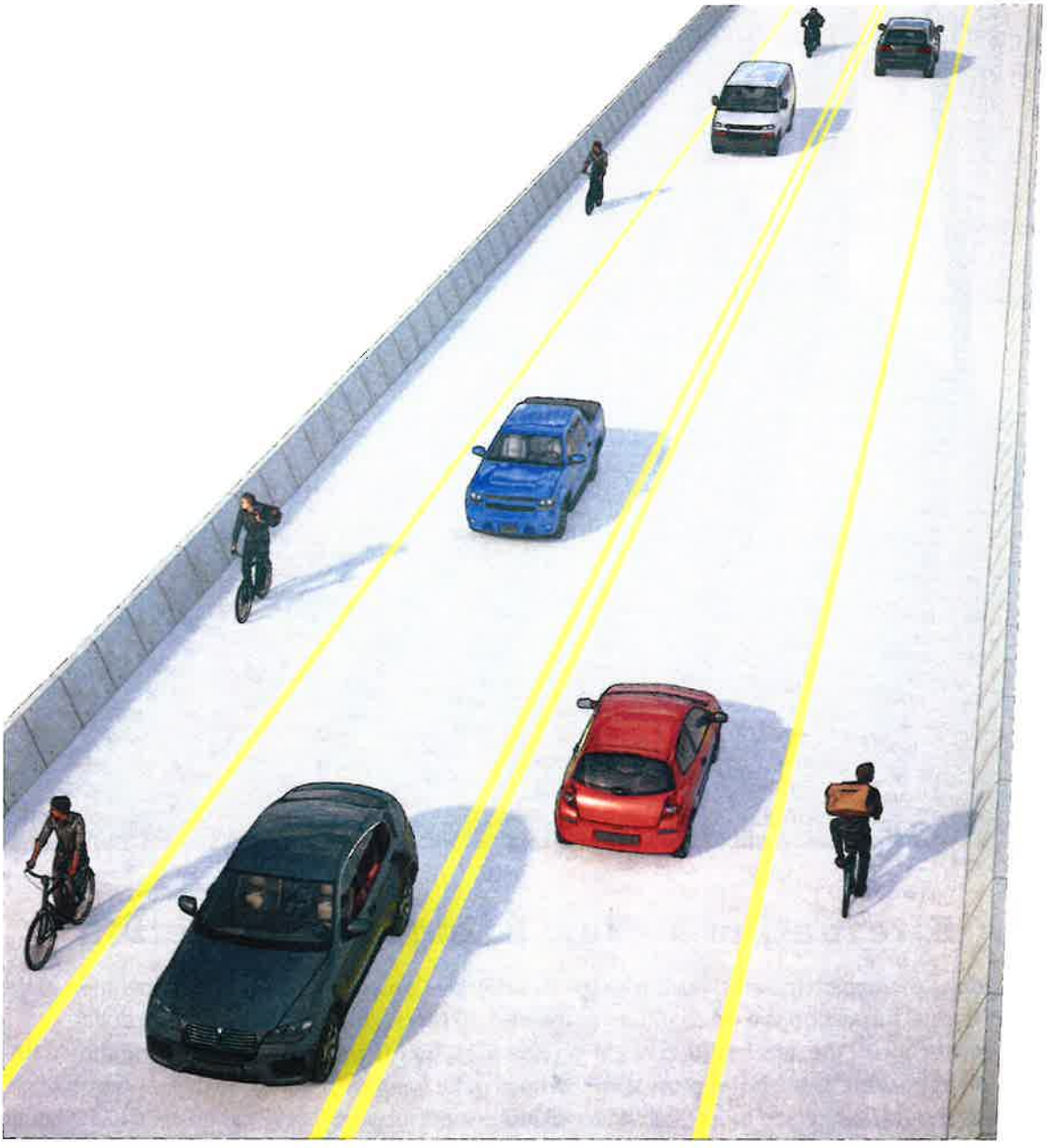
9.4 Alternative 3. New Bridge Construction

Should the Bridge Commission move forward with the New Bridge Construction alternative, operation of the bridge with bi-annual inspection should continue for the next 10 years (2020-2030). Establish a dollar amount for construction of the new bridge ($62.1M in **Table 6.1**). Grants and/or Federal Funding should be pursued as soon as possible as the NEPA process would need to be followed. Alongside this, a portion of bridge proceeds should be directed to a matching fund until a substantial portion is raised at 2040. Federally

funded projects typically require at least a 10-20% local match. Solicit bids for construction, notify various state agencies. Identify schedule and construct bridge by 2040.

