

# INTERSTATE 80 PLANNING STUDY (PEL)



Toll Financing Study

Office of Location and Environment | December 2017

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## **1. EXECUTIVE SUMMARY**

### **Improving I-80 Across Iowa**

The Iowa Department of Transportation (DOT) is conducting a planning study of the rural portions of Interstate 80 across Iowa to best address safety and mobility needs of all freight and passenger travelers (i.e., Planning Study). This study is being conducted using the federally adopted Planning and Environmental Linkages (PEL) Study process. The Planning Study will allow near-term improvements to be planned, designed, and as funding is available, constructed in accordance with the long-term plan.

### **Paying for the Rural I-80 Improvements**

Current federal and state highway funds are limited and insufficient to meet all of the state's highway needs. As a result, the Iowa DOT must continually balance the competing needs of the state's highway system to prioritize the use of available funding. With a projected construction cost of nearly four billion dollars, improving rural I-80 will be a significant investment. Based on anticipated funding, the overall needs of the state, and utilizing funding as it becomes available, it will take approximately three quarters of Iowa DOT's Interstate budget and nearly 20 years to fully implement the I-80 improvements. Consequently, other funding opportunities, such as tolling, are being explored to pay for the I-80 improvements.

### **Planning-Level Toll Financing Study**

Utilizing tolling for major transportation projects is not a new concept. Today, in other regions of the country, tolling is a common means of funding and financing highway improvements that could not otherwise be constructed with traditional funding. It is commonly purported that tolls have paid for roughly half of all new highway lanes constructed in the nation over the last two decades. However, as tolling would be new for the State of Iowa, enacting tolling would be a significant change in transportation public policy. Therefore, possibly enacting tolls along rural I-80 requires careful and systematic consideration.

The first step in evaluating tolling as a possible funding solution for rural I-80 is to determine what potential funding it could offer. To answer this initial question, the Iowa DOT is conducting this planning-level toll financing study. This study, in short, will determine the ability of the project to pay for itself. Utilizing projections of gross toll revenues generated by the project, minus the costs of financing and operating and maintaining I-80, the analyses will determine the toll revenue bond financing capacity, as compared to the construction costs of the improvements.

This study supports the larger I-80 Planning Study by helping the state's decision makers select the best overall improvement strategy and implementation plan. As a planning-level study, the results of this analysis are conceptual, requiring additional and more detailed analysis if tolling was to move forward.

## The Benefits and Impacts of Tolling

If enacted, tolling would be a significant change in how Iowa has historically constructed and maintained its Interstate highways. Tolling would provide a new revenue source, but would introduce a new type of user fee for I-80 travelers. This would impact the state differently than a pay-as-you-go approach with existing funding. A comprehensive and balanced assessment of the benefits and impacts (*Table 1*) would be necessary by policymakers if tolling was to advance further.

*Table 1: SUMMARY OF THE BENEFITS AND IMPACTS OF TOLLING*

| Advantages of Tolling   | Disadvantages of Tolling   |
|---|--|
| <ul style="list-style-type: none"> <li>• <b>Dedicated Revenue</b> – Provides a new revenue source dedicated 100% to the project for financing of upfront construction.</li> <li>• <b>Sustained Operations and Maintenance</b> – Provides a new long-term revenue source for sustained operations and maintenance.</li> <li>• <b>Accelerated Construction</b> – Improvements would be completed sooner, offsetting inflationary escalations of costs.</li> <li>• <b>Equity of Payment and Use</b> – Only users of the project, regardless of in-state or out-of-state residency, pay for the project.</li> <li>• <b>Service Reliability</b> – As traffic increases, provides a funding source to pay for additional projects and infrastructure rehabilitation.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Debt Financing</b> – Interest costs would be incurred for financing.</li> <li>• <b>Traffic Diversion</b> – Some traffic would divert to other highways to avoid paying a toll, potentially affecting the overall highway system.</li> <li>• <b>Public/Stakeholder Acceptance</b> – Some travelers may not be supportive of paying tolls for an improved I-80, in addition to current fuel taxes.</li> <li>• <b>Authorization</b> – Authority to enact tolls would require federal approvals and new state enabling legislation.</li> <li>• <b>Administration Costs</b> – Collecting tolls is not as cost efficient as fuel taxes.</li> </ul> |

## Funding the I-80 Improvements: Financial Feasibility of Tolling

Utilizing tolls to fund and finance the I-80 improvements is a financially feasible option. Within the range of confidence of this conceptual study, projected toll revenues would likely be sufficient to finance the 6-lane widening and modernization of rural I-80 across Iowa, if all lanes were tolled. Using typical rural Interstate toll rates and public financing terms, toll revenues could likely pay for and finance the I-80 improvements, as well as fund its continued operations and maintenance into the future. No additional public funding would likely be required. However, due to lower toll revenue projections and higher construction costs, a truck-only toll lane improvement concept, with only trucks being tolled, would not be financially feasible. If tolling advances into more detailed studies, full (100%) financial feasibility would be determined through further program refinements.

**Table 2** provides a summary of the toll financing analysis for a 6-lane, all lanes tolled improvement concept.

**Table 2: SUMMARY OF RURAL I-80 TOLL FINANCIAL FEASIBILITY**

| Item                     | Description   |
|--------------------------|---|
| Toll Project Description | Widen and reconstruct rural I-80 across Iowa (248 miles) with a modern and future adaptable 6-lane roadway section with all lanes being tolled  |
| Construction Schedule    | 5-year construction period from 2022 to 2026  |
| Program Costs            | <ul style="list-style-type: none"> <li>• \$3,618M – Total Design and Construction Cost (Expenditure Year)</li> <li>• \$3,861M – Total Program Cost (Expenditure Year)</li> <li>• Annual operations and maintenance costs to be paid from toll revenue</li> </ul>  |
| Toll Pricing and Revenue | <ul style="list-style-type: none"> <li>• Open toll system configuration with 11 I-80 tolling stations across Iowa</li> <li>• Opening toll rate: \$0.08/mile for autos and \$0.24/mile for trucks</li> <li>• Annual 2% increases in toll rates to account for inflation</li> </ul>                                 |
| Financing Terms          | <ul style="list-style-type: none"> <li>• Sources of Financing: Toll revenue bonds and US DOT TIFIA loan</li> <li>• Repayment Sources: Net toll revenues with no State of Iowa funding</li> <li>• Debt-Service Coverage: Set at level intended to obtain 'A' rating</li> <li>• Final Maturity: 35 years</li> </ul> |
| Financial Feasibility    | <ul style="list-style-type: none"> <li>• 76% to 93% of total program cost could be paid by toll financing</li> <li>• Full (100%) financial feasibility would be determined through refinements in toll program costs, toll pricing, revenue and/or financing terms</li> </ul>                                     |

### Tolling Authorization

The State of Iowa does not currently have authority to enact tolls on I-80. As an Interstate, authorization would need to be granted by the FHWA through an existing Interstate reconstruction pilot program. In addition, new enabling state legislation would be required. This legislation would need to grant the State of Iowa the authority to enact and collect tolls, issue toll revenue bonds, enforce toll collection, and include other key toll-related provisions.

### I-80 Planning Study: Toll Implementation Considerations

As an important first step, this study has determined that tolling is a financially feasible implementation option. Based on these findings, the Planning Study, through coordination with state policymakers, the general public and key stakeholders, can evaluate the overall viability and acceptance of tolling and whether it should be included as a possible recommended implementation option. Should the tolling concept be included in the Planning Study recommendations, considerable additional study and analysis would subsequently be required as the program progresses.

## 2. INTRODUCTION

### The I-80 Planning Study

The Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for rural I-80 across the State of Iowa (i.e., Planning Study). Since its original construction, this east-west Interstate has linked the state's economic centers of the Quad Cities, Des Moines, Iowa City and Council Bluffs with the National Interstate Highway System. However, with age and continued growth of traffic, especially truck traffic, this Interstate needs reconstruction to meet the demands of the next century. The Iowa DOT is conducting the Planning Study to determine the best long-term approach for improving this vital transportation link statewide, while enabling localized improvements to meet current and pressing rehabilitation and capacity needs, to be developed as the needs arise.

As part of the nation's Interstate system, the original construction and maintenance of I-80 was provided through the Federal-aid Highway Program, in addition to matching state funds. However, given the magnitude of the improvement costs and the limited availability of federal and state funds, it is necessary to consider other sources of funding and financing. Consequently, the Iowa DOT is conducting a planning-level study to evaluate tolling as an alternative strategy for funding the I-80 improvements. As a conceptual study, the findings of the study will inform the Planning Study process on the feasibility of utilizing toll funding and financing to implement the I-80 improvements.

### Tolling as a Funding Option

To initiate the Planning Study, the Iowa DOT established a series of principles to guide the study process. Fundamental to these principles, and integral to the selection of the best improvement strategy, is the need for a pragmatic recommendation that is readily implementable and adaptable to existing and future conditions. Therefore, the ability to fund the recommended improvements is an important consideration. The affordability and financial sustainability of the improvement program needs to consider both current and potentially viable funding sources. Therefore, the possible application of toll funding and financing is a reasonable and logical consideration for I-80.

#### I-80 Planning Study – Guiding Principles

- Balance access and mobility
- Design for future needs, considering emerging technologies
- “Right-size” Interstate 80
- Consider environmental and social implications
- Build on past efforts
- Consider practical transportation modes
- Engage stakeholders
- Develop an implementation plan

## **Planning-Level Toll Financing Study**

The intent of the toll study is to determine the financial feasibility of tolling rural I-80 to pay for and finance its improvements. This study will determine the ability of the project to pay for itself. Utilizing projections of gross toll revenues generated by the project, minus the costs of financing and operating and maintaining the Interstate, the analyses will determine the toll revenue bond financing capacity, as compared to the construction costs of the improvements. The findings of the study can then be included in the Planning Study's overall evaluation and consideration of all the candidate improvement strategies. This information will help inform decision makers on the selection of the best improvement strategy and implementation plan.

As a planning-level study, the results of this analysis are conceptual, requiring additional and more detailed analysis and study if tolling is to move forward as part of the Planning Study recommendations. In support of the Planning Study process, the toll study's findings will be sufficiently reliable for system-level investment decision-making. This study will answer the general question of the financial viability of implementing tolls on rural I-80. The Planning Study will assess the overall viability and acceptance of tolling as an optional implementation strategy to be considered further.

## **3. I-80 PROGRAM FUNDING AND POLICY CONSIDERATIONS**

### **Program Funding Options**

An important factor in determining the best means of meeting the long-term needs of I-80 is the ability of currently available funding sources to implement the improvement program. Alternative funding sources should also be considered, such as tolling, to meet the state's broader objectives of serving the state as a whole while meeting the specific needs of I-80.

#### **Current Federal Funding**

Today, the Federal Highway Trust Fund, combined with matching state public funding, is the primary funding source currently available for the improvement of I-80. However, due to a number of factors, these sources of funding are insufficient to meet the projected needs of the nation, the State of Iowa, and I-80.

#### **Current Status of State Funding**

The primary sources of state-generated transportation funding in Iowa is the state motor fuel tax and vehicle registration fees. These sources account for roughly 96% of the state funding available for transportation. In support of Iowa DOT's regular evaluation of the adequacy of funding and assessment of the general condition of the state's roadway system, in March 2011, Governor Terry E. Branstad created the Governor's Transportation 2020 Citizen Advisory Commission. In its assessment of the state's roadway system, in coordination with the Governor's



Commission and documented in the Commission's final report, the Iowa DOT identified a total 20-year state funding need of \$79.8B, as compared to projected revenue of \$47.3B over the same period – a funding shortfall of roughly \$32.5B. As noted in the final report, “the system as a whole will continue to experience deteriorating pavement and bridge conditions.”

### **Emerging Trends in Transportation Funding**

In the 2005 reauthorization of the Federal-aid Highway Program, SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users), the National Surface Transportation Infrastructure Financing Commission was created. This commission's purpose was to study the Highway Trust Fund revenues and the impacts of these revenues for future highway and transit needs. Among the considerations were alternative approaches to generating needed revenues. The Financing Commission completed its report, entitled *Paying Our Way*, in 2009.

In its findings, *Paying Our Way* presents a number of policy directions to address the funding needs of the nation's surface transportation system, including the role of tolling and pricing strategies. Among other recommendations, this study recommended a national transition to a federal funding system based on a charge for each mile driven (i.e., tolls).

### **Toll Financing as a Funding Solution**

The concept of imposing tolls has long been considered and implemented as a means of funding and financing transportation projects. In many regions across the country, today, tolling has become an integral tool for delivering much need transportation investments. Given the limitations of public funding, it is generally purported that tolls have financed roughly half of all new highway lanes constructed in the nation over the last two decades. From a federal policy perspective, the concept has been an ever-increasing consideration by policymakers on a widespread basis to fund the existing and future needs of the Interstate system. Tolling is increasingly viewed as a potential funding solution for the future, as it provides a new and sustainable source of revenue that better connects the user fee with the service provided.

### **Legal Authority for Tolling**

Today, the Federal-aid Highway Program, governed by Title 23 of the United States Code, provides states and other public entities the ability to utilize tolling to fund and finance Interstate reconstruction and construction. Current law has created the Interstate System Reconstruction and Rehabilitation Pilot Program specifically for reconstructing the Interstate with tolling. This pilot program was created for circumstances similar to rural I-80. As a pilot program, its intent is to demonstrate the role of tolling in reconstructing and improving all lanes within the Interstate system – something that is otherwise prohibited by law. This program currently allows up to three existing Interstate facilities (highway, bridge or tunnel) to be tolled to fund needed recon-

struction or rehabilitation. As a demonstration program, it is limited to three projects, each located in a different state. No special funding is authorized by this program.

In addition to federal authorization, state authorization would be required to enact tolls along I-80. A prerequisite for the award of an application into the Interstate System Reconstruction and Rehabilitation Pilot Program is the necessary legal authority of the applicant to enact tolls and the evidence of strong political support for the project. The State of Iowa does not currently have tolling authorization, except in certain instances related to bridges spanning waterways between Iowa and another state. The State of Iowa would need to enact enabling legislation. This legislation would need to grant the authority to enact and collect tolls, issue revenue bonds, enforce toll collection, and include other key toll-related provisions. In addition, this legislation could include provisions enabling the entering into agreements with private entities for the construction, maintenance and operation of the facility, including the collection of tolls.

### **Public Opinion Regarding Tolling**

As part of the Planning Study, the Iowa DOT has implemented a public information program, including an on-line questionnaire opinion survey. Opinions regarding the possible application of tolls on I-80 were gathered through this questionnaire. When specifically asked if tolling should be considered as a means of paying for Interstate improvements, 65% of respondents were opposed.

Recent national surveys show that public opinion regarding tolling is considerably different when recognizing the need for transportation investments and considering the available options for funding. Recent surveys by the International Bridge, Tunnel and Turnpike Association (IBTTA) highlight that nationally, public acceptance for tolling as a source of funding is increasing. These surveys show that 72% of Americans would be in favor of toll roads if there was no other way to pay for critical transportation improvements. Similarly, another recent survey conducted by HNTB's America THINKS determined that approximately 80% of respondents were in favor of using tolling to improve the transportation system. Important values that formed their opinion included the improved safety, condition and reliability the project would provide.

### **Iowa Transportation Policy**

Enacting tolls to fund and finance the rural I-80 improvements would represent a significant change in how major projects have historically been delivered in Iowa. Utilizing toll financing would require new public transportation policy for the state. Considerable coordination with state policymakers, public officials, transportation stakeholders and the general public would be required. Iowa has traditionally utilized a pay-as-you-go philosophy in the delivery of its transportation system improvements. These fiscal values are woven into the state's political fabric and were evidenced in the recommendations of the Governor's Commission report. If the Iowa DOT and the state's leadership consider tolling, these values will need to be considered.

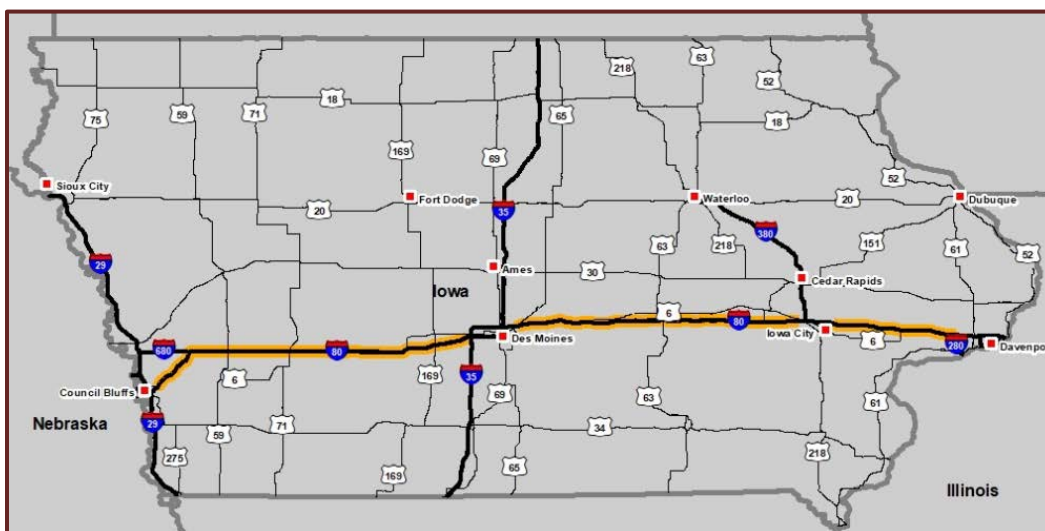
## 4. RURAL I-80 CORRIDOR IMPROVEMENT PROGRAM

### Description of the I-80 Corridor

The I-80 Corridor, as defined for the Planning Study and shown on **Figure 1**, extends across Iowa along the existing I-80 alignment, from Council Bluffs to the Quad Cities. For the roadway improvement strategies, improvements would entail the widening and upgrading of the existing roadway and bridges to meet the capacity, infrastructure replacement, improved standards and safety goals of the study. These improvements would be implemented within the rural sections of I-80. Defined by three major segments, the improvements would extend from just east of Council Bluffs to just west of Des Moines, from just east of Des Moines to just west of Iowa City, and from just east of Iowa City to just west of the Quad Cities. **Table 3** presents the limits of the I-80 Corridor segments by interchange and milepost. The total length of the Corridor is 248 miles.

The I-80 Corridor, as defined above, represents the rural segments of I-80 across Iowa. Within these rural segments, the existing I-80 consists of a rural 4-lane divided roadway section. For the metropolitan areas, studies are currently underway or are planned to assess the expansion and improvement of I-80. For the implementation of the rural improvements, it is assumed that any additional improvements to I-80 within these metro areas for lane balance and continuity, as well as any additional capacity needs, would be constructed from other funding sources. Tolling is being evaluated for only the rural portions of I-80. Coordination would be required with the various metropolitan planning agencies and other planning partners for the corresponding metro area improvements following the Planning Study.

**Figure 1: THE I-80 CORRIDOR**



**Table 3: THE I-80 CORRIDOR SEGMENTS**

| Segment | From      |        | To         |        | Length (Mi.) |
|---------|-----------|--------|------------|--------|--------------|
| 1       | US 6      | MP 8   | Jordan Crk | MP 121 | 113          |
| 2       | Co Rd S14 | MP 143 | Co Rd W52  | MP 237 | 94           |
| 3       | Co Rd F44 | MP 249 | I-280      | MP 290 | 41           |

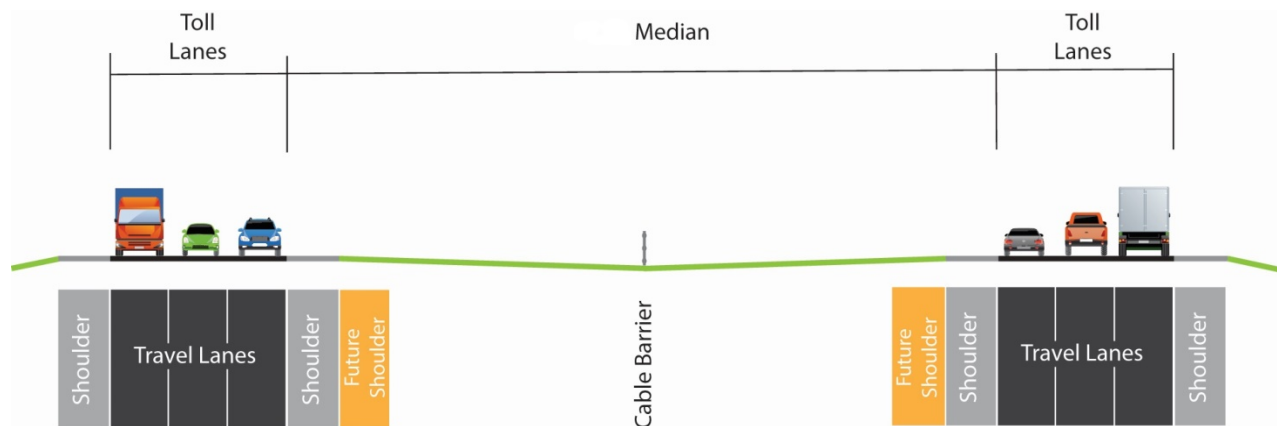
**Summary of Toll Improvement Alternatives**

The Planning Study is considering a number of alternative improvement strategies to meet the needs of the Corridor. Considering the possible application of tolls and toll financing, two roadway widening improvement alternatives would be applicable – the 6-Lane Improvement Alternative and the 10-Lane TOT (Truck-only Lanes) Improvement Alternative. This toll study will determine the conceptual toll financial feasibility for each of these two alternatives.

**6-Lane Improvement Alternative**

This improvement alternative entails the full reconstruction, widening and modernization of the roadway to provide six general purpose lanes across the state (**Figure 2**). Under this concept, all travel lanes would be tolled. Lane use restrictions would not be provided – autos and trucks would have access to all lanes.

**Figure 2: 6-LANE IMPROVEMENT ALTERNATIVE**

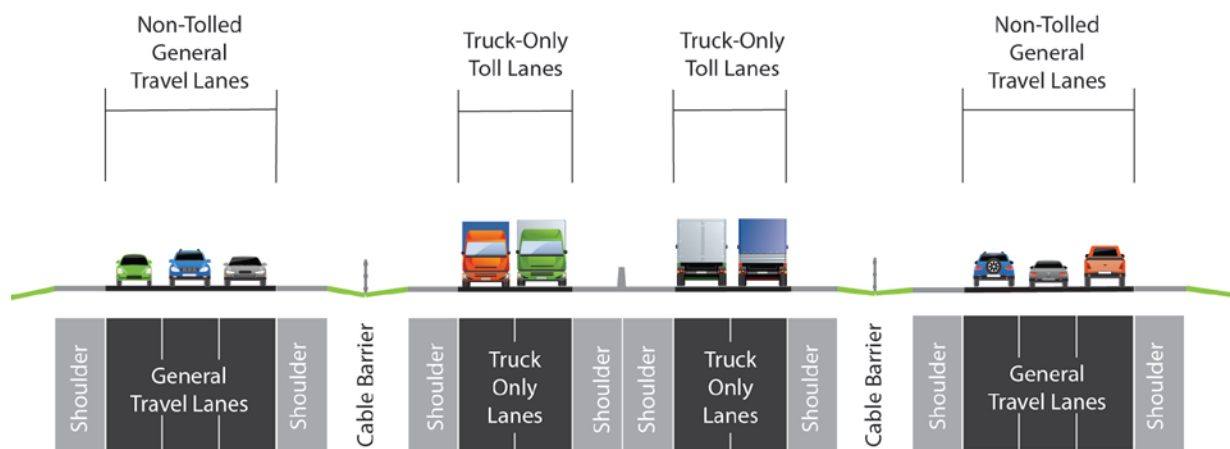


**10-Lane TOT (Truck-Only Toll) Improvement Alternative**

This improvement alternative entails the full reconstruction, widening and modernization of the roadway to provide four truck-only lanes and six general purpose lanes across the state (**Figure**

3). Under this concept, only the truck-only lanes would be tolled – the six general purpose lanes would be toll free. In contrast to the other alternative, this alternative evaluates the potential benefits of tolling only truck traffic. Trucks would be restricted to the exclusive and separated truck-only lanes, located within the middle of the roadway section. Access to the truck-only lanes would be provided by slip ramps connecting the truck-only lanes with the general purpose lanes at various locations throughout the Corridor. Trucks would be restricted from the general purpose lanes, except for entering and exiting the Corridor.

**Figure 3: 10-LANE TOT IMPROVEMENT ALTERNATIVE**



## 5. TOLLING FUNDAMENTALS

### Purpose of Tolls

Tolls are direct roadway user fees charged to travelers for the use of a roadway facility. A toll is a fee for service. These fees are typically and primarily used for funding and financing the construction, operation and maintenance of the facility. In some instances, however, tolls or road pricing can also be used for broader public objectives beyond revenue generation, such as for travel demand and congestion management.

For the I-80 Corridor, if tolling was to be implemented, the primary objective would be to provide new funds and financing, in whole or in combination with public funds, to construct, operate and maintain the improved facility for reliable and safe travel along the Corridor. A fundamental benefit of tolling is the ability to capitalize the projected revenue stream generated by the tolls to bond finance the construction of the improvements. This enables the direct travel-related and economic benefits of the project to be realized much sooner, as compared to a pay-as-you-go approach to the project delivery using traditional funding sources. Bond financing is a necessary and fundamental component of a toll project. Toll roads are typically self-perpetuating and cannot be implemented through a pay-as-you-go approach.

If enacted, tolling would be a significant change in how Iowa has historically constructed and maintained its Interstates. Tolling would provide a new revenue source, but would introduce a new type of user fee for I-80 travelers, which would impact the State differently than a pay-as-you-go approach with current funding. The advantages of tolling are inherent to it providing a new source of revenue. However, as a new fee for travelers, it would also have some impacts. Residents of the state and I-80 travelers may not be supportive of paying an additional fee to travel on I-80. In addition, costs would be incurred for financing the construction and some I-80 traffic would likely divert to other highways to avoid the toll. If tolling was to advance further, a comprehensive and balanced assessment of these benefits and impacts would be necessary by policymakers to determine the overall viability and acceptance of tolling.

Table 4 presents a summary of the advantages and disadvantages of tolling.

**Table 4: SUMMARY OF THE BENEFITS AND IMPACTS OF TOLLING**

| Advantages of Tolling   | Disadvantages of Tolling   |
|---|--|
| <ul style="list-style-type: none"> <li>• <b>Dedicated Revenue</b> – Provides a new revenue source dedicated 100% to the project for financing of upfront construction.</li> <li>• <b>Sustained Operations and Maintenance</b> – Provides a new long-term revenue source for sustained operations and maintenance.</li> <li>• <b>Accelerated Construction</b> – Improvements would be completed sooner, offsetting inflationary escalations of costs.</li> <li>• <b>Equity of Payment and Use</b> – Only users of the project, regardless of in-state or out-of-state residency, pay for the project.</li> <li>• <b>Service Reliability</b> – As traffic increases, provides a funding source to pay for additional projects and infrastructure rehabilitation.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Debt Financing</b> – Interest costs would be incurred for financing.</li> <li>• <b>Traffic Diversion</b> – Some traffic would divert to other highways to avoid paying a toll, potentially affecting the overall highway system.</li> <li>• <b>Public/Stakeholder Acceptance</b> – Some travelers may not be supportive of paying tolls for an improved I-80, in addition to current fuel taxes.</li> <li>• <b>Authorization</b> – Authority to enact tolls would require federal approvals and new state enabling legislation.</li> <li>• <b>Administration Costs</b> – Collecting tolls is not as cost efficient as fuel taxes.</li> </ul> |

### Toll Financing Principles

One of the key considerations of a toll project is the overall toll pricing strategy. This overall strategy determines, in part, the revenue available for the financing of the project, which can occur through a number of different legal structures and mechanisms. The setting of toll rates is typically driven by public policy and economic market forces. The principle basis of toll pricing is the economic benefit received by the traveler in terms of improved reliability, safety, travel time, and overall costs of travel. The overall pricing strategy is also based on fulfilling the goals of the facility and the sponsoring agency.



### Toll Revenue Bond Financing

Toll revenue bond financing is typically utilized to generate the capital necessary to construct and deliver the toll facility. Traditionally, depending on the legal structure of the bond issuance, nonrecourse tax-exempt bonds with a 30 to 40-year maturity are issued. Projected toll revenues are pledged as security for the financing. The toll revenue pledge may be of all toll revenues collected (gross) or only of toll revenues that remain following the payment of operation and maintenance expenses and, potentially, set asides for future major rehabilitation. The terms and covenants of the bonds, such as debt service coverage requirements, debt service structure, final maturity, reserves, flow of funds, and others, vary from transaction to transaction, depending on the legal structure of the financing and the perceived risks.

When toll revenue bond financing is insufficient to fully fund the project, public funds or other sources of funding can be used in combination with the bonds to deliver the project. Under these circumstances, new and additional funding sources would need to be secured.

### Public Private Partnerships

A relatively new means of delivering toll projects in the United States is the use of public-private partnerships (P3). In some instances, P3 arrangements can enable a toll project to be delivered that otherwise could not be implemented due to the funding and/or financing limitations of the sponsoring agency. With a P3 approach, the private sector may bring additional equity to the project financing. A P3 is primarily a delivery and risk transfer tool for the project and requires a revenue stream and/or guarantees of payment by the public-sector partners for a return on the investment by the private entity. Through this type of arrangement, the private sector can bring improved efficiencies and innovations in the delivery of the project. While not always the best or most appropriate approach, depending on the project circumstances and the goals of the sponsoring agency, P3 agreements can be an effective and powerful tool for delivering a project. Iowa does not currently have enabling legislation for P3s.

### Other Financing Mechanisms

There are several tools available today to enhance the overall financing of a toll project. These tools include the following:

- **Transportation Infrastructure Finance and Innovation Act (TIFIA) Program** – This program, administered by the US Department of Transportation, provides federal credit assistance for the financing of major surface transportation projects. This credit assistance typically provides more flexible terms than what may be obtained in the financial markets, thereby enhancing the overall financing of a project. Eligible applicants include state and local governments, as well as private entities in partnership with the public agencies.

- **Private Activity Bonds (PABs)** – PABs are tax-exempt bonds issued by or on the behalf of local or state government for the specific purpose of financing a project that benefits the public. This enables the private debt obligor to realize the financial benefits of tax-exempt bond financing, thereby providing the lower interest rate benefits of publically-issued debt. With PABs, the public sponsoring agency is not required to pledge its credit to secure the financing. PABs are an important mechanism in P3 projects to improve the overall financing terms of the project and better leverage the public's investments.

### **Legal Structure and Governance**

The legislation that creates the tolling authorization determines the governance structure of a toll road. As a result, toll roads today have a variety of governance structures. For the pre-Interstate era turnpikes, such as the Kansas Turnpike, Oklahoma Turnpike and others, enabling legislation created and empowered the quasi-governmental agency for the purposes of financing, constructing and operating the toll road or toll road system. These authorities have traditionally operated independent of the state's DOT.

The enabling legislation, as an act of the state or multiple states in the case of bi-state authorities, establishes the administering agency and its overall functions and obligations of oversight to assure accountability of serving the public's interests. The legislation typically defines the purpose of the Authority; the necessary powers to act as a quasi-governmental entity; and the ability to enact tolls, incur debt, contract for design and construction, and acquire real property such as right-of-way. Today, authorizations for tolling have evolved to include subdivisions within the state DOT or as regional mobility authorities with broader authorities and powers. In some cases, previously created tolling authorities have been integrated into the state's DOT through new legislation.

While there is no standard, as many different legal structures are in existence today, if necessary for a tolling start-up, a unique legal and governance structure can be tailored specific to the needs and circumstances of the project or region. As no tolling authorization currently exists for the I-80 Corridor, legislative action could be drafted specific to the Corridor and the State of Iowa to give it the necessary authority and structure to effectively oversee its operations.

### **Electronic Toll Collection**

With advancements in technology, stopping or slowing down to pay a cash toll have become things of the past. Today, essentially all new or modern toll facilities utilize Electronic Toll Collection (ETC). This technology eliminates cash transactions and allows for free-flow travel, at normal operating speeds, at the tolling locations. In addition to traveler convenience, when compared to cash collections, ETC is safer, provides environmental benefits, costs considerably less to administer and is easier to audit.

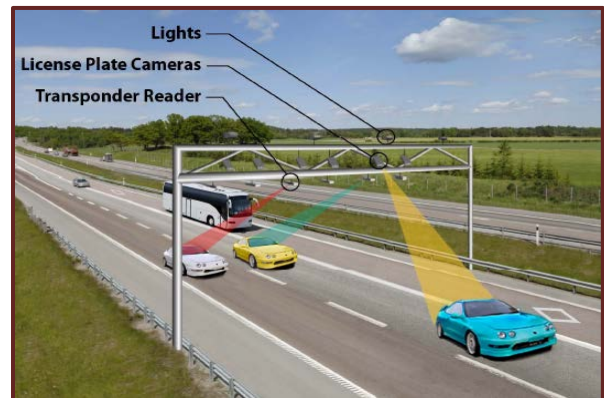


There are three main components of ETC systems – vehicle recognition, vehicle classification and account identification. These components work together in order to complete a toll transaction. Vehicle recognition within the toll lane is accomplished through in-road and overhead sensors, cameras, vehicle-to-roadside communications, or a combination of these technologies. These devices are located at the tolling point either along the roadside, embedded in the pavement or suspended overhead on a gantry. As part of the vehicle recognition process, the vehicle classification is determined through these devices in accordance with the system’s tolling regime (i.e., trucks verses autos). Information collected, either through an on-board electronic tag called a transponder or through the vehicle license plate, is then transmitted to a controller and the unique vehicle identity is associated with a specific user account through a relational database.



*Today’s transponders entail a sticker applied inside the vehicles windshield. Source: E-470 Public Highway Authority website*

An additional benefit of ETC is the establishment of a service provider-to-customer relationship, in which the benefits of ETC can be shared between the parties. Typically, toll customers open a pre-paid individual account with the service provider in exchange for a transponder. Tolls are then drawn against the account as toll transactions are incurred utilizing the transponder. Price incentives are typically offered to customers to encourage transponder use, including free access to the transponders. For customers without a transponder, video tolling is commonly used for toll collections. Given the higher cost of video tolling collections per transaction, typically a surcharge is incurred by the customer.



*Utilizing in-vehicle transponders, overhead cameras and in-road sensors, tolls are collected without slowing down or stopping to pay the toll. Source: WyDOT I-80 Toll Feasibility Study*

The concept of toll operations for the I-80 Corridor would include both the use of transponders and video tolling. Transponders would be made available to customers through a marketing campaign. Customer incentives would be utilized to encourage transponder use. For the out-of-state traveler and other customers without a transponder, video tolling would be utilized for toll collections.

## **6. TOLL TRAFFIC AND REVENUE**

### **Toll Collection System Concept**

Along with pricing strategies, the configuration of the toll collection system can affect the amount of revenue collected and the ability to accomplish the overall goals of the program. For the I-80 Corridor, an open toll collection system configuration would be used.

An open toll collection system allows greater flexibility in the overall toll pricing and collection strategy. With an open system, not all travel within the facility is charged a toll. Based on the overall characteristics of travel within the facility, mainline toll collection points can be strategically located along the facility to match the prevailing travel characteristics within the facility. Under this concept, local travel between the mainline collection points would be toll free. This concept does not maximize toll revenues, but does reduce the complexities of toll collections and the costs of toll collection infrastructure. This concept further simplifies the customer experience and billing process.

For this conceptual toll analysis, it is assumed that the 6-Lane Improvement Alternative would have 11 tolling locations strategically located across the Corridor. Due to the higher operational costs of trucks to divert around the tolling stations using the local highway and roadway system, five tolling locations are assumed for the 10-Lane TOT Improvement Alternative.

### **Corridor Traffic Analysis**

Baseline traffic projections were provided by the Iowa DOT for the Corridor for 2015 and 2040. These projections were developed using the iTRAM travel demand forecasting model and included the widening of the I-80 Corridor for each improvement alternative.

### **Traffic and Toll Revenue Estimates**

A planning-level analysis of projected toll traffic and revenue was performed for the two improvement alternatives. Based on the alternatives' toll collection configuration and the base traffic projections, annual estimates of toll revenue were developed based on an assumed overall toll pricing strategy and estimates of travel diversion caused by the introduction of tolls.

### **Toll Pricing Strategy**

For this conceptual toll analysis, an optimal pricing strategy to maximize the revenue potential was not determined. Rather, a typical and reasonable pricing scheme was assumed based on current and customary industry practices. As a basis of analysis, an overall pricing scheme similar to other active rural Interstate toll roads, similar to the I-80 Corridor, was assumed – the Kansas Turnpike and the Oklahoma Turnpike. While likely under the full revenue generating potential, utilizing customary and proven toll rates for a rural Interstate provides confidence in the legitimacy and practicality of the overall approach to pricing. While conservative, this ap-

proach provides a reasonable test of the concept's financial feasibility. It further supports the reasonableness of the study's conclusions. Should tolling be considered further, additional studies would be required to identify the best and optimal pricing strategy for the project.