The New Bridge Construction alternative would need to be completed in tandem with either the Bridge Conversion to a Recreational Trail Facility alternative (3a) or the Bridge Closure (Demolition) alternative (3b). The construction of a new bridge can be completed, and a plan for the current structure would have to be pursued. The New Bridge Construction alternative is graphically depicted in **Figure 9.2**.

Figure 9.2 New Bridge Construction Rendering



9.4.1 Alternative 3a. Bridge Conversion to a Recreational Trail Facility & New Bridge Construction Implementation Plan

The combination of a new bridge constructed, and the current bridge being converted to a recreational trail facility is estimated to cost $68.8M (**Table 6.1**). An implementation plan is provided below:

- Step 1: by Year 2020
  - Establish a financial plan from a combination, or individually, of toll sales, grants, and federal funds.
  - Pursuit of grants and federal funds should be undertaken as soon as possible; outside assistance from MAPA and other governmental entities may be needed in order to obtain funding.
  - Many federal programs require matching funds. A savings plan from toll sales, that will take place for the next 20 years, can be put aside for this purpose. Assuming a 20% local match, $13.8M would be needed by 2040. This would require at least $690,000 to be set aside every year from 2020 to 2040.
    - Current toll revenues are approximately $740,000 and current bridge expenditures are approximately $570,000, leaving approximately $170,000 to set aside per year.
    - The difference of $520,000 could be accomplished by increasing tolls. A 50 cent increase in tolls should bring in around $550,000 additional dollars a year if assuming an average of 3,000 ADT over the next 20 years which is a conservative approach when the projected ADT is 5,000 by 2040.
    - Bonding against future toll revenues is also another option to raise additional funds.
  - Regularly evaluate the above action times to ensure goals are being met. If the need arises, maneuvering to a different alternative can be done.
  - A dedicated campaign should be undertaken to make the proposed recreational bridge a regional destination; some qualitative benefits and a minimal amount of quantitative benefits could result.
- Step 2: by Year 2030
  - Continue bi-annual inspections of the bridge, having started in 2020.
  - Evaluate status of funding plan to ensure that target goal of $68.8M for bridge conversion to a recreational trail facility and new bridge construction is met. Assuming federal funds are obtained, a 20% local match should be raised by 2040, or approximately $13.8M.
  - Continue maintenance of the existing bridge. Plans for conversion to a recreational trail facility should be evaluated on a continuous basis from 2030 henceforth.
- Step 3: by Year 2034

- Assess status of bridge conversion to a recreational trail facility and new bridge construction funding plan, maintenance costs, and ensure that target goal is met.

- Step 4: by Year 2038
  - Finalize planning the bridge conversion to a recreational trail facility and construction of a new bridge.
  - Notify various state agencies, solicit bids for bridge conversion to a recreational trail facility and new bridge construction, and establish schedule.
- Step 5: by Year 2040
  - Convert existing bridge to a recreational trail facility once construction of new bridge is completed.

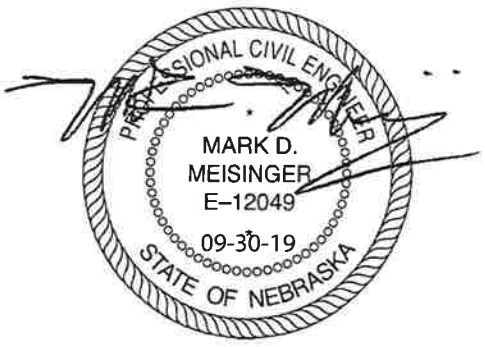
9.4.2 Alternative 3b. Bridge Closure (Demolition) & New Bridge Construction Implementation Plan

To build a new bridge and demolish the old structure is estimated to cost $70.6M (**Table 6.1**). An implementation plan is provided below:

- Step 1: by Year 2020
  - Establish a financial plan from a combination, or individually, of toll sales, grants, and federal funds.
  - Pursuit of grants and federal funds should be undertaken as soon as possible; outside assistance from MAPA and other governmental entities may be needed in order to obtain funding.
  - Many federal programs require matching funds. A savings plan from toll sales, that will take place for the next 20 years, can be put aside for this purpose. Assuming a 20% local match, $14.1M would be needed by 2040. This would require at least $706,000 to be set aside every year from 2020 to 2040.
    - Current toll revenues are approximately $740,000 and current bridge expenditures are approximately $570,000, leaving approximately $170,000 to set aside per year.
    - The difference of $536,000 could be accomplished by increasing tolls. A 50 cent increase in tolls should bring in around $550,000 additional dollars per year if assuming an average of 3,000 ADT over the next 20 years which is a conservative approach when the projected ADT is 5,000 by 2040.
    - Bonding against future toll revenues is also another option to raise additional funds.
  - Regularly evaluate the above action times to ensure goals are being met. If the need arises, maneuvering to a different alternative can be done.
- Step 2: by Year 2030
  - Continue bi-annual inspections of the bridge.