In consideration of these factors, the assumed overall pricing regime for the I-80 Corridor tolling analysis included fixed toll rates by major vehicle classifications (i.e., auto and truck). Toll rates of \$0.08 per mile for autos and \$0.24 per mile for all trucks (no additional sub-classifications) were assumed at time of opening.

### **Toll Revenue Estimating Methodologies**

To estimate the annual projected toll revenue, the potential of toll diversion was estimated to determine the toll traffic volumes for both autos and trucks. Utilizing factors reflecting traveler preferences, as identified in the project's public opinion survey, and ease of alternative routes considering the economics of travel, estimates of annual toll traffic were developed.

To assess the sensitivity of the Corridor's financial capacity to traffic and toll diversion, in lieu of a singular revenue forecast for the overall pricing strategy, a range of potential projected toll revenue was developed. Two planning scenarios were utilized – Low Diversion and High Diversion. These two scenarios reflect the potential range of traffic diversion, and resulting toll revenue, considering both local and regional travel characteristics at each tolling location. For local traveler aversion, tolling stations were located to discourage localized trip diversion. Utilizing varying diversion factors for local and regional trips, and based on the travel characteristics at each tolling location, the resulting corridor-wide diversion was 16% to 33% for the 6-Lane Improvement Alternative and 24% to 40% for the 10-Lane TOT Improvement Alternative. For the purposes of this planning-level study, the range of projected toll revenue presents a reasonable forecast for the conceptual analysis. Later, more detailed analysis would provide specific estimates of toll traffic and revenue for a variety of toll pricing strategies to identify the optimal pricing plan and its projected toll revenue for the project.

To develop the toll revenue estimates, other assumed methodologies include: an annual inflationary toll rate increase of 2.0%; a toll rate surcharge for video tolling transactions sufficient to cover the additional costs of administering the additional billing and collections processes; fines and collections procedures for recovery of lost revenue to account for toll violations; and a three-year ramp-up period for toll collections.

## **7. PROGRAM COSTS**

### **Program Implementation Plan**

For the purposes of the toll financing analysis, a conceptual Program Implementation Plan was developed. The Plan includes all activities necessary for the planning, financing, design and

construction of the improvements, leading to the opening of the project to traffic. This plan, defined for each improvement alternative, includes the sequencing and timing of these activities. While conceptual, these steps reflect in general the major actions necessary to implement the toll program. Depending on the outcomes of the Planning Study, there are a number of ways the improvement program could be delivered. Based on the Planning Study's recommended improvement strategy, an appropriate and more detailed improvement plan would be defined. For this purposes of this conceptual analysis, it is assumed a new Toll Authority would be created and the construction would be completed using an accelerated delivery approach for each of three Corridor segments.

Important activities within the Program Implementation Plan include: environmental and engineering studies to secure the necessary environmental approvals and permits; obtaining the necessary approvals and authorizations from the FHWA and State of Iowa; organizational and operational start-up of the new Toll Authority; more detailed study of toll traffic and revenue; legal and financial planning services; preliminary engineering design and right-of-way plans; program management to oversee the project procurement, construction and right-of-way acquisition; and the final design and construction.

Based on this conceptual and generalized implementation plan, the following accelerated construction schedule is assumed for the two improvement alternatives, as shown in **Table 5**.

**Table 5: CONSTRUCTION SCHEDULE FOR TOLLING**

| Segment | 6-Lane Alternative |              | 10-Lane TOT Alternative |              |
|---------|--------------------|--------------|-------------------------|--------------|
|         | Begin              | Opening      | Begin                   | Opening      |
| 1       | Jan. 1, 2023       | Jan. 1, 2027 | Jan. 1, 2025            | Jan. 1, 2029 |
| 2       | Jan. 1, 2022       | Jan. 1, 2026 | Jan. 1, 2022            | Jan. 1, 2026 |
| 3       | Jan. 1, 2022       | Jan. 1, 2025 | Jan. 1, 2022            | Jan. 1, 2025 |

### Construction Capital Costs

Estimates of construction costs for year 2016, including roadway, bridges, drainage, earthwork, signage, lighting and incidentals, were provided by the Iowa DOT for each improvement alternative. Estimates were based on current construction bid tabulations with a 2.5 percent per year cost escalation to account for inflation. Cost contingencies were included.

Construction cost estimates were developed for the tolling infrastructure based on the assumed toll collection configurations for each improvement alternative. These construction elements include the toll collection equipment at each tolling station. The communications infrastructure backbone is included in the road and bridge construction estimates.

**Table 6** presents the design and construction cost estimates for the two alternatives. These estimates reflect the total anticipated design and construction costs for each segment for the assumed year of cost expenditure. A five percent cost factor was included for design engineering.

**Table 6: TOTAL DESIGN AND CONSTRUCTION COSTS (YEAR OF EXPENDITURE) - \$M**

| Improvement<br>Alternative | Corridor Segment |         |         |         |
|----------------------------|------------------|---------|---------|---------|
|                            | 1                | 2       | 3       | Total   |
| 6-Lane                     | \$1,671          | \$1,356 | \$592   | \$3,618 |
| 10-Lane TOT                | \$3,783          | \$2,922 | \$1,275 | \$7,980 |

### Program Delivery Costs

Overall program costs are included in **Table 7**. Total costs reflect the sum of annual costs (i.e., year of expenditure), evenly distributed over the period of the activity, plus inflation, as appropriate. In some cases, percentages of construction costs based on common industry practices were used as a basis for the estimates. The final design and construction costs include all related program costs, including procurement, right-of-way acquisition and the construction quality management. These estimates are conceptual and are a reasonable estimate of all costs necessary to fully implement the program.

**Table 7: TOTAL PROGRAM COSTS (YEAR OF EXPENDITURE) - \$M**

| Program Cost Item                       | 6-Lane Alternative | 10-Lane TOT Alternative |
|---|--------------------|-------------------------|
| NEPA Environmental Studies              | \$22               | \$25                    |
| Enabling Legislation and Authorizations | \$4                | \$9                     |
| Toll Authority Start-up                 | \$14               | \$14                    |
| Investment Grade T&R Study              | \$3                | \$6                     |
| Bond Issuance Preparations              | \$6                | \$13                    |
| Preliminary Design and ROW Plans        | \$29               | \$63                    |
| Program Management                      | \$44               | \$95                    |
| Final Design and Construction (Total):  |                    |                         |
| Procurement/Quality/ROW Acquisition     | \$122              | \$314                   |
| Design and Construction (Total)         | \$3,618            | \$7,980                 |
| <b>Total Program Costs</b>              | <b>\$3,861</b>     | <b>\$8,520</b>          |

## **Operation and Maintenance Costs**

The recurring costs of toll operations and maintenance for the Corridor include all expenses incurred by the Authority for the continued operations of the organization once toll operations begin. Utilizing data from similar toll authorities currently in operations, normalized annual cost factors for the major key organizational functions were developed based on the unique characteristics of those agencies. Adjustments to these cost factors were applied to reflect the unique circumstances of the I-80 Corridor. These factors were defined based on overall size (i.e., lane miles), annual gross toll revenues, annual miles of travel, and annual number of toll transactions for the representative agencies.

## **8. FINANCIAL ANALYSIS**

A planning-level financial analysis was performed to assess the potential viability of paying for the I-80 reconstruction with debt that would be repaid over time by toll revenues. This analysis provides a preliminary understanding of the potential ability of toll revenue debt to finance the program costs. Prior to the implementation of tolls and issuance of debt, however, significant additional analysis, institutional and legal actions, and authorizations will be required.

### **Financial Analysis Framework**

The debt capacity analysis assessed the feasibility of financing the total program costs of the two improvement alternatives. For each alternative, the analysis assessed the financing capacity of the projected net toll revenues for both the low and high traffic diversion scenarios. The use of net toll revenues in the analysis assumes that operation and maintenance costs are paid from toll revenues first and, then, the remaining toll revenues are available for debt service payments.

### **Basis of Financial Analysis**

In addition to the assumptions behind the estimated program costs, toll revenues, and operations and maintenance costs, the debt capacity analysis includes numerous assumptions related to the sources of financing, governance of the toll road, repayment sources, debt management policies, bond covenants, debt service structure, interest rates, credit ratings, reserves, costs of issuance, and other factors. This analysis is a planning-level assessment and all financing assumptions are subject to change based on market conditions, policy decisions, legislative changes, and other factors.

The financial analysis assumes that the sources of financing include a loan from the TIFIA program and toll revenue bonds issued by an independent authority. Of the total required financing, 33 percent is assumed to be a TIFIA loan and the remaining 67 percent is assumed to be toll revenue bonds. Historically, the TIFIA program has limited its contribution to a project's financing to 33 percent of the total. The analysis also assumes that the debt is repaid completely from



toll revenues without any recourse to other resources of either the Iowa DOT or the State of Iowa.

A minimum debt service coverage policy of 175% is assumed. This policy establishes that net toll revenues will be maintained at a level at least 175% of annual debt service. Such a policy gives investors' confidence that debt service obligations will be met and reduces the level of risk of the investment, thereby lowering interest costs. Such a policy, of course, is just one of many factors that will determine investor interest in the bonds and the ultimate interest costs. The interest rates are assumed to be fixed rate for the duration of the amortization of the debt. Some use of variable rate debt could be considered as planning for the program and financing progresses, but at this preliminary stage of analysis, a fixed rate approach is assumed.

The key financing assumptions are provided in **Table 8**.

**Table 8: KEY FINANCING ASSUMPTIONS**

| Item                  | Assumptions   |
|-----------------------|---|
| Sources of Financing  | 33% of total financing is a US DOT TIFIA loan<br>67% of total financing is toll revenue bonds |
| Governance            | Independent authority with autonomous toll setting authority                                  |
| Repayment Source      | Toll revenues; non-recourse to Iowa DOT and State of Iowa                                     |
| Debt Service Coverage | Net toll revenues are at least 175 percent of annual debt service                             |
| Interest rates        | Fixed for the duration of amortization  |

### Debt Service Structure

In order to have funding available to pay for the program costs, debt must be incurred prior to the ability to generate revenue through the collection of tolls. Once the toll revenue bonds are issued, however, interest payments must begin to be paid. One option to make the interest payments due prior to the collection of toll revenue is to use capitalized interest. Capitalized interest entails the issuance of additional bonds, beyond what is required to fund program costs, and the use of these bond proceeds to pay interest payments until toll revenues begin to be collected. The use of capitalized interest is assumed to make interest payments during the construction period of all the financing scenarios. It should be noted that the TIFIA program's flexible repayment provisions enable the deferment of both interest and principal repayment, thereby avoiding the need to pay its debt service prior to collection of toll revenue.

Another financing issue is the gap between projected net revenues and the debt service payments, especially in the early years of the toll road's operation. The size of the gap and the number of years in which a gap exists varies based on the improvement alternative and the net toll revenue scenario (low or high traffic diversion). To address this gap, the analysis assumes

that a certain amount of principal repayment is deferred until net toll revenues can accommodate debt service payments.

Both the use of capitalized interest and the deferment of principal repayment increases the overall cost of debt service, when compared to a structure that repays principal and interest more evenly (or level) over the amortization period. The analysis, therefore, minimizes the amount of capitalized interest and use of deferred principal. In some cases, this results in non-compliance with the assumed debt service coverage policy of 175% for a year or two in the early years of amortization. Given the preliminary nature of the analysis, this is deemed to be within a range of acceptability for determining the potential feasibility of the financing.

For each of the improvement alternatives and toll revenue scenarios, two debt service structures were analyzed, as described below:

- **Level Debt Service Structure** – After an initial period of capitalized interest and principal deferment, the annual debt service repayment amount is kept constant (level) for the duration of the amortization. Under this debt service structure, the full program cost is funded by the debt and the resulting debt service coverage does not comply with the policy in all years. The resulting debt coverage ratio can then be compared with the assumed 175% policy as a gauge of the program's potential financial feasibility.
- **Deferred Debt Service Structure** – In addition to an initial period of capitalized interest and principal deferment, under this structure additional principal is deferred to align more with the increasing growth of the projected net toll revenues over the amortization period. This results in overall debt service increasing over time. Under this debt service structure, compliance with the debt service coverage policy of 175 % is strictly adhered to and fewer bonds are issued as needed to ensure compliance. As a result, under this financing structure, the total bond and loan proceeds can then be compared with the total program costs, expressed as a percentage, as a gauge of the program's potential financial feasibility.

Many other debt structuring options are possible and would be considered to optimize the financing plan if the planning for the tolling program and financing progresses. These structures were selected for their ability to provide a gauge of the feasibility of toll financing within reasonable parameters at this preliminary stage of planning.

### **Debt Capacity Analysis Results**

The debt capacity analysis found that the projected net toll revenues for the 6-lane Improvement Alternative, with tolls charged on all vehicles, would likely be sufficient to finance the estimated program costs. The projected net toll revenues for the 10-lane TOT Improvement Alternative, with tolls charged only on trucks, however, would be insufficient to finance the estimated program costs. These conclusions are within the reasonable range of the analysis at this conceptual stage of planning.



### 6-Lane Improvement Alternative

Projected net toll revenues from the low or high traffic diversion scenarios are estimated to be sufficient to cover the projected debt service to finance the estimated total program cost. Capitalized interest and deferred principal repayment are utilized to enable the projected revenues to meet debt service requirements. While at this conceptual level of analysis the assumed debt service coverage policy of 175% is not fully complied with in a few early years before revenues begin to increase, it is reasonable to conclude that further refinements in the tolling program and/or debt financing structure could meet these requirements and be fully financially feasible.

As shown in **Table 9**, under the level debt service structure, in the early years, the minimum debt service coverage policy is broken and declines to a low of 137% under the low diversion scenario and 100% under the high diversion scenario. Given the preliminary nature of the analysis, this degree of noncompliance was deemed to be within a range of acceptability for determining the potential feasibility of the financing. That said, breaking compliance with a debt service coverage policy would have credit rating and other effects as planning for the project and financing progresses. In later years, the minimum debt service coverage policy is exceeded for both the low and high traffic diversion scenarios.

**Table 9: 6-LANE IMPROVEMENT ALTERNATIVE FINANCIAL SUMMARY (\$M)**

| Item                      | Low Traffic Diversion |                    | High Traffic Diversion |                    |
|---------------------------|-----------------------|--------------------|------------------------|--------------------|
|                           | Level Structure       | Deferred Structure | Level Structure        | Deferred Structure |
| Total Program Costs       | \$3,861               |                    |                        |                    |
| Total Net Revenues        | \$25,803              |                    | \$19,476               |                    |
| Total Debt Service        | \$7,936               | \$9,766            | \$7,936                | \$7,124            |
| Minimum Coverage          | 137%                  | Set at 175%        | 100%                   | Set at 175%        |
| % Program Costs Funded    | 100%                  | 93%                | 100%                   | 76%                |
| Excess Revenue after Debt | \$13,712              | \$11,881           | \$8,352                | \$9,164            |

Under the deferred debt service structure, the debt service coverage policy of 175% is maintained in the analysis to determine the amount of total program costs that could be financed. As shown, 93% of the total program costs could be financed for the low traffic diversion scenario and 76% for the high traffic diversion scenario – both within the range of acceptability for financial feasibility at this stage of analysis.

### 10-Lane TOT Improvement Alternative

Due to this alternative's larger program costs and lower net toll revenues, as only trucks would be tolled, projected net toll revenues for both the low and high traffic diversion scenarios are not sufficient to cover the projected debt service to finance the Corridor improvements. Even with the utilization of capitalized interest and deferred principal repayment, revenues are insufficient to make debt service payments. Given the magnitude of the revenue shortfall, even given the conceptual level of the analysis, it is reasonable to conclude that further refinements to the toll program and financing would not enable this alternative to be fully financially feasible.

As shown in **Table 10**, under the level debt service structure, minimum debt service coverage is 24% under the low traffic diversion scenario and 14% under the high traffic diversion scenario. Under the deferred debt service structure, the use of additional deferred principal only enables 33% of the program costs to be funded under the low diversion scenario and 20% under the high diversion scenario.

**Table 10: 10-LANE TOT IMPROVEMENT ALTERNATIVE FINANCIAL SUMMARY (\$M)**

| Item                      | Low Traffic Diversion |                    | High Traffic Diversion |                    |
|---------------------------|-----------------------|--------------------|------------------------|--------------------|
|                           | Level Structure       | Deferred Structure | Level Structure        | Deferred Structure |
| Total Program Costs       | \$8,520               |                    |                        |                    |
| Total Net Revenues        | \$13,571              |                    | \$9,351                |                    |
| Total Debt Service        | \$18,227              | \$4,741            | \$18,227               | \$2,959            |
| Minimum Coverage          | 24%                   | Set at 175%        | 14%                    | Set at 175%        |
| % Program Costs Funded    | NA                    | 33%                | NA                     | 20%                |
| Excess Revenue after Debt | (\$6,342)             | \$7,144            | (\$10,101)             | \$5,167            |

## 9. STUDY FINDINGS

This planning-level toll study was performed to determine, at a conceptual level, whether tolls are a financially feasible option to pay for the I-80 Corridor improvements. While this study assessed the feasibility of using tolls, there are a number of other significant public policy and planning issues that will affect the determination of whether or not tolling should be considered further. The intent of this study is to inform the Planning Study on the financial feasibility of tolling for consideration and possible inclusion in the overall study's recommendations and implementation planning.

As a conceptual planning study, the findings of this analysis provide a reliable and reasonable basis for its conclusions. Generalized assumptions for planning-level cost estimates, traffic fore-

casting, toll revenue estimates and financial analyses were based on the best information available at this stage of planning. Typical and customary industry practices were utilized in the analysis. This level of analysis and precision are consistent with the level of detail of the Planning Study and satisfactorily support the study's decision-making and recommendations. Should the tolling concept be included in the Planning Study recommendations, considerable additional study and analysis would subsequently be required as the program progresses.

### Financial Feasibility

Utilizing tolls to fully fund and finance the I-80 Corridor improvements is a financially feasible option. This study has determined, within the range of confidence for the analysis, that projected toll revenues could be sufficient to fund and finance the 6-Lane Improvement Alternative. Based on the program's projected costs for construction and annual operations and maintenance, net toll revenues would likely be sufficient to finance this alternative. However, due to higher program construction costs and lower toll revenue projections, as only trucks would be tolled, utilizing tolls to finance the 10-Lane TOT Improvement Alternative would not be financially feasible.

### Financial Analysis Sensitivities

The determination of the financial feasibility of tolling for the two improvement alternatives was based on a number of planning-level assumptions and is sensitive to these assumptions. To further assess these sensitivities, a likely range of potential toll revenue was estimated and analyzed for each improvement alternative based on a low and high traffic diversion scenario. This approach frames the likely range or degree of financial feasibility. In addition, the financial analysis was performed to assess the sensitivities of each alternative and revenue scenario to meeting either a debt service coverage ratio of 175% or, based on a full compliance with this ratio, the bonding capacity of each compared to its total program cost. **Table 11** summarizes the sensitivities of the financial analysis.

**Table 11: SUMMARY OF TOLLING FINANCIAL FEASIBILITY**

| Improvement Alternative | Measure of Financial Feasibility (Low – High Diversion) |  | Concept-Level Feasibility Finding |
|-------------------------|---|--|-----------------------------------|
|                         | Minimum Debt Service Coverage Ratio                     | Bonding Capacity to Total Program Cost (%) |                                   |
| 6-Lane                  | 137% to 100%  | 93% to 76%                                 | Feasible                          |
| 10-Lane TOT             | 24% to 14%  | 33% to 20%                                 | Not Feasible                      |

### Reasonableness of Financial Feasibility

The financial analysis has concluded that the 6-lane Improvement Alternative would be financially feasible within the reasonable and acceptable limits of this study. This judgment is based

on a number of factors and practical considerations that could further enhance and improve the financial performance of the program. However, the degree of the financial shortcomings of the 10-Lane TOT Improvement Alternative are likely too great to reasonably expect that further refinements could ensure full financial feasibility.

Refinements to the program, to be evaluated in more detail if tolling advances, could measurably improve its financial performance and ensure full financial feasibility. These include: value engineering to reduce the overall construction costs; committing resources to operate and maintain the Corridor to enable a gross toll revenue pledge for the financing; refining the toll collection system configuration and/or pricing to maximize the toll revenue; accelerating the program's schedule to reduce the effects of inflation; and refining the financial framework. There are funding and debt structuring alternatives that could be considered to maintain the minimum debt service coverage of 175% and fully fund the program. These potential refinements include, for example, using other state or federal resources to pay for a portion of program costs; utilizing some amount of variable rate debt which has lower interest rates in the earlier years of amortization; possibly utilizing a P3 structure to leverage up-front private equity; and other financing structural refinements.

### **I-80 Planning Study: Toll Implementation Considerations**

Implementing tolls on the I-80 Corridor would be a significant change in public policy for the State of Iowa. While there are numerous advantages, tolling would directly affect travelers and users of the Corridor. As a user fee, travelers would pay directly for the improved travel service. Possibly enacting tolling would raise important policy issues for the state's transportation decision makers. The evaluation of tolling needs to balance its benefits and impacts. If considered further, a comprehensive assessment of the economic benefits and costs of tolling compared to other funding strategies is needed, including coordination with policymakers, the general public and stakeholders. The I-80 Planning Study provides this opportunity to more fully evaluate whether or not tolling could be part of the implementation plan for the Corridor.

Implementing tolling on the Corridor would entail a number of steps and phases of decision-making. This toll study and how it might be addressed within the Planning Study recommendations, is just an initial, yet important planning-level decision – the first of many before tolling would be implemented. The use of tolling as a funding and financing strategy could be an option the Planning Study recommends for further consideration and public discussion in subsequent planning and study activities for the Corridor.

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## **APPENDIX A – EMERGING INTERSTATE TOLLING ISSUES**

### **Introduction**

Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for the I-80 Corridor across the state of Iowa (i.e., Planning Study). Since its original construction, this east-west highway corridor has linked the state's economic centers of the Quad Cities, Des Moines and Council Bluffs with each other and the nation's Interstate Highway System. But with age and continued growth of traffic, especially truck traffic, this corridor needs to be reconstructed to meet the demands of the next century. The Iowa DOT is conducting the Planning Study to determine the best approach for improving this vital transportation link statewide, while enabling localized improvements, to meet current and pressing rehabilitation and capacity needs, to be developed as the needs arise.

As part of the National Interstate Highway System, the original construction and maintenance of I-80 have been provided through the Federal-aid Highway Program, in addition to matching state funds. But given the magnitude of the improvement costs and the limited availability of federal and state funds, other sources of funding and financing should be considered. The Iowa DOT is conducting a planning-level study evaluating tolling as an alternative strategy for funding the improvements.

The purpose of this research review is to summarize Interstate tolling issues for the Iowa DOT's consideration as it evaluates the possible application of tolling I-80. In particular, this research focused on relevant tolling issues to determine the eligibility of enacting tolls on I-80, identify emerging federal policies that could influence the state's approach, and review experiences of other DOTs with similar rural interstate issues that have considered enacting tolls.

### **History of the Interstate and Tolling**

In 1944, the Federal-Aid Highway Act authorized and designated a National System of Interstate Highways. This act established the framework for the Interstate network and the federal role in its construction and oversight. It established the individual states as the owners and operators of the system, with federal participation in the funding. Until the National Interstate and Defense Highways Act in 1956, federal funds were appropriated from general revenue. It was this new law that established the National Highway Trust Fund – funded through a national tax on gasoline and diesel fuel. The 1956 Act established a 90 percent federal funding participation level for construction, with the remaining 10 percent from state sources. Today, the Interstate system is roughly 46,900 miles long, connecting major metropolitan areas and other key components of the nation's national defense system.

In the years prior to 1956, a number of toll highways were financed and constructed across the country through toll-revenue bond financing. These tollways, typically overseen by independent toll authorities, provided inter-regional mobility between major metropolitan areas. Examples



include the Ohio Turnpike, the New Jersey Turnpike, the Kansas Turnpike, and numerous other turnpike systems. With the creation of the Interstate system, these pre-Interstate era turnpikes were incorporated into the National Interstate System by legislative action to ensure network connectivity. Today, approximately 3,200 miles of the Interstate Highway System are tolled highways, bridges and tunnels.

### **Interstate Tolling Eligibility**

Today, the Federal-aid Highway Program, governed by Title 23 of the United States Code, provides states and other public entities the ability to utilize tolling to fund and finance Interstate reconstruction and construction. Most recent reauthorizations of the Federal-aid Highway Program, the Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) Act and the Fixing America's Surface Transportation (FAST) Act, continued and/or revised previously established federal tolling provisions in affect today. Four federal tolling programs are currently available, as follows:

#### **General Tolling Program (Section 129)**

This program allows federal participation in the initial construction of a new toll highway, bridge or tunnel on the Interstate system; initial construction of one or more toll lanes and rehabilitation of existing lanes on an existing Interstate highway as long as the number of toll-free lanes is not less than before the construction; reconstruction of an existing toll highway, bridge or tunnel; reconstruction of an existing toll-free bridge or tunnel as a toll facility; reconstruction of an existing toll-free Federal-aid highway (other than an Interstate highway) as a toll facility; and conversion of an existing HOV lane to a toll facility. This program entails restrictions on the use of toll revenues and requires annual audits to ensure compliance with these limitations.

#### **High Occupancy Vehicle Facilities (Section 166)**

This program allows for the conversion of existing HOV lanes to include toll-paying vehicles that do not meet the minimum occupancy standards for the facility for both Interstate and non-Interstate Federal-aid highways. Provisions under this program include annual certification of operational performance standards, traveler access for enrolling into the toll system, and toll collection operations. The authorization for these types of projects is fully granted in the General Tolling Program, but since the General Tolling Program doesn't address eligibility for non-HOV users, all HOV conversion projects are legislated through this program. This program has no limitations on the number of projects.

#### **Interstate System Reconstruction and Rehabilitation Pilot Program**

This program allows up to three existing Interstate facilities to be tolled to fund needed improvements, including widening and/or reconstruction, that could not otherwise be funding and maintained through currently available funding. Under this program, Federal Interstate maintenance funds cannot be used on the tolled facility.



### **Value Pricing Pilot Program**

This program encourages the utilization of pricing mechanisms, including tolling and non-tolling strategies, to manage congestion on highways. Authority is given for up to 15 projects. Tolling applications can be based on a limited number or all lanes on a highway, or a zone within a system of highways, or a regional or other geographical boundary. This program provides authorities for strategies that might not otherwise be covered by the other programs. Non-toll strategies under this program could include mileage-based pricing, parking pricing or ride cost-sharing.

As evidenced over the past several reauthorizations of the Federal-aid Highway Program, some of the provisions enabling tolling of Interstates have become mainstreamed within the legislation and more flexibility has been granted to states and other public agencies. It is reasonable to expect, therefore, that this evolution of policy will continue moving forward as projects are successfully completed. These successes will likely further enable the application of tolling to move from a demonstration status into mainstream authorizations. As an example, due to the high number of successful projects across the country and the continued demand by states and other agencies, earlier demonstrations of Interstate Express Lane applications have enabled these types of projects to be mainstreamed into the General Tolling Program. While the ISRRP Program is currently in a demonstration status, with applications limited to three projects, if and when the successful demonstration of this program becomes evident and additional demand is expressed by the states, it is reasonable to expect this program to be similarly mainstreamed into the General Tolling Program.

### **The Interstate System Reconstruction and Rehabilitation Pilot Program**

This program allows up to three existing Interstate facilities (highway, bridge or tunnel) to be tolled to fund needed reconstruction or rehabilitation that could not otherwise be adequately maintained or functionally improved without the collection of tolls. As a demonstration program, it is limited to three projects, each located in a different state. No special funding is authorized by this program. This program further requires that Interstate Maintenance Funds may not be used on a facility for which tolls are being collected under this program.

To date, the success of this program has been limited, with no projects being completed. At one point in time, three states had been granted authority under this program – Virginia, North Carolina and Missouri. However, due to the lack of the necessary local and state political support, including the necessary supporting legislation, both Virginia and North Carolina have withdrawn their projects from the program. Missouri is currently in the process of evaluating whether or not to proceed with their application. (Note: Subsequent to the writing of this summary, Missouri has rescinded its application.)

Recently, the FHWA has placed a renewed emphasis on this program. With this new emphasis, FHWA has asked Missouri to make a decision by December 2016 on whether or not to proceed with its application. MoDOT's application, which was originally approved with Provisional Ap-

proval in 2005, is to widen and improve I-70 across the state using tolls. But little progress has been made due to a lack of local and state legislative support – an important requirement of the program. Given this lack of progress and FHWA's renewed interest, FHWA is requesting a commitment from MoDOT to secure its current slot in the program.

Moving forward, FHWA is encouraging states to utilize this program and will be advertising a Notice of Availability for either two or three slots, depending on Missouri's decision, sometime in Fall 2016. With the amendments of the FAST Act, the ISRRP Program will place a greater emphasis on the applicant's continued progress by: requiring upfront evidence of local support and placing a three-year approval window to make progress on the project, with the ability to extend the approval upon demonstrated progress towards implementation.

### **The Value Pricing Pilot Program**

Originally established by the Intermodal Surface Transportation Efficiency Act (ISTEA) and continued by subsequent federal legislation, this program is intended to demonstrate how and to what extent roadway congestion can be reduced through the deployment of pricing strategies. Deployed pricing strategies are intended to affect traveler behaviors to positively impact traffic volumes, transit ridership, air quality and the availability of transportation funding. Fiscal year 2012 was the final year in which funding was available to solicit projects. However, while the program is no longer soliciting projects, it continues to manage the completion of active projects currently in the program. While federal funds are no longer available for this program, FHWA's ability to enter into cooperative agreements under this program will continue. Of the 15 slots authorized for this program, seven are permanently reserved for states that have executed cooperative agreements and eight are committed to state agencies under active study. It's anticipated that as these states complete their study activities, slots could then become available for other applicants, at the discretion of the Secretary of Transportation.

The current status of the VPP Program is a direct reflection of the continued mainstreaming of federal tolling authorization. Current federal legislation now accommodates the more typical pricing strategies of express toll lanes and HOV lane conversions to toll users, which would have previously been applicable to the VPP Program, through the General Tolling Program (Section 129) and the High Occupancy Vehicle Facilities Program (Section 166). FHWA prefers these two mainstreamed programs be utilized wherever possible. Therefore, requests for tolling authority under the VPP Program will be limited and reserved for applications that could not otherwise be accommodated under the mainstreamed tolling programs. Moving forward, the VPP Program is intended for more unique, demonstrative pricing strategy applications.

### **Emerging Interstate Funding Issues and Interstate Policy Considerations**

In an earlier reauthorization of the Federal-aid Highway Program, SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) in 2005, several studies were authorized to prepare the nation for meeting its future transportation infrastructure

and financing needs. These studies have been completed and have set the stage for the likely future direction of federal policy for Interstate tolling. In addition to a study to assess the condition and future needs of the surface transportation system, and a study to field test the application of highway user fees based on actual mileage driven, this act created the National Surface Transportation Infrastructure Financing Commission. This commission was created to complete a study on Highway Trust Fund revenues and the impacts of these revenues for future highway and transit needs. Among the considerations were alternative approaches to generating needed revenues. This commission completed its report, entitled *Paying Our Way*, in 2009.

In its findings, *Paying Our Way* presents a number of policy directions to address the funding needs of the surface transportation system, including the role of tolling and pricing strategies. In general, this study concluded that the current funding system of taxes paid for fuel consumed is too indirectly connected to the traveler's use of the system. Funding approaches that more directly tie the use of the system with the payment for that use are needed. It found that today only around 60 percent of revenue is generated from fuel taxes, such that users are not bearing their appropriate share of the costs for their travel. It also determined that the current fuel tax system doesn't provide a sufficient linkage to impact traveler behavior, such as which parts of the system to use or when to use it. Therefore, given the advancement in technologies and the ability to collect user fees tied directly to the use of the system, this study recommended a national transition to a federal funding system based on a charge for each mile driven. This new federal funding strategy would have the additional benefit of better connecting the user charges with the service provided, including the type of road (i.e., Interstate), the time of day (i.e., level of congestion), and vehicle weight and fuel economy (i.e., operational impacts to the system). This new approach would enable states and local agencies to develop their own mileage-based or pricing strategies for their systems within this payment framework. The report further recognizes that broad national and local use of pricing mechanisms, including both targeted facility tolling and mileage-based systems, would result in a more efficient system – encouraging more efficient traveler choices of mode and timing of travel, thereby reducing the needed additional capacity and investment. This would further complement broader social and environmental goals, some of which are currently in conflict with the existing fuel consumption based payment system.

In its final report, as a long-term, sustainable and equitable approach, the Commission recommended an aggressive transition to a federal mileage-based funding system. Recognizing the obvious challenges of this transition, the Commission recommended ensuring the security and sustainability of the existing Highway Trust Fund, funded through additional fuel taxes, and further relaxation of existing prohibitions for tolling, including the tolling of Interstates. These measures, along with other recommendations, would help bridge the transition until such time the new system is fully operational. Upon and during this transition, the existing fuel tax system could be phased out and existing and new toll facilities could be integrated into the new user-based pricing system, both nationally and locally.

The concept of imposing tolling has long been considered and implemented as a means of funding and financing transportation projects. More recently, the concept has been an increasing consideration by policymakers on a widespread basis to fund the existing and future needs of the Interstate system. To further highlight the potential role of tolling in the future, *Paying Our Way* identifies three types of broad tolling applications:

- **Facility-level Tolling and Pricing** – Tolling of a roadway or system of roadways at the state and/or local level.
- **Cordon Pricing** – To manage demand, reduce congestion and raise funding, implement tolling at a state or local level within a cordoned boundary, such as around a CBD or corridor.
- **Mileage-Based User Fees (Vehicle Miles Travelled (VMT) Charges)** – Charging fees for the total number of miles travelled.

Beyond the findings of the National Surface Transportation and Revenue Study Commission, additional literature research has revealed a common recognition of the potential roll of tolling as a strategy for addressing the nation's future funding needs. Possible strategies expressed by policy briefs and papers include:

- Allowing imposition of tolls at state discretion.
- Enabling states to opt out of the Federal-aid Highway Program.
- Making permanent and expanding FHWA's existing Interstate tolling programs.
- Allowing the tolling of Interstates in congested areas when new capacity is provided.

While broad, system level policy recommendations and thought leadership have been expressed regarding the role of tolling as a means of meeting existing and future needs, other potential revenue-generating strategies have also been identified, with some moving to implementation. A number of states have explored and have implemented joint development opportunities to supplement existing funding. Examples include the commercialization of rest areas by selling advertisement rights or privatizing rest area operations; right-of-way and use agreements with utility owners for the joint use of state property; and agreements for joint use of right-of-way by third parties for infrastructure installations such as electricity generation and distribution for wind turbines and solar panels. More recently, with the continued advancement of technology and emergence of automated and connected vehicles, the growing needs of electric vehicles within the national fleet, and customer demand for access to the internet network, several states are exploring partnerships with private industry to jointly deliver the Interstate reconstruction and improvement. In theory, widening and reconstructing an existing Interstate corridor provides possible opportunities for a state to partner with private utility service providers and/or developers in the joint development of the corridor. These partnerships could incentivize the private sector to invest in the corridor's construction with the state in exchange for accommodations within

the project that generate additional revenue or benefits to the private partner, thereby offsetting their investment. An example could include energy generating surface panels within the roadway whereas the value of the electricity generation offsets any additional capital and maintenance costs of the construction. Both Missouri and Colorado are currently exploring these types of innovations for the reconstruction of I-70 within their respective states.

### **Similar DOT Interstate Tolling Experiences**

As the Iowa DOT considers the possible use of toll financing for I-80, there are other states that have similarly conducted rural Interstate corridor improvement studies that could provide valuable insights and lessons learned, including the consideration of alternative funding strategies. Two states with similar rural, cross-state Interstates as I-80 in Iowa were identified – Wyoming (I-80) and Colorado (I-70). A summary of the current status of each of these states is as follows:

#### **Wyoming Department of Transportation (I-80)**

A meeting was conducted with Wyoming Department of Transportation (WyDOT) on August 30, 2016 to discuss their approach to the consideration of tolling I-80 across Wyoming. Interstate 80 in Wyoming has experienced significant truck traffic growth over the last decade. While the Great Recession has slowed the growth, prior to the recession, truck traffic was growing at around 4% per year. As a result, roadway capacity and level of service has become an issue. In addition, roadway and bridge conditions are deteriorating. In response, WyDOT conducted a feasibility study to consider improvement options and toll financing. The preferred improvement concept entailed truck-only lanes and improvements to the general purpose lanes. The financial analysis determined that the project was financially feasible. The analysis concluded that due to limited regional alternative routes, little diversion of travel would be expected.