- Evaluate status of funding plan to ensure that target goal of $70.6M for demolition and new bridge construction is met. Assuming federal funds are obtained, a 20% local match should be raised by 2040, or approximately $14.1M.
- If projected maintenance of the existing bridge is exceeding the amount being put aside for demolition and new bridge construction, begin process of bridge decommissioning. This should be evaluated on a continuous basis from 2030 henceforth.

- Step 3: by Year 2034
  - Assess status of demolition and new bridge construction funding plan, maintenance costs, and ensure that target goal is being met.
- Step 4: by Year 2038
  - If not already started, begin planning the demolition of the existing bridge and construction of a new bridge.
  - Notify various state agencies, solicit bids for demolition of the existing bridge and new bridge construction, and establish schedule.
- Step 5: by Year 2040
  - Demolish existing bridge once construction of new bridge is completed.



APPENDICES

APPENDIX A. METHODS AND ASSUMPTIONS DOCUMENT

APPENDIX B. STAKEHOLDER CONTACTS AND PROJECT MEETING MINUTES

- Stakeholder Contacts
- Kickoff Meeting Minutes
- Stakeholder Workshop #1 Meeting Minutes
- Stakeholder Workshop #1 Presentation
- Steering Committee Meeting #1 Meeting Minutes
- Stakeholder Workshop #2 Meeting Minutes
- Stakeholder Workshop #2 Presentation
- Steering Committee Meeting #2 Meeting Minutes

APPENDIX C. FOCUS GROUP INTERVIEWS AND PUBLIC OPEN HOUSE COMMENTS

APPENDIX D. HISTORIC BRIDGE COMMISSION DOCUMENTS

- Resolution to Creating the Bellevue Bridge Commission
- Bellevue Bridge Toll Revenues
- Bellevue Bridge Annual Vehicle Counts
- Regional Historic ADT Traffic Volumes
- Creative Marketing Project for Bellevue Grand Army of the Republic Bridge (Bellevue West DECA, 2008)
- Bellevue Bridge Coating Condition Assessment (KTA, 2016)
- Conceptual Design for Future Bellevue Bridge (TranSystems, 2007)
- Future Bellevue Bridge Cost Estimate (HNTB, 2010)

APPENDIX E. STRUCTURAL DOCUMENTS

- Bellevue Bridge Plan and Elevation
- Bellevue Bridge Inspection Report (InfraStructure, LLC 2017)
- Bellevue Bridge Underwater Inspection Report (Ayres Associates, 2017)
- Bellevue Bridge Load Rating Summary

APPENDIX F. TRAFFIC DATA COLLECTION

- 24-hour turning movement counts
  - E. Mission Avenue with S. 15th Street/Payne Drive just west of the Bellevue Bridge
  - Mills County Highway H10/Bunge Avenue with the I-29 Frontage Road
- 4-hour peak period turning movement counts:
  - E. Mission Avenue with Franklin Street (Harvell Drive connection)
  - E. Mission Avenue with Hancock Street (Harlan Lewis Road connection)
  - Harlan Lewis Road with US 34
  - County Highway H10/Bunge Avenue with I-29 Southbound Ramps
  - County Highway H10/Bunge Avenue with I-29 Northbound Ramps
- 2018 Existing and 2040 Future Average Daily Traffic (NCHRP Modeling Adjustment)

APPENDIX G. TRAFFIC OPERATIONS DOCUMENTS

- Bellevue Bridge Roadway Capacities Analysis
- Bellevue Bridge Travelsheds
- US 34 Bridge Travelsheds
- Time Cost of Closure of the Bellevue Bridge

APPENDIX H. ENVIRONMENTAL REVIEW DOCUMENTS

- List of Potential Permits Required for Bridge Construction / Modification
- Initial Environmental Review
- NGPC and USFWS – Draft Environmental Review Report
- Iowa DNR Environmental Review Coordination Emails
- LWCF 6(f) Boundary Map
- Historic Evaluation Coordination Letters
- Wetland Delineation Report
- Wellhead Protection Areas Map
- Hazardous Materials Memorandum
- FEMA Flood Insurance Rate Maps
- Environmental Justice - EJSCREEN Summary Report

APPENDIX I. BENEFIT-COST ANALYSIS DOCUMENTS

- Bellevue Bridge Alternative Construction Costs
- Annual Net Benefit of Bellevue Bridge
- Benefit-Cost Analysis Spreadsheets

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11422 Miracle Hills Dr, Ste 115
Omaha, NE 68154
402.445.4405