While the study was being completed, the Wyoming General Assembly passed a statewide gas tax increase for transportation. The focus of the new funding program is providing community linkages, thereby allowing more federal funds to be directed to the rehabilitation of I-80. As a result of the new funding, it was determined that the I-80 tolling option would no longer be considered. While the new funding doesn't allow for a full-scale reconstruction of I-80, WyDOT can slow down the overall rate of pavement and bridge deterioration within the corridor. Although the tolling option didn't advance to implementation, the consideration did help advance the statewide funding package. Currently, in addition to rehabilitating the corridor as funds are available, WyDOT is especially focused on weather-related operational improvements within the corridor.

#### **Colorado Department of Transportation (I-70)**

On September 20, 2016, a meeting was conducted with CDOT to discuss their past and current approach to improving I-70 across the state. Interstate 70 connects the Front Range region, including the Denver Metropolitan Area, Fort Collins and Colorado Springs, with the Western Slope – the areas around Grand Junction on the west side of the state. This corridor, commonly

called the I-70 Mountain Corridor, provides Interstate mobility across the state and is the primary means of access into the High County for summer and winter recreational activities. Because of this, the corridor has unique travel characteristics, with high peak travel conditions westbound on Fridays and eastbound on Sundays, in both summer and winter. Major features include mountainous topography, including the Eisenhower Johnson Memorial Tunnel (EJMT) under the Continental Divide and the Twin Tunnels near the City of Idaho Springs. CDOT has completed a First Tier EIS for improving the corridor, consisting of roadway and tunnel widening and associated improvements. But due to funding challenges, CDOT has been unable to comprehensively implement the First Tier EIS recommendations.

In coordination with the First Tier EIS, CDOT considered toll financing to fund the recommended roadway improvements. The First Tier Record of Decision established several key triggers that needed to be met before the agency could implement the recommended roadway improvement program. Foremost of these was the requirement of a more comprehensive study and decision regarding a fixed-guideway high-speed rail system along the corridor. While this study was subsequently completed, discussions with key stakeholders on the findings of the study and the financial feasibility of rail improvements continue to this date.

While the rail study was in progress, an unsolicited proposal was received by CDOT for an express lane tolling concept that was dependent upon fulfilling the high-speed rail approval trigger. In response, CDOT issued an RFP, called the I-70 Mountain Corridor Co-Developer Program, and received several competing tolling proposals. These proposals included varying tolling concepts to fund the roadway improvements, ranging from barrier tolling at the tunnel locations, closed system tolling at all entry (i.e., gateway) points and the original unsolicited concept of an express lane. Further due-diligence by CDOT determined that the express lane concept would not sufficiently fund the program, and due to a lack of consensus with local stakeholders and broader policy and political support for the other tolling proposals, the RFP was terminated and no further action was taken by CDOT. Currently, with the completion of the high-speed rail study and continued evidence of the need for long-term roadway improvements in the corridor, CDOT is re-engaging with the local stakeholders to re-strategize the long-term implementation plan for the corridor, as agreed in the First Tier ROD. This reengagement may include the consideration of toll financing.

While the ability to implement wholesale improvements has been limited, CDOT has implemented operational, traveler information improvements along the corridor, especially around the EJMT. Based on the First Tier EIS, available funding has allowed the widening of the Twin Tunnels in both directions and Peak Period Shoulder Lane (PPSL) improvements in the eastbound direction on both sides of the Twin Tunnels. The PPSL project entails the hardening and widening of the inside shoulder for use as a Tolled Express Lane only during peak travel periods. This project has been very successful, increasing the throughput of the corridor during the peak travel periods. CDOT is currently exploring how to implement a similar complementary improvement in the westbound direction.



Recently, CDOT has implemented a new program called RoadX to address the emergence of new technologies for improved auto and truck automation and connected operations. RoadX is an initiative to partner with the private industry to begin preparing the state for new disruptive technologies that will change how transportation agencies plan and deliver their systems in the future. The advancement of automated vehicle operations will change the transportation system needs in the future, and CDOT believes will affect how the state addresses the long-term needs of I-70. CDOT's approach is to encourage private industry to bring new ideas to the state for testing and proof of concept. CDOT is willing to invest jointly with private industry to field test worthy ideas. CDOT is not taking a traditional procurement approach with this program, but rather is open to partnering with individual interests that submit creative ideas. To date, over 75 innovations have been proposed. Current examples of ideas being tested include the installation of inductive electrification systems embedded in the pavement to recharge electric vehicles and adaptive traffic management systems that enable vehicles to communicate to traffic control systems. These new innovations will affect the design and construction of the infrastructure and could potentially bring new revenue sources to the state.

CDOT's approach to wholesale improvements to the I-70 Mountain Corridor continues to evolve. The successes and advancement of RoadX and the limitations of currently available traditional funding will likely impact CDOT's long-term approach. CDOT will continue to balance the more pressing and immediate needs of the corridor with its readiness and preparations for the expected future changes and advancements in the transportation system with automated vehicles. Depending on the rate of these technology advancements, CDOT believes that the traffic needs of the I-70 Mountain Corridor may be reduced as vehicle automation increases the traffic-carrying capacity of the existing corridor, including vehicle throughput and the required footprint of any necessary widening. Given the merits of long-term investments in the Corridor that may not be fully realized with the emergence of future vehicle advancements, CDOT may be taking a wait-and-see approach to comprehensive improvements to the I-70 Mountain Corridor. While RoadX is in progress, CDOT is currently re-engaging with local and state stakeholders to re-examine the long-term improvement program for the I-70 Mountain Corridor, including the means of funding and financing the improvements, including tolling. Moving forward, flexibility and adaptive measures will undoubtedly be included in the program to appropriately include the advancements of the RoadX Program as they become evident and applicable.

### **Interstate System Tolling Policy Considerations**

The emerging federal policy direction regarding the tolling of the Interstate Highway System raises various implementation considerations as tolling becomes more mainstreamed and as states continue to look to toll financing to address the pressing needs for Interstate reinvestment and reconstruction. With the projected failure of the current Federal Highway Trust Fund to provide sufficient revenues to fund the surface transportation program authorized by Congress, renewed interest in tolling at the national level can be expected. As states continue to exercise the increased flexibility regarding tolling currently available, Congress will likely need to address a

broad range of policy issues relating to tolling in future authorizations. If and when tolling becomes more fully mainstreamed into federal policy, these broader national policy issues will need to be addressed to more fully integrate the implications of tolling into a comprehensive policy base for the nation's surface transportation system. Policy considerations relevant for discussions relating to broader tolling applications could include the following:

### **Role of Federal Funding for Tolloed Interstate Highways**

In a broad sense, the future federal role in tolloed Interstate highways will be determined by policies yet to be established by Congress to address the funding shortfall of the Highway Trust Fund. If tolling is established as a direct means of augmenting or replacing current revenues, expansion of the current federal role will need to be addressed and defined. Congress may elect to continue the current approach of piloting and demonstrating the benefits of tolling, or could more directly encourage the use of tolling by granting states greater flexibility. Furthermore, as part of a broader shift in funding policy, federal policy direction could require the conversion of segments of the Federal-aid system to tolloed highways, depending on the overall policy approach to address the revenue shortfalls. Future congressional action will thereby further define the federal role and address the policy direction of combining toll revenues with federal funds, including construction, operations and maintenance.

### **Transition to a Tolloed System**

An important consideration is the transition and integration of a tolloed Interstate system into the current system of Federal-aid highways. There are many factors potentially affecting this issue, including how directly and aggressively federal policy accelerates and forms this transition. Questions relating to the status, use and disposition of the existing Highway Trust Fund will need to be addressed by policymakers. Considerations could include a full transition away from the Highway Trust Fund, or an integrated approach whereas existing fuel-based tax revenues are limited for specific purposes, such as maintenance. With an integrated approach, questions relating to double taxation, which is a common public concern relating to tolling, will need to be addressed. Critical to this question will be the clear delineation of the uses and purposes of the funding sources and broader public understanding of the integrated funding approach to delivering the national surface transportation program. A national tolling policy needs to be understood to be an important part of solving the current insolvency of the Highway Trust Fund. As part of this transition, consideration will need to be given to the distribution of current Federal-aid maintenance funds to states.

### **Overall National Highway System Performance**

If the surface transportation system moves to a more fully-integrated system of tolloed and non-tolloed Interstate highways, the varying operating principals of the various segments that comprise the overall system could create competing performance expectations within the system. This could result in unbalanced dedication of revenue sources within the system for maintenance and expansion. A fully integrated system approach will need to be established to avoid



unreasonable prioritization of higher performance standards on the tolled segments. Uses of toll revenues will need to be less restrictive, in compliance with bonding covenants and other requirements, to avoid segment competition within the overall system. The quality of non-tolled segments cannot be unduly sacrificed in the interest of promoting travel, and thereby revenue generation, on the tolled segments of the overall system.

### **Efficiency of Administrative Costs and Revenue Uses**

The mechanics involved in collecting revenue for a tolled facility and the current fuel-based tax system are notably different. The process for collecting motor fuel taxes is administratively simple – taxes are collected at the wholesale stage rather than at the pump, thereby significantly reducing the number of collection points. This further supports strong collection enforcement. With a toll system, revenue is collected at the end customer level, thereby significantly increasing the number of collection points. With electronic toll collection, today's toll customer typically utilizes a pre-paid account with the provider, thereby considerably improving the efficiency and reliability of toll collections. While there are notable mechanical differences in the administrative efficiencies in the collection of revenues, there are also differences in the efficiencies in the administration in the uses of these revenues. Toll revenue uses are inherently more directly tied to and connected with the customer service or use for which the toll was charged. In other words, toll revenues are more directly spent on the maintenance and operations for the highway facility or system from where it was collected.

### **Regulation of Toll Rates and Pricing Equity**

Beyond a requirement that bridge tolls “shall be just and reasonable” and a provision limiting tolls on buses, current federal law provides no further restrictions on toll rates. In some instances, state, regional or local laws which enable tolling have placed controls over the setting of toll rates. While toll rates can be highly politicized and appropriate sensitivities are needed in the interest of public service, unnecessary regulation can have unintended consequences by negatively affecting the financial feasibilities of the tolled facility or system. But a more widespread use of tolling within the national highway system would raise questions about equity and the need for appropriate regulation or oversight for toll pricing. These issues could surface in a number of contexts. Geographically, whether within a region or between states, inequities in toll rates or in toll collection locations could unfairly shift the payment burden to travelers from other areas. This could adversely affect commerce at a local or state level and result in unfair payment burdens. While traditionally toll rates have been determined by market forces and the costs or impacts of the service provided, thereby typically justifying a higher toll for trucks, disproportionately shifting the cost burden to trucks could also adversely impact commerce. As the financial feasibility of tolling is dependent upon higher traffic volumes, disproportionate system service and performance could arise between rural and urban areas, creating another potential equity concern. From a much broader social perspective, toll pricing strategies could be utilized to affect comprehensive land use, modal and air quality goals, thereby affecting various sectors

of the public differently. Given these potential dynamics, for a nationwide program of tolling, it is conceivable that a federal role in rate setting would need to be discussed and enacted by Congress. A national framework for toll rate standards, guidance and oversight to assure fair and reasonable tolling applications would likely be necessary.

### **Roll of Private Sector in Tolloed Highways and Local Tolling Authorization**

The concept of tolling provides the benefit of a long-term dedicated revenue stream that can be capitalized to support the initial construction, operations and maintenance of the tolloed facility. Historically, this debt-financing structure has allowed private equity investment in the delivery and oversight of a tolloed facility. Today, the FHWA, through a number of legal provisions, encourages the public partnership with the private sector in the delivery of tolloed facilities. Partnering with the private sector can increase the overall funds invested in the system, thereby better leveraging any public funds, and can shift credit and delivery risks away from the public sector. Some of the available tools that encourage private investment include tax-exempt bonding, called Private Activity Bonds, and TIFIA (Transportation Infrastructure Finance and Innovation Act) which provides federal credit assistance and loans. With this partnership, however, comes the expectation of returns on the investment, and risks, assumed by the private sector. With a more broad-based role for tolling in the national funding system, important questions will need to be addressed at a national level regarding the appropriateness of private investment, including potential returns and losses, in the system's delivery. As the entities responsible for the delivery and oversight of the national highway system, if public-private partnerships are to be utilized, states will need to have the necessary abilities and legislative authorities to do so. While many states have already done so, regardless of whether or not public-private partnerships are to be utilized, states will need to have the appropriate authorities to enact tolling.

### **Toll Interoperability**

MAP-21 established new federal legislative requirements regarding electronic toll collection interoperability. In particular, MAP-21 requires that not later than four years after the law's enactment, all toll facilities on the Federal-aid highway system shall implement technologies or business practices that provide for the interoperability of electronic toll collection between independent toll systems. The tolling industry has responded to this directive and progress continues in this regard. While considerable progress has been made by the industry to fully implement interoperability, establishment of a national electronic architecture may need to be further considered should a more direct federal role in tolling be implemented. Additionally, federal provisions may need to be considered to better enable the collection and enforcement of tolls for out-of-state customers.

## **APPENDIX B – INTERSTATE TOLLING LEGAL ISSUES**

### **Introduction**

The Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for the I-80 Corridor across the state of Iowa (i.e., Planning Study). As part of that study, the Iowa DOT is looking to determine whether it is eligible to toll under existing legislation and, if so, whether it has the authority to move forward with a toll project. The purpose of this legal review is to summarize the applicable federal and state tolling legislation and identify any need for state action to support tolling in the future.

### **Applicable Federal Tolling Authority**

The federal authority available for consideration in the tolling of I-80 across the State of Iowa, includes:

- Title 23 USC Section 129 General Tolling Program
- Interstate System Reconstruction & Rehabilitation Pilot Program
- Title 23 USC Section 166 HOV (High Occupancy Vehicle) Facilities
- Value Pricing Pilot Program

### **Title 23 USC Section 129 General Tolling Program**

Under Title 23 USC Section 129(a)(1), federal participation is allowed in the following types of toll activities:

- Initial construction of a toll highway, bridge, or tunnel or approach to the highway, bridge, or tunnel;
- Initial construction of one or more lanes or other improvements that increase capacity of a highway, bridge, or tunnel (other than a highway on the Interstate System) and conversion of that highway, bridge, or tunnel to a tolled facility, if the number of toll-free lanes, excluding auxiliary lanes, after the construction is not less than the number of toll-free lanes, excluding auxiliary lanes, before the construction;
- Initial construction of one or more lanes or other improvements that increase the capacity of a highway, bridge, or tunnel on the Interstate System and conversion of that highway, bridge, or tunnel to a tolled facility, if the number of toll-free non-HOV lanes, excluding auxiliary lanes, after such construction is not less than the number of toll-free non-HOV lanes, excluding auxiliary lanes, before such construction;
- Reconstruction, resurfacing, restoration, rehabilitation, or replacement of a toll highway, bridge, or tunnel or approach to the highway, bridge, or tunnel;

- Reconstruction or replacement of a toll-free bridge or tunnel and conversion of the bridge or tunnel to a toll facility;
- Reconstruction of a toll-free Federal-aid highway (other than a highway on the Interstate System) and conversion of the highway to a toll facility;
- Reconstruction, restoration, or rehabilitation of a highway on the Interstate System if the number of toll-free non-HOV lanes, excluding auxiliary lanes, after reconstruction, restoration, or rehabilitation is not less than the number of toll-free non-HOV lanes, excluding auxiliary lanes, before reconstruction, restoration, or rehabilitation;
- Conversion of a HOV lane on a highway, bridge, or tunnel to a toll facility; and
- Preliminary studies to determine the feasibility of a toll facility for which federal participation is authorized under this paragraph.

Title 23 USC 129(a) also deals with ownership, revenues and financing.

It is unlikely that the type of tolling activities provided for under Title 23 USC 129 would be applicable to I-80 in Iowa. As an Interstate, any tolling done to I-80 would fall under the authority of the widening and/or reconstruction provisions which require that existing non-tolled lanes be preserved with the improvements. This tolling configuration would not likely be practical or feasible for rural stretches of the Interstate system.

### **Interstate System Reconstruction & Rehabilitation Pilot Program (ISRRP)**

The Interstate System Reconstruction & Rehabilitation Pilot Program was continued under SAFETEA-LU through the authority initially provided in Section 1216 (b) of the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21). MAP-21 did not make any changes to this program, however, the FAST Act made some modifications. The Program allows up to three existing Interstate facilities (highway, bridge, or tunnel) to be tolled to fund needed reconstruction or rehabilitation on that could not otherwise be adequately maintained or functionally improved without the collection of tolls. Each of the three facilities is required to be in a different state. No special funding is authorized for the Program. By law, Interstate maintenance funds may not be used on a facility for which tolls are being collected under this program. Note that the Interstate Maintenance Program was consolidated into the National Highway Performance Program under MAP-21. This program was maintained in the FAST Act.

The FAST Act changes that amended Section 1216(b) of TEA-21 entailed setting new time limits for an applicant to move from a provisionally-approved application to a completed application that fully satisfies the program's eligibility and selection criteria, for completing the environmental review and permitting under the National Environmental Policy Act (NEPA) and for executing a toll agreement with the Secretary. This section of the FAST Act sets the new requirements for eligibility, selection and completion.

- Eligibility – To be eligible to participate in the pilot program, a State shall submit to the Secretary an application that contains, at a minimum the following:
  - An identification of the facility on the Interstate System proposed to be a toll facility, including the age, condition, and intensity of use of the facility.
  - In the case of a facility that affects a metropolitan area, an assurance that the metropolitan planning organization established for the area has been consulted concerning the placement and amount of tolls on the facility.
  - An analysis demonstrating that the facility could not be maintained or improved to meet current or future needs from the State’s apportionments and allocations made available by this Act and from revenues for highways from any other source without toll revenues.
  - A facility management plan that includes –
    - a plan for implementing the imposition of tolls on the facility;
    - a schedule and finance for the reconstruction and rehabilitation of the facility using toll revenues;
    - a description of the public transportation agency that will be responsible for implementation and administration of the pilot program;
    - a description of whether consideration will be given to privatizing the maintenance and operational aspects of the facility, while retaining legal and administrative control of the portion of the Interstate route; and
    - such other information as the Secretary may require.
- Selection Criteria – The Secretary may approve the application of a State under the eligibility criteria only if the Secretary determines that:
  - the State is unable to reconstruct or rehabilitate the proposed toll facility using existing apportionments;
  - the facility has a sufficient intensity of use, age, or condition to warrant the collection of tolls;
  - the State plan for implementing tolls on the facility takes into account the interests of local, regional, and interstate travelers;
  - the State plan for reconstruction or rehabilitation of the facility using toll revenues is reasonable;
  - the State has given preference to the use of a public toll agency with demonstrated capability to build, operate, and maintain a toll expressway system meeting criteria for the Interstate System; and

- the State has the authority required for the project to proceed.
- Requirements for project completion -
  - General term for expiration of provisional application – An application provisionally approved by the Secretary under this subsection shall expire 3 years after the date on which the application was provisionally approved if the State has not:
    - submitted a complete application to the Secretary that fully satisfies the eligibility criteria and the selection criteria;
    - completed the environmental review and permitting process under the National environmental Policy Act of 1969 (NEPA) for the pilot project; and
    - executed a toll agreement with the Secretary.
  - Exceptions to expiration- Notwithstanding the general provision above, the Secretary may extend the provisional approval for not more than 1 additional year if the State demonstrates material progress toward implementation of the project as evidenced by:
    - substantial progress in completing the environmental review and permitting process for the project under NEPA;
    - funding and financing commitments for the pilot project;
    - expressions of support for the pilot project from State and local governments, community interests, and the public; and
    - submission of a facility management plan.

The ISRRP is a program that would be applicable to I-80 in Iowa. As some of the states previously approved for the program have rescinded their applications, slots may now be available for other states to participate in the program.

### **High Occupancy Vehicle (HOV) Facilities**

Title 23 USC Section 166 provides authority for public agencies to allow toll-paying vehicles that do not meet the minimum occupancy standards to use HOV lanes. Tolls under this section may be charged on both Interstate and non-Interstate facilities. There is no limit on the number of projects or the number of states that can participate.

Tolling of HOV facilities is not an applicable application for I-80 as HOV facilities are not currently in operation within the Corridor.

## Value Pricing Pilot Program (VPP)

The Value Pricing Pilot (VPP) Program encourages implementation and evaluation of VPP projects to manage congestion on highways through tolling and other pricing mechanisms. VPP projects may or may not involve tolls or pricing, as follows:

Projects Involving Toll:

- *Priced Lanes:* Pricing is applied on a limited number of lanes of a roadway.
- *Priced Roadways:* Pricing is applied on all lanes of a roadway facility.
- *Zone-Based Pricing:* Pricing is applied within a limited zone involving several roadway facilities.
- *Systemwide Pricing:* Pricing is applied within an entire metropolitan region or boundary.

The VPP Program is not applicable to Iowa for tolling the I-80 Corridor across the state as the program is designed to address traffic congestion and dynamic congestion pricing in metropolitan areas.

## State Enabling Legislation

23 USC Section 129 is the main federal enabling legislation on tolling and in that section, beyond the types of tolling that are eligible, it also specifically requires: If a State does not have a highway, bridge or tunnel toll facility as of the date of the enactment of MAP-21, before commencing any activity authorized under this section, the State shall have in effect a law that permits tolling on a highway, bridge or tunnel.

Iowa currently does not have legislation enabling tolling, except in certain instances related to bridges spanning waterways between Iowa and another state. The State of Iowa would likely need to enact enabling legislation to toll I-80. This legislation would need to grant the authority to enact and collect tolls, issue revenue bonds, enforce toll collection, and include other toll-related provisions. In addition, this legislation could include provisions enabling the entering into agreements with private entities for the construction, maintenance and operation of the facility, including the collection of tolls.

## Conclusion

Considering the programs available to enable tolling from the federal level, it does not appear that 23 USC 129, 23 USC 166 or the VPP Program are likely options for I-80 in Iowa. The ISRRP could potentially be an opportunity for Iowa if it is able to secure one of the three program slots. To be selected into the Pilot Program, the FAST Act requires the State to have the necessary local authority and approval. It further requires that local support for the project be demonstrated. This expression of support by local and state authorities may best be made evident and may require state enabling legislation. The FAST Act is not as specific in the ISRRP as



to what the required authority entails, as it is in 23 USC 129. It does not specifically call out the need to put law into effect. While there may not be prohibitions, legislation may be required to fully satisfy the ISRRP requirements.

## **APPENDIX C – TOLL COLLECTION SYSTEM CONFIGURATION**

### **Introduction**

Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for the I-80 Corridor across the state of Iowa (i.e., Planning Study). Since its original construction, this east-west highway corridor has linked the state's economic centers of the Quad Cities, Des Moines and Council Bluffs with each other and the nation's Interstate Highway System. But with age and continued growth of traffic, especially truck traffic, this corridor needs to be reconstructed to meet the demands of the next century. The Iowa DOT is conducting the Planning Study to determine the best approach for improving this vital transportation link statewide, while enabling localized improvements, to meet current and pressing rehabilitation and capacity needs, to be developed as the needs arise.

As part of the National Interstate Highway System, the original construction and maintenance of I-80 have been provided through the Federal-aid Highway Program, in addition to matching state funds. But given the magnitude of the improvement costs and the limited availability of federal and state funds, other sources of funding and financing should be considered. The Iowa DOT is conducting a planning-level study evaluating tolling as an alternative strategy for funding the improvements.

The purpose of this summary is to identify toll collection system configuration options and pricing strategies for the possible application of tolling I-80.

### **Concept of Tolling**

Tolls are direct roadway user fees charged to travelers for the use of a roadway facility. A toll is a fee for the service provided. These fees are typically and primarily used for funding and financing the construction, operation and maintenance of the facility. In some instances, however, tolls or road pricing can also be used for broader public objectives beyond revenue generation, such as for travel demand and congestion management. Typically in major metropolitan areas, road pricing can be used to reduce peak hour travel and associated congestion by shifting roadway travel to other modes and/or other less congested times of the day. These broader environmental and social goals include improved transportation system efficiencies, air quality, land use development densities, noise and safety.

For the I-80 Corridor, defined as the rural portions of I-80 across Iowa, the primary objective of tolling is to provide funds and financing, in whole or in combination with public funds, to construct, operate and maintain the improved facility for reliable and safe travel along the Corridor.

### **Pricing Considerations**

The setting of toll rates is typically driven by economic market forces. The principle basis of toll pricing is the economic benefit received by the traveler in terms of improved reliability, safety,

travel time, and overall costs of travel. The overall pricing regime is also based on fulfilling the goals of the facility. For the I-80 Corridor, toll rates would be established based on the goal of providing sufficient revenue to implement the Corridor's improvements while still being in line with the traveler economic benefits.

The overall pricing regime would include the following considerations:

- **Use of Facility** – Tolls would be based on the direct use of the facility and the service provided, charged on a per-mile basis. A common per-mile toll rate would be used across the Corridor for the various vehicle classifications.
- **Vehicle Classifications** – Based on the differences of benefits provided to the various vehicle classes and their different impact costs to the facility, different toll rates would be charged for autos and trucks. Due to greater travel benefits (labor, costs of travel, vehicle maintenance and safety) and higher relative impacts to the I-80 facility, higher tolls would be charged for trucks. While not considered in this study, further class differentiation could be provided for trucks based on number of axels and weight.
- **Variable Pricing** – Toll rates would be constant and would not be adjusted for time of day or congestion conditions.
- **Price Exemptions** – Accept as required by law, toll exemptions or limitations would not be included.

### **Toll Collection System Concept**

Along with pricing strategies, the configuration of the toll collection system can affect the amount of revenue collected and the ability to accomplish the overall goals of the program. For the I-80 Corridor, there are two primary types of toll collection system configurations: closed system and open system.

The concept of a closed system is to charge and collect tolls for all travel within the facility. This system charges a toll for the specific trip distance based on the point of entry and exit within the facility. This concept maximizes the revenue collection and distributes the burden of the toll evenly to all users. Toll collection infrastructure is therefore required at all mainline and ramp entry and exit locations to capture all travel. The toll collection system must be able to identify the points of entry and exit to determine the fee to be charged for each trip (i.e., a transaction). To simplify the complexities of toll collection, a variant of this concept is to use strategically located mainline barrier toll collection points combined with ramp collection points. This variant would normalize the tolls at each collection point based on average or typical usage.

An open toll collection system allows greater flexibility in the overall toll pricing and collection strategy. With an open system, not all travel within the facility is charged a toll. Based on the overall characteristics of travel within the facility, mainline toll collection points can be strategically located along the facility to match the prevailing travel characteristics within the facility.

Under this concept, local travel between the mainline collection points would be toll free. This concept does not maximize toll revenues, but does reduce the complexities of toll collections and the costs of toll collection infrastructure. This concept further simplifies the customer experience and billing process.

A comparison of the benefits of the two types of toll collection systems is as follows:

| Issue                                | Closed System   | Open System  |
|--------------------------------------|---|--|
| Revenue Generation                   | Maximizes revenue   | Does not maximize revenue  |
| Toll Customer Basis                  | All users pay   | Some local trips are toll free   |
| Toll Charge Equity                   | All users pay equally based on direct miles of use  | Only users at mainline toll points pay. Fees are based on typical mainline mileage usage                   |
| Toll Collection Infrastructure Costs | Highest cost – toll collection infrastructure is required at all entry and exit points              | Lower cost – toll collection infrastructure is required only at mainline tolling points                    |
| Toll Collection Process              | Most complex – the entry and exit point for each trip is required to determine the toll transaction | Simpler – each mainline tolling point passage is a transaction. A trip could include multiple transactions |
| Customer Convenience                 | More complex  | More simple  |

The determination of the best and most appropriate toll collection system for a particular facility depends on the goals of the project and the project’s unique travel patterns and characteristics. The I-80 Corridor includes the rural portions of I-80 – the metropolitan areas of Council Bluffs, Des Moines, Iowa City and the Quad Cities are not included. The travel characteristics within rural I-80 will influence the toll configuration. Future improvements within the urban areas not included in the I-80 Corridor will need to be coordinated with the rural improvements.

### **Toll Collection System (6-Lane Improvement Alternative)**

This improvement concept entails the widening and modernization of the roadway to provide six general purpose lanes across the state. Under this concept, all travel lanes would be tolled. Lane use restrictions would not be provided – autos and trucks would have access to all lanes. With this improvement concept, all travel within the Corridor would equally realize the benefits of the improvements.

Given the travel characteristics along the I-80 Corridor, with most travel being of a regional or intra-regional nature, the open system toll collection concept would be most appropriate for the 6-Lane Improvement Alternative. This type of system would appropriately capture the majority of

travel and usage along the Corridor without unnecessarily jeopardizing the ability to collect the revenue necessary to fund and finance the improvements. This concept further simplifies the toll collection process, improves the traveler convenience and reduces the amount of toll collection infrastructure. As the program entails the improvement of an existing Interstate, this concept provides the added benefit of strategically placing the burden of funding the improvements on the regional Interstate traveler, which is the primary source of the need for the improvements, while allowing some local travel to be toll free.

In addition to the overall objectives of the tolling program, there are several other factors affecting the optimal location of the mainline tolling points for an open system with the 6-Lane Improvement Alternative:

### **Corridor Entry and Exit Gateways**

Tolling points should be located near the ends of the Corridor as gateways into the tolled facility. At the western end, a tolling point should be located as near to Council Bluffs as reasonably possible. Similarly, at the east end, a mainline tolling point should be located close to the Quad Cities. While the gateway location is important to demarcate the entry into the toll system, tolling points at the outskirts of growing metropolitan areas need to be located sufficiently outside future suburban growth and development areas to avoid affecting future local travel.

### **Travel Markets**

The traffic volumes along the I-80 Corridor reflect the general travel markets served by the Corridor. Mainline tolling points should be located to capture the travelers for which the tolls are intended, based on goals of the program. Locating the tolling locations at the higher traffic volume locations would also maximize the revenue collected.

### **Spacing and Geographic Distribution**

Appropriate spacing of the mainline tolling points along the Corridor prevents the amount of the charge being an incentive to avoid the toll by diverting to local roads. If the charge is too high at a particular tolling location, traffic would be more motivated to divert from the facility to avoid the toll. However, too many tolling locations would unnecessarily increase the costs of the collection infrastructure and operations. Having a typical and uniform spacing also more evenly distributes the cost burden on the local traveler across the Corridor. The typical spacing should reflect the average trip length within the Corridor. For a rural Interstate, typical mainline tolling spacing should be less than 40 miles.

### **Local Toll Diversion**

The placement of a mainline tolling location needs to consider the ease of trip diversion along adjacent alternate roadways. While local diversion can be expected for local travelers who may be more knowledgeable about the alternative roadway network and would likely be using the

tolled roadway for shorter trips, mainline tolling locations need to be located where the local network wouldn't encourage diversion around the tolling point.

### Roadway System Connections

As evident by the traffic volumes and markets along the I-80 Corridor, the majority of travel along the Corridor is of a regional nature with longer travel lengths. Traffic volumes along the Corridor are generally uniform, with the highest volumes being between Iowa City and the Quad Cities. While connections to north-south highways distribute travel to other areas within the state, the predominant system connections occur at I-380 in Iowa City and at I-35 in Des Moines. The placement of mainline tolling locations needs to consider connections to secondary routes, such as US 71, US 169 and US 63.

Based on these considerations, the open system toll collection concept for the 6-Lane Improvement Alternative would entail the following mainline tolling locations:

| Corridor Segment | Tolling Station No. | Tolling Point MP | County               |
|------------------|---------------------|------------------|----------------------|
| Council Bluffs   |                     |                  |                      |
| 1                | 1                   | 10               | Pottawattamie County |
|                  | 2                   | 31               | Pottawattamie County |
|                  | 3                   | 59               | Cass County          |
|                  | 4                   | 91               | Adair County         |
|                  | 5                   | 116              | Dallas County        |
| Des Moines       |                     |                  |                      |
| 2                | 6                   | 146              | Polk County          |
|                  | 7                   | 176              | Jasper County        |
|                  | 8                   | 208              | Iowa County          |
|                  | 9                   | 234              | Johnson County       |
| Iowa City        |                     |                  |                      |
| 3                | 10                  | 257              | Cedar County         |
|                  | 11                  | 279              | Scott County         |
| Quad Cities      |                     |                  |                      |

### **Toll Collection System (10-Lane TOT Improvement Alternative)**

This improvement concept entails the widening and modernization of the roadway to provide four truck-only lanes and six general purpose lanes across the state. Under this concept, the truck-only lanes would be tolled – the six general purpose lanes would be toll free. Trucks would be restricted to the exclusive and separated truck-only lanes, located within the middle of the roadway section. Access to the truck-only lanes would be provided by slip ramps connecting the truck-only lanes with the general purpose lanes at various locations throughout the Corridor. Trucks would be restricted from the general purpose lanes, except for entering and exiting the Corridor. To enter and exit the truck-only lanes, trucks would utilize the slip ramps and would traverse and weave across the general purpose lanes to enter and exit the Corridor at the mixed-use interchange locations. Trucks would directly benefit from this improvement concept with an exclusive roadway allowing heavier loads and longer combination vehicles, as well as the avoidance of mixed vehicle traffic. Autos in the non-tolled lanes would benefit from the improved roadway section and the elimination of truck traffic within the general purpose lanes.

The intent of this improvement concept is to provide direct travel benefits to trucks by allowing higher weights and longer combination vehicles, thereby improving the efficiency of freight movement along the Corridor. Given the nature of truck traffic along the I-80 Corridor, which predominately consists of long-distance trips, an open system toll collection concept would be most appropriate for the 10-Lane TOT Improvement Alternative. With the ease of access to the adjacent general purpose lanes, to eliminate the avoidance of tolls by trucks within the TOT lanes, an overall concept of toll operations would need to be implemented to eliminate the potential leakage of toll revenue. This would include the consideration of special enforcement zones and truck restrictions in the general purpose lanes.

Similar to the 6-Lane Improvement Alternative, there are several factors affecting the optimal location of the TOT Lane tolling points for an open system along the I-80 Corridor. Based on these considerations, the open system toll collection concept for the 10-Lane TOT Improvement Alternative would entail the following TOT Lane tolling locations. Due to the higher costs of travel for trucks, fewer tolling points are required than the 6-Lane Improvement Alternative.

| <b>Corridor Segment</b> | <b>Tolling Station No.</b> | <b>Tolling Point MP</b> | <b>County</b>        |
|-------------------------|----------------------------|-------------------------|----------------------|
| Council Bluffs          |                            |                         |                      |
| 1                       | 1                          | 31                      | Pottawattamie County |
|                         | 2                          | 102                     | Dallas County        |
| Des Moines              |                            |                         |                      |



|             |   |     |               |
|-------------|---|-----|---------------|
| 2           | 3 | 176 | Jasper County |
|             | 4 | 208 | Iowa County   |
| Iowa City   |   |     |               |
| 3           | 5 | 279 | Scott County  |
| Quad Cities |   |     |               |

### Electronic Toll Collection

With advancements in technology, stopping or slowing down to pay a cash toll has become obsolete. Today, essentially all new or modern toll facilities utilize Electronic Toll Collection (ETC). This technology eliminates cash transactions and allows for free-flow travel at the tolling locations. In addition to traveler convenience, when compared to cash collections, ETC is safer, provides environmental benefits, costs considerably less to administer and is easier to audit.

There are three main components of ETC systems – Vehicle Recognition, Vehicle Classification and Account Identification. These components work together in order to complete a toll transaction. Vehicle recognition within the toll lane is accomplished through in-road and overhead sensors, cameras, vehicle-to-roadside communications, or a combination of these technologies. These devices are located at the tolling point either along the roadside, embedded in the pavement or suspended overhead on a gantry. As part of the vehicle recognition process, the vehicle classification is determined through these devices in accordance with the systems tolling regime (i.e., trucks versus autos). Information collected, either through an on-board electronic tag called a transponder or through the vehicle license plate, is then transmitted to a controller and the unique vehicle identity is associated with a specific user account through a relational database.

A summary of the technologies involved in ETC is as follows:

#### Transponders

The most common means of vehicle to roadside communications for vehicle identification used today is the electronic tag (i.e., transponder). For toll systems currently in operation, the use of transponders accounts for a majority of all toll transactions. Transponders, in the form of a sticker, are typically mounted to the windshield of the vehicle. A radio-frequency identification chip is embedded in the transponder and as the vehicle passes through a tolling point, the tag communicates with the roadside reader, usually mounted on an overhead gantry, to identify the tag. This information is then transmitted to a controller.

#### Overhead Cameras

The use of overhead cameras at the tolling points for vehicle identification is commonly called video tolling. Video tolling captures an image of the vehicle license plate as the vehicle passes through the tolling point. Optical character recognition software is then used to convert the li-

cense plate image into a discrete identification number. Depending on the overall concept of tolling operations, this technology can be used to identify vehicles not possessing a transponder for account identification and collections; or can be used for processing toll violations and transponder reader errors.

### **In-Road Sensors**

To recognize the presence of a vehicle within a tolling point, sensor systems are utilized, either within the roadway, along the roadside or overhead. There are several technologies used for this purpose. Traditionally, inductive sensors embedded in the pavement have been used. Treadles register a count of the number of axles for a passing vehicle. Light-curtain laser technologies can also be used to determine the shape of the vehicle to further different truck sub classifications. Sensors also help distinguish gaps between passing vehicles. These systems can identify up to 23 different vehicle classes, detect speeds, and measure vehicle lengths and number of axles.

An additional benefit of ETC is the establishment of a service provider-to-customer relationship, in which the benefits of ETC can be shared between the parties. Typically, toll customers open a pre-paid individual account with the service provider in exchange for a transponder. Tolls are then drawn against the account as toll transactions are incurred utilizing the transponder. Price incentives are typically offered to customers to encourage transponder use, including free access to the transponders. For customers without a transponder, video tolling is commonly used for toll collections. Given the higher cost of video tolling collections per transaction, typically a surcharge is incurred by the customer.

### **Concept of Toll Operations**

The concept of operations for tolling the I-80 Corridor would include both the use of transponders and video tolling. Transponders would be made available to customers through a marketing campaign. Customer incentives would be utilized to encourage transponder use. For the out-of-state traveler and other customers without a transponder, video tolling would be utilized for toll collections.

## **APPENDIX D – TOLLING PUBLIC OPINION SUMMARY**

### **Introduction**

The Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for the I-80 Corridor across the State of Iowa (i.e., Planning Study). Since its original construction, this east-west highway corridor has linked the state's economic centers of the Quad Cities, Des Moines and Council Bluffs with the nation's Interstate Highway System. With age and continued growth of traffic, especially truck traffic, this corridor needs to be reconstructed to meet the demands of the next century. The Iowa DOT is conducting the Planning Study to determine the best approach for improving this vital transportation link statewide. This improvement plan will allow localized solutions to be implemented to meet rehabilitation and capacity needs as these needs arise.

As part of the National Interstate Highway System, the original construction and maintenance of I-80 have been provided through the Federal-aid Highway Program, in addition to matching state funds. Given the magnitude of the improvement costs and the limited availability of Federal and state funds, other sources of funding and financing should be considered. The Iowa DOT is conducting a planning-level study to evaluate tolling as an alternative strategy for funding the improvements.

The purpose of this paper is to summarize the findings of public opinion research conducted by the Iowa DOT regarding tolling and to summarize available national public opinion on tolling. This information is provided for the Iowa DOT's consideration as it evaluates the possible application of tolling to fund and finance the I-80 Corridor's improvements.

### **I-80 Planning Study Public Opinion Survey**

In support of the Planning and Environmental Linkage Study, the Iowa DOT has implemented a public information program. The general intent of this program is to provide outreach to community stakeholders and the general public to ensure that they are informed of the project. More specifically, the program's purpose is to inform and raise awareness of the study, to generate interest from the general public and stakeholders, and to solicit feedback. Due to the length of the I-80 Corridor and the large population base surrounding I-80 (nearly one-third of Iowa's population), the program was constructed to reach out to a larger audience through online information and engagement. A project website is currently available to share updated information regarding the study. Included on the website is the opportunity for the general public and stakeholders to provide feedback and share their opinions through an on-line questionnaire opinion survey.

The on-line questionnaire was organized to gather I-80 traveler information and opinions regarding general demographics, nature of travel, general driving experience, operational concerns,

support of improvement concepts, and sufficiency of current funding. As of July 18, 2016, the results of the survey included 2,700 responses and offer the following observations:

### General

Nearly all of those surveyed currently view Iowa DOT's Interstate highways as a "C" average or better. A high majority of respondents believe congestion and travel times are trending up, would use alternate routes to I-80 if conditions worsen, and have a favorable opinion to adding truck-only lanes or general traffic lanes (particularly east of Des Moines). Specific results include:

- 65% of respondents travel on I-80 at least 20 miles a week.
- 44% of respondents travel on I-80 more than 50 miles a week.
- 51% of travel on I-80 is work-related.
- 66% of travelers consider I-80 to have high traffic.
- 87% of travelers expect traffic congestion to worsen in the future.
- 71% of travelers feel it will be important to add travel lanes in the future.

### Tolling

When specifically asked if tolling should be considered as a means of paying for Interstate improvements, 65% of respondents were opposed. When specifically asked under what conditions would alternate routes to I-80 be considered, while not a specific choice within the survey, some respondents commented that tolls would be a condition to choose an alternate route (roughly 4% of the 396 comments referenced tolling as a deterrent to using I-80). As a general representation of the prevailing public opinion, when asked to rate the condition of the Iowa Interstate system or what changes to the Interstate system would positively impact the respondent's quality of life, a high preponderance of the toll-related comments expressed general support for tolling. In general, these comments referenced their positive experiences with other state tolling systems and how tolling can help pay for the construction and maintenance of the Interstate. Similarly, when asked what changes would negatively impact their quality of life, roughly 22% of the comments referenced that tolling would negatively impact them.

### National Tolling Public Opinion

A number of public opinion surveys have been implemented throughout the country in recent years to assess the general public acceptance of tolling. These surveys have been conducted to understand the prevailing opinion of the general public regarding tolling as a means of constructing and maintaining the highway system, not for a specific project. These surveys have been conducted by representatives of the transportation community, including agencies, private consulting firms and non-profit research organizations.

### **International Bridge, Tunnel and Turnpike Association (IBTTA)**

In recent years, IBTTA has published several surveys that focus on the public perception of tolling to fund transportation. The collective goal of these surveys is to present data dispelling common tolling myths. Some myths include a perception that tolls are double taxation, expensive to collect and that all roads are already paid for. IBTTA highlights that nationally public acceptance for tolling as a source of funding is trending up. Surveys that IBTTA commissioned show that 72% of Americans would be in favor of toll roads if there was no other way to pay for critical transportation needs. Benefits of tolling highlighted by IBTTA include:

- 35 states/territories currently utilize tolling.
- Tolling is a pure user-based fee – if you don't use it, you don't pay.
- User-based fees are less regressive than other taxes, such as sales and gasoline taxes.
- Surveys show that public opinion is supportive of tolls, even in the current difficult revenue raising climate.
- Toll roads are less congested and modern technology is helping reduce travel times and convenience.
- Studies show all income levels support the option for toll roads, if value is received.

### **America THINKS**

The “America THINKS” survey was conducted in 2014 by HNTB. This survey was a tool to aid tolling initiatives in Texas, as well as nationwide. The results were similar to IBTTA and favorable regarding the public willingness to support toll roads if the outcome adds value. Survey findings include:

- Approximately 80% of respondents were in favor of tolling to improve transportation.
- Users value safety, condition and reliability of highway travel.
- 70% of Texans could be influenced to support tolling for faster and reliable travel.
- Three out of four Texans currently using toll systems are happy with the fee and value received.

### **The Mercatus Center**

The Mercatus Center at George Mason University published a tolling study in 2016, entitled “Tolling the Freeway: Congestion Pricing and the Economics of Managing Traffic”. The key findings included:

- Traffic congestion is increasing despite increased lanes and mass transit usage.
- Congested roads have a cost to the public in wasted time and air pollution.
- There is mixed evidence that tolling is a regressive tax.

- Equity concerns have limited the expansion of congestion pricing.
- Best solution is for states to toll interstate highways.
- Although initially opposed, the public supports tolls when value is provided.
- States should consider tolling on a trial basis to demonstrate its benefits.
- Advancements in technology are making toll collection more efficient and less expensive.

### **The Reason Foundation**

The Reason Foundation published a report on the public perception of tolling titled “Value Added Tolling – A Better Deal for America’s Highway Users”. This document explores the concerns of highway users and seeks to develop approaches that would benefit the interest of the public. The report concludes that public opinion on tolling will improve as tolled facilities are shown as a means of meeting our transportation needs. Identified ways to improve public opinion regarding tolls include: limiting toll revenue uses to the specific facility where they are collected; using tolls to replace existing fuel taxes, not in addition to them; and providing a better level of service with the tolled facility. Others key takeaways include:

- Improved fuel economy and no fuel tax increases mean the public pays less now than before.
- DOT research supports shifting to user fees from gas taxes in the future.
- Cost of collection for modern tolling is equal to cost of collection for gas tax.

## **APPENDIX E – TOLL TRAFFIC AND REVENUE**

### **Introduction**

The Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for the I-80 Corridor across the State of Iowa (i.e., Planning Study). Since its original construction, this east-west highway corridor has linked the state’s economic centers of the Quad Cities, Des Moines and Council Bluffs with the nation’s Interstate Highway System. With age and continued growth of traffic, especially truck traffic, this corridor needs to be reconstructed to meet the demands of the next century. The Iowa DOT is conducting the Planning Study to determine the best approach for improving this vital transportation link statewide. This improvement plan will allow localized solutions to be implemented to meet rehabilitation and capacity needs as these needs arise.

As part of the National Interstate Highway System, the original construction and maintenance of I-80 have been provided through the Federal-aid Highway Program, in addition to matching state funds. Given the magnitude of the improvement costs and the limited availability of Federal and state funds, other sources of funding and financing should be considered. The Iowa DOT is conducting a planning-level study to evaluate tolling as an alternative strategy for funding the improvements.

The purpose of this summary is to present the assumptions, methodologies and estimates of projected toll revenue for the toll financing study.

### **Corridor Traffic Analysis**

Baseline traffic projections were provided by the Iowa DOT for the Corridor for 2015 and 2040. These projections were developed using the iTRAM travel demand forecasting model and included the widening of the I-80 Corridor for each improvement alternative. The following tables present the baseline traffic projections for the two improvement alternatives at each proposed tolling location.

#### ***6-LANE IMPROVEMENT ALTERNATIVE – BASELINE AVERAGE ANNUAL DAILY TRAFFIC***

| <b>Toll Location</b> | <b>2015</b>  |             |              | <b>2040</b>  |             |              |
|----------------------|--------------|-------------|--------------|--------------|-------------|--------------|
|                      | <b>Total</b> | <b>Auto</b> | <b>Truck</b> | <b>Total</b> | <b>Auto</b> | <b>Truck</b> |
| 1                    | 21,303       | 13,634      | 7,669        | 33,490       | 21,434      | 12,056       |
| 2                    | 23,548       | 14,835      | 8,713        | 35,567       | 22,407      | 13,160       |
| 3                    | 20,136       | 12,082      | 8,054        | 31,569       | 18,941      | 12,628       |
| 4                    | 22,139       | 13,726      | 8,413        | 34,601       | 21,453      | 13,148       |



|    |        |        |        |        |        |        |
|----|--------|--------|--------|--------|--------|--------|
| 5  | 36,340 | 27,255 | 9,085  | 64,145 | 48,109 | 16,036 |
| 6  | 37,360 | 26,899 | 10,461 | 62,523 | 45,017 | 17,506 |
| 7  | 28,240 | 18,074 | 10,166 | 50,759 | 32,486 | 18,273 |
| 8  | 27,578 | 17,374 | 10,204 | 48,888 | 30,800 | 18,088 |
| 9  | 32,327 | 21,659 | 10,668 | 60,186 | 40,325 | 19,861 |
| 10 | 38,259 | 24,486 | 13,773 | 72,454 | 46,371 | 26,083 |
| 11 | 36,647 | 23,088 | 13,559 | 75,309 | 47,445 | 27,864 |

***10-LANE TOT IMPROVEMENT ALTERNATIVE – BASELINE AVERAGE ANNUAL DAILY TRAFFIC***

| Toll Location | 2015   |        |        | 2040   |        |        |
|---------------|--------|--------|--------|--------|--------|--------|
|               | Total  | Auto   | Truck  | Total  | Auto   | Truck  |
| 1             | 23,582 | 14,857 | 8,725  | 35,703 | 22,493 | 13,210 |
| 2             | 25,482 | 17,073 | 8,409  | 43,209 | 28,950 | 14,259 |
| 3             | 28,355 | 18,147 | 10,208 | 53,056 | 33,956 | 19,100 |
| 4             | 27,715 | 17,460 | 10,255 | 51,743 | 32,598 | 19,145 |
| 5             | 37,078 | 23,359 | 13,719 | 89,082 | 56,122 | 32,960 |

**Traffic and Toll Revenue Estimates**

A planning-level analysis of projected toll traffic and revenue was performed for the two improvement alternatives. Based on the alternatives' toll collection configuration and the base traffic projections, annual estimates of toll revenue were developed based on an assumed overall toll pricing strategy and estimates of travel diversion caused by the introduction of tolls.

**Toll Pricing Strategy**

For this conceptual toll analysis, an optimal pricing strategy to maximize the revenue potential was not determined. Rather, a typical and reasonable pricing scheme was assumed based on current and customary industry practices. As a basis of analysis, an overall pricing scheme similar to other active rural Interstate toll roads, similar to the I-80 Corridor, was assumed – the Kansas Turnpike and the Oklahoma Turnpike. While likely under the full revenue generating potential, utilizing customary and proven toll rates for a rural Interstate provides confidence in the legitimacy and practicality of the overall approach to pricing. While conservative, this approach provides a reasonable test of the concept's financial feasibility. It further supports the reasonableness of the study's conclusions. Should tolling be considered further, additional studies would be required to identify the right and optimal pricing strategy for the project.

In consideration of these factors, the assumed overall pricing regime for the I-80 Corridor tolling analysis includes the following assumptions:

- **Use of Facility** – Tolls would be based on the direct use of the facility and the service provided, charged on a per-mile basis. A common per-mile toll rate would be used across the Corridor for the various vehicle classifications.
- **Vehicle Classifications** – Based on the differences of benefits provided to the various vehicle classes and their different impact costs to the facility, different toll rates would be charged for autos and trucks. Due to greater travel benefits (labor, costs of travel, vehicle maintenance and safety) and higher relative impacts to the I-80 facility, higher tolls would be charged for trucks. While not considered in this study, further class differentiation could be provided for trucks based on number of axels and weight.
- **Fixed Pricing** – Toll rates would be constant and would not be adjusted for time of day or congestion conditions.
- **Price Exemptions** – Accept as required by law, toll exemptions or limitations would not be included.
- **Toll Rates** - \$0.08 per mile for autos and \$0.24 per mile for all trucks (no additional sub-classifications for trucks) at time of opening.

### **Toll Revenue Estimating Methodologies**

To estimate the annual projected toll revenue, the potential of toll diversion was estimated to determine the toll traffic volumes for both autos and trucks. Utilizing factors reflecting traveler preferences, as identified in the project's public opinion survey, and ease of alternative routes considering the economics of travel, estimates of annual toll traffic were developed. To estimate the projected annual toll revenue, the following methodologies and assumptions were used:

- **Toll Diversion Scenarios** – To assess the sensitivity of the Corridor's financial capacity to traffic and toll diversion, in lieu of a singular revenue forecast for the overall pricing strategy, a range of potential projected toll revenue was developed. Two planning scenarios were utilized – Low Diversion and High Diversion. These two scenarios reflect the potential range of traffic diversion, and resulting toll revenue, considering both local and regional travel characteristics at each tolling location. For local traveler aversion, tolling stations were located to discourage localized trip diversion. Utilizing varying diversion factors for local and regional trips, and based on the travel characteristics at each tolling location, the resulting corridor-wide diversion was 16% to 33% for the 6-Lane Improvement Alternative and 24% to 40% for the 10-Lane TOT Improvement Alternative. For the purposes of this planning-level study, the range of projected toll revenue presents a reasonable forecast for the conceptual analysis. Later, more detailed analysis would provide specific estimates of toll traffic and revenue for a variety of toll pricing strategies to identify the optimal pricing plan and its projected toll revenue for the project.

- **Opening Dates** – The project would be constructed in three main segments, each with a segment-wide opening date. The overall Program Implementation Plan presents the phasing of construction and opening of segment operations assumed for the analysis.
- **Annual Toll Rate Increases** – An annual inflationary toll rate increase of 2.0% was assumed.
- **Video Tolling Surcharge** – A toll rate surcharge would be included for transactions utilizing video tolling. It is assumed that this surcharge would be sufficient, in practice, to cover the additional costs of administering the additional billing and collections processes.
- **Toll Violations** – A nominal leakage of revenue through toll violations and non-payment would likely occur. For this analysis, it was assumed that fines and collections procedures for recovery of lost revenue would be in place to account for toll violations.
- **Operational Ramp-up** – A three-year ramp-up period was assumed for toll collections.
- **Costs of Travel** – It is assumed that the overall costs and economics of travel, including vehicle operating costs, fuel costs and the monetized value of time, would not change relative to the toll pricing, including the inflationary increases, over the life of the project.
- **Annualized Revenue** – It is assumed that the average annual daily traffic projections, provided by the Iowa DOT, reflect the annualized daily travel normalized for seasonal and weekday/weekend variations. On this basis, annual revenue days were assumed to be 365 days a year.

### Annual Projections of Gross Toll Revenue

The following table presents the projected annual gross toll revenue for the two improvement alternatives.

*ANNUAL GROSS TOLL REVENUE (\$M)*

| Year | 6-Lane Alternative |                | 10-Lane TOT Alternative |                |
|------|--------------------|----------------|-------------------------|----------------|
|      | Low Diversion      | High Diversion | Low Diversion           | High Diversion |
| 2025 | \$100              | \$82           | \$60                    | \$48           |
| 2026 | \$286              | \$229          | \$163                   | \$128          |
| 2027 | \$477              | \$379          | \$175                   | \$138          |
| 2028 | \$507              | \$403          | \$187                   | \$148          |
| 2029 | \$535              | \$426          | \$300                   | \$237          |
| 2030 | \$558              | \$444          | \$316                   | \$250          |
| 2031 | \$582              | \$463          | \$334                   | \$264          |
| 2032 | \$607              | \$483          | \$350                   | \$276          |

|      |         |         |       |       |
|------|---------|---------|-------|-------|
| 2033 | \$634   | \$504   | \$366 | \$289 |
| 2034 | \$661   | \$526   | \$383 | \$303 |
| 2035 | \$690   | \$549   | \$401 | \$317 |
| 2036 | \$720   | \$573   | \$420 | \$332 |
| 2037 | \$751   | \$598   | \$440 | \$347 |
| 2038 | \$783   | \$623   | \$460 | \$363 |
| 2039 | \$817   | \$650   | \$481 | \$380 |
| 2040 | \$853   | \$679   | \$504 | \$398 |
| 2041 | \$890   | \$708   | \$527 | \$416 |
| 2042 | \$928   | \$739   | \$552 | \$436 |
| 2043 | \$968   | \$771   | \$578 | \$456 |
| 2044 | \$1,010 | \$804   | \$605 | \$477 |
| 2045 | \$1,054 | \$839   | \$633 | \$500 |
| 2046 | \$1,100 | \$875   | \$662 | \$523 |
| 2047 | \$1,147 | \$913   | \$693 | \$547 |
| 2048 | \$1,197 | \$953   | \$726 | \$573 |
| 2049 | \$1,249 | \$994   | \$759 | \$599 |
| 2050 | \$1,303 | \$1,037 | \$795 | \$627 |

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## APPENDIX F – PROGRAM COSTS

### Introduction

The Iowa Department of Transportation (Iowa DOT) is performing a Planning and Environmental Linkage (PEL) Study for the I-80 Corridor across the State of Iowa (i.e., Planning Study). Since its original construction, this east-west highway corridor has linked the state's economic centers of the Quad Cities, Des Moines and Council Bluffs with the nation's Interstate Highway System. With age and continued growth of traffic, especially truck traffic, this corridor needs to be reconstructed to meet the demands of the next century. The Iowa DOT is conducting the Planning Study to determine the best approach for improving this vital transportation link statewide. This improvement plan will allow localized solutions to be implemented to meet rehabilitation and capacity needs as these needs arise.

As part of the National Interstate Highway System, the original construction and maintenance of I-80 have been provided through the Federal-aid Highway Program, in addition to matching state funds. Given the magnitude of the improvement costs and the limited availability of Federal and state funds, other sources of funding and financing should be considered. The Iowa DOT is conducting a planning-level study to evaluate tolling as an alternative strategy for funding the improvements.

The purpose of this summary is to document the assumptions and methodologies for estimating the overall program delivery, construction and operations and maintenance costs for two alternative tolling improvement options. This information provides the basis of costs for the toll financial analysis.

### Program Implementation Plan

For the purposes of the toll financing analysis, a conceptual Program Implementation Plan was developed. The overall plan includes all activities necessary for the planning, financing, design and construction of the improvements, leading to the opening of the project to traffic. This plan, defined for each improvement alternative, includes the sequencing and timing of these activities. While conceptual, these steps reflect in general the major actions necessary to implement the toll program. Depending on the outcomes of the Planning Study, there are a number of ways the improvement program could be delivered. Based on the Planning Study's recommended improvement strategy, an appropriate and more detailed improvement plan would be defined. The following implementation plan was conceptually defined for the purpose of the tolling financial feasibility analysis.

The execution of the program's implementation would commence upon the completion of the Planning Study. The ability to move forward with tolling is contingent upon securing the necessary authorizations and approvals, including enabling state legislation. State legislation would establish the overall governance and delivery framework for the program. Advancing the toll

program would entail a series of follow-up decisions, coordination points and approvals with the FHWA, local officials and other regulatory approving agencies, supported by more detailed technical analysis and public, agency and industry involvement. FHWA approval for the Interstate System Reconstruction and Rehabilitation Pilot Program would need to be granted. In coordination with the FHWA, at the appropriate time, an overall Project Management Plan would also need to be developed and administered to oversee the program's successful completion.

Another important decision affecting the overall plan is the identification of the best delivery approach. A number of factors would affect this determination. In addition to other considerations, these factors include: the availability of management, design and construction resources, particularly considering the size of the program; the best-value approach for financing the program (often called a value-for-money analysis to determine if it's advantageous to use a public-private partnership or finance publically); the best management structure to assure accountability for quality and timely delivery, and control and ownership of program-related risks; and opportunities for local contractors and suppliers.

For the purposes of this analysis, it was assumed that a new and independent tolling authority would be created. This Authority would then contract with the Iowa DOT, consultants, advisors, contractors and other third-parties as appropriate for all services necessary to deliver the program. It was also assumed that an accelerated delivery approach would be used to design and construct the improvements. The project would be delivered according to three major segments – Segment 1 (Council Bluffs to Des Moines), Segment 2 (Des Moines to Iowa City) and Segment 3 (Iowa City to Quad Cities). While there are a number of ways the construction could be phased, this assumption provides a reasonable basis for the financial analysis. The 6-Lane Improvement Alternative would be constructed in five years. Due to the additional size and scope of the 10-Lane TOT Improvement Alternative, a seven-year construction period was assumed. All services and activities necessary to ready the program for the bond issuance and construction lettings would be paid through other sources. The bond proceeds would fund all activities following issuance.

Important elements of the tolling implementation plan would include the following major activities:

- **NEPA Environmental Studies** – Through adoption of the Planning Study findings, National Environmental Policy Act (NEPA) studies would be required to secure the necessary environmental approvals and permits. Tolling would be an important consideration in these studies.
- **Enabling Legislation, Authorizations and Agreements** – All necessary approvals and authorizations would need to be obtained prior to bond issuance, including FHWA approvals, state authorization, and the establishment of the new toll organization.
- **Toll Authority Start-up** – The new Authority would need to be created organizationally and operationally to be prepared for the administration of the implementation program

and continued toll operations. Activities would include hiring an executive director and other key management staff; establishing business, communications, and administration functions; establishing an administrative and customer service center facility; initiating agency communications, marketing and branding; acquiring toll collection central communications equipment and software; and acquiring business information equipment and software. Consultants would need to be hired to advise and assist in the agency start-up.

- **Investment-Grade Traffic and Revenue Studies** – More detailed study of toll traffic and revenue would be required to support the bond financing.
- **Bonding Preparations** – Legal and financial planning and underwriting services would be required to support the implementation program and the issuance of bonds.
- **Preliminary Design and Right-of-way Plans** – Upon completion of the NEPA studies, preliminary design would be necessary to define the construction program and right-of-way requirements.
- **Program Management** – Overall management resources would be required to oversee all activities necessary to deliver the program, including management, engineering, right-of-way acquisition, financial and legal services. This activity would oversee all aspects of the construction procurements, right-of-way acquisition, construction contract compliance, the quality management program and all other financial and legal compliance requirements of the construction program.
- **Final Design and Construction** – In addition to the construction costs, final design would be required and the construction contracts would need to be procured, right-of-way acquired, and construction quality would be managed through inspection and compliance audits.

Based on this conceptual and generalized implementation plan, the following construction schedule is assumed for the two improvement alternatives, as shown in the following table.

***CONSTRUCTION SCHEDULE FOR TOLLING***

| Segment | 6-Lane Alternative |              | 10-Lane TOT Alternative |              |
|---------|--------------------|--------------|-------------------------|--------------|
|         | Begin              | Opening      | Begin                   | Opening      |
| 1       | Jan. 1, 2023       | Jan. 1, 2027 | Jan. 1, 2025            | Jan. 1, 2029 |
| 2       | Jan. 1, 2022       | Jan. 1, 2026 | Jan. 1, 2022            | Jan. 1, 2026 |
| 3       | Jan. 1, 2022       | Jan. 1, 2025 | Jan. 1, 2022            | Jan. 1, 2025 |

**Construction Capital Costs**

Estimates of construction costs, including roadway, bridges, drainage, earthwork, signage, lighting and incidentals, were provided by the Iowa DOT for each improvement alternative. Estimates were based on current construction bid tabulations with a 2.5 percent per year cost esca-



lation to account for inflation. Cost contingencies were included. Cost estimates were provided for year 2016.

Construction cost estimates were developed for the tolling infrastructure based on the assumed toll collection configurations for each improvement alternative. These construction elements include the toll collection equipment at each tolling station. The communications infrastructure backbone is included in the road and bridge construction estimates.

The following table presents the construction cost estimates for the two alternatives. These estimates reflect the anticipated design and construction costs for each segment for the assumed year of expenditure, including road, bridge and toll infrastructure design and construction. A five percent cost factor was included for design engineering.

***TOTAL DESIGN AND CONSTRUCTION COSTS (YEAR OF EXPENDITURE) - \$M***

| Improvement<br>Alternative | Corridor Segment |         |         |         |
|----------------------------|------------------|---------|---------|---------|
|                            | 1                | 2       | 3       | Total   |
| 6-Lane                     | \$1,671          | \$1,356 | \$592   | \$3,618 |
| 10-Lane TOT                | \$3,783          | \$2,922 | \$1,275 | \$7,980 |

**Program Delivery Costs**

Overall program costs are included in the following table. Total costs reflect the sum of annual costs (i.e., year of expenditure), evenly distributed over the period of the activity, plus inflation, as appropriate. In some cases, percentages of construction costs based on common industry practices were used as a basis for the estimates. The final design and construction costs include all related program costs, including procurement, right-of-way acquisition and the construction quality management. These estimates are conceptual and are a reasonable estimate of all costs necessary to fully implement the program.

***TOTAL PROGRAM COSTS (YEAR OF EXPENDITURE) - \$M***

| Program Cost<br>Item                    | 6-Lane<br>Alternative | 10-Lane TOT<br>Alternative |
|---|-----------------------|----------------------------|
| NEPA Environmental Studies              | \$22                  | \$25                       |
| Enabling Legislation and Authorizations | \$4                   | \$9                        |
| Toll Authority Start-up                 | \$14                  | \$14                       |
| Investment Grade T&R Study              | \$3                   | \$6                        |
| Bond Issuance Preparations              | \$6                   | \$13                       |
| Preliminary Design and ROW Plans        | \$29                  | \$63                       |

|  |                |                |
|--|----------------|----------------|
| Program Management                     | \$44           | \$95           |
| Final Design and Construction (Total): |                |                |
| Procurement/Quality/ROW Acquisition    | \$122          | \$314          |
| Design and Construction (Total)        | \$3,618        | \$7,980        |
| <b>Total Program Costs</b>             | <b>\$3,861</b> | <b>\$8,520</b> |

### Operation and Maintenance Costs

The recurring costs of toll operations and maintenance include all expenses incurred by the Authority for the continued operations of the organization once toll operations begin. Utilizing data from similar toll authorities currently in operations, normalized annual cost factors for the major key organizational functions were developed based on the unique characteristics of those agencies. Adjustments to these cost factors were applied to reflect the unique circumstances of the I-80 Corridor. These factors were defined based on overall size (i.e., lane miles), annual gross toll revenues, annual miles of travel, and annual number of toll transactions for the representative agencies.

The total estimates of operations and maintenance costs were based on the following key budgetary functions of the Authority:

- **Administration** – Annual salary and operational expenses for the Authority Board, Executive Director and other management staff, including communications, business and engineering staff.
- **Insurance** – Use and occupancy insurance annual premiums.
- **Toll Collection** – Expenses for staff, equipment and operations for toll revenue collections.
- **Highway Patrol** – Expenses for staff and equipment for highway patrol and toll violation enforcement.
- **Maintenance** – Costs of ongoing snow and ice control, roadside maintenance, and minor infrastructure repair and rehabilitation.
- **Replacement Reserve** – Annual deposits to a fund for major infrastructure replacement.

The annual estimates of ongoing operations and maintenance for each improvement alternative are presented in the following table. An annual cost inflation factor of two percent was included. As annual operations and maintenance are a function of system usage, in addition to the size of the system, annual costs are provided for both the low and high diversion traffic scenarios. These estimates also reflect the timing of the project delivery as each segment is opened to traffic and generates toll revenue. The annual net toll revenue, which is pledged for the toll revenue bond financing, is the gross toll revenue minus these operations and maintenance costs.

***ANNUAL TOLL AUTHORITY OPERATIONS AND MAINTENANCE COSTS (\$M)***

| Year | 6-Lane Alternative |                | 10-Lane TOT Alternative |                |
|------|--------------------|----------------|-------------------------|----------------|
|      | Low Diversion      | High Diversion | Low Diversion           | High Diversion |
| 2025 | \$45               | \$41           | \$37                    | \$35           |
| 2026 | \$119              | \$107          | \$97                    | \$92           |
| 2027 | \$202              | \$182          | \$101                   | \$95           |
| 2028 | \$210              | \$188          | \$104                   | \$98           |
| 2029 | \$217              | \$195          | \$179                   | \$170          |
| 2030 | \$224              | \$200          | \$184                   | \$174          |
| 2031 | \$231              | \$207          | \$189                   | \$179          |
| 2032 | \$238              | \$213          | \$194                   | \$184          |
| 2033 | \$246              | \$220          | \$200                   | \$188          |
| 2034 | \$254              | \$226          | \$205                   | \$193          |
| 2035 | \$262              | \$233          | \$211                   | \$198          |
| 2036 | \$271              | \$241          | \$216                   | \$203          |
| 2037 | \$280              | \$248          | \$222                   | \$209          |
| 2038 | \$289              | \$256          | \$228                   | \$214          |
| 2039 | \$298              | \$264          | \$235                   | \$220          |
| 2040 | \$308              | \$273          | \$241                   | \$226          |
| 2041 | \$319              | \$281          | \$248                   | \$232          |
| 2042 | \$329              | \$290          | \$255                   | \$238          |
| 2043 | \$340              | \$300          | \$263                   | \$245          |
| 2044 | \$352              | \$309          | \$270                   | \$251          |
| 2045 | \$363              | \$319          | \$278                   | \$258          |
| 2046 | \$376              | \$330          | \$286                   | \$265          |
| 2047 | \$389              | \$341          | \$294                   | \$273          |
| 2048 | \$402              | \$352          | \$303                   | \$280          |
| 2049 | \$416              | \$363          | \$312                   | \$288          |
| 2050 | \$430              | \$375          | \$321                   | \$296          |

## APPENDIX G – FINANCIAL FRAMEWORK

### Questions:

What amount of debt proceeds can be generated by leveraging projected toll revenues on I-80 throughout the State of Iowa? How much of project costs will these proceeds cover? At what financing cost?

### Analysis:

Planning level analysis providing a range of estimated debt proceeds.

|   | Assumptions                                     | Considerations   | Preliminary Framework  |
|---|---|--|--|
| 1 | Source(s) of financing                          | <ul style="list-style-type: none"> <li>▪ Toll revenue bonds</li> <li>▪ Toll revenue bonds &amp; TIFIA loan combination</li> <li>▪ Public-private partnership</li> </ul>  | <ul style="list-style-type: none"> <li>▪ 33% TIFIA; 67% toll revenue bonds</li> </ul>  |
| 2 | Governance                                      | <ul style="list-style-type: none"> <li>▪ Independent Authority</li> <li>▪ Iowa DOT</li> <li>▪ Speed with which a toll rate increase can be implemented is a key rating factor</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Independent Authority with autonomous toll setting authority</li> </ul>   |
| 3 | Repayment source(s)                             | <ul style="list-style-type: none"> <li>▪ Toll revenues only</li> <li>▪ Toll revenues backed by a general obligation or other state transportation revenues</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Toll revenues only; non-recourse</li> <li>▪ 2 improvement/tolling strategies</li> </ul>   |
| 4 | Rate covenant & projected debt service coverage | <ul style="list-style-type: none"> <li>▪ Tolls must be set to ensure revenues exceed debt service by a certain minimum amount to comply with bond document covenants</li> <li>▪ Gross or net (of O&amp;M costs &amp; renewal and replacement costs) pledge</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Net pledge</li> <li>▪ Bonds &amp; TIFIA: <ul style="list-style-type: none"> <li>○ 1.25x rate covenant</li> <li>○ 1.75x projected coverage</li> </ul> </li> </ul>  |
| 5 | Reserve funds                                   | <ul style="list-style-type: none"> <li>▪ Provides resources to draw on if tolls insufficient to meet debt service</li> <li>▪ Increases amount of bond proceeds required in order to fund reserve</li> <li>▪ To obtain desirable credit quality also may need to establish a toll stabilization fund</li> </ul> | <ul style="list-style-type: none"> <li>▪ Bonds &amp; TIFIA: DSRF equal to lesser of maximum annual debt service, 125% average annual debt service, or 10% outstanding par</li> <li>▪ Toll stabilization fund funded over time with excess revenue</li> </ul> |
| 6 | Final maturity/term of financing                | <ul style="list-style-type: none"> <li>▪ Useful life of financed assets</li> <li>▪ Ability to repay/level of projected revenues</li> <li>▪ Policy on length of financings</li> <li>▪ As a flexible lender, TIFIA max term is 35 years from substantial completion</li> </ul>                                   | <ul style="list-style-type: none"> <li>▪ Bonds: 30 years from issuance</li> <li>▪ TIFIA: 35 years from substantial completion</li> </ul>   |

|    | Assumptions            | Considerations   | Preliminary Framework  |
|----|------------------------|--|--|
| 7  | Amortization structure | <ul style="list-style-type: none"> <li>▪ Ability to repay               <ul style="list-style-type: none"> <li>○ Timing and level of projected revenues</li> <li>○ Traffic / toll revenue forecast</li> </ul> </li> <li>▪ Policy on average life of financing</li> <li>▪ As a flexible lender, TIFIA repayments must begin w/in 5 years after substantial completion; amortization otherwise flexible</li> </ul>                               | <ul style="list-style-type: none"> <li>▪ Bonds: Level debt service after interest only ramp up period</li> <li>▪ TIFIA: No repayments until 5 years after substantial completion followed by level debt service</li> </ul>   |
| 8  | Number of financings   | <ul style="list-style-type: none"> <li>▪ Length of construction period</li> <li>▪ Incurring interest costs prior to need for proceeds</li> <li>▪ IRS's stringent rules regarding interest earnings on invested tax-exempt bond proceeds</li> <li>▪ Future issuances subject to additional bonds test requiring toll revenues to exceed debt service by a certain amount</li> </ul>   | <ul style="list-style-type: none"> <li>▪ 5 year construction period w/uniform funding needs</li> <li>▪ Single bond issuance</li> <li>▪ Single TIFIA loan (drawn down as needed)</li> </ul>   |
| 9  | Costs of issuance      | <ul style="list-style-type: none"> <li>▪ Include legal fees, financial advisor fees, underwriter's discount, trustee costs, etc.</li> <li>▪ Nationally, such costs average 0.8% of proceeds</li> <li>▪ Costs for establishing a new credit may be higher</li> </ul>  | <ul style="list-style-type: none"> <li>▪ 1.0% of proceeds</li> </ul>   |
| 10 | Credit rating          | <ul style="list-style-type: none"> <li>▪ Rating agencies review various quantitative and qualitative factors, including:               <ul style="list-style-type: none"> <li>○ Asset type</li> <li>○ Operating history</li> <li>○ Service area characteristics and competing facilities</li> <li>○ Traffic profile and trends</li> <li>○ Ability and willingness to raise rates</li> <li>○ Debt service coverage ratio</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>▪ Assumptions made with goal of obtaining 'A' rating               <ul style="list-style-type: none"> <li>○ To be finalized after review of traffic, revenue, and O&amp;M forecast</li> </ul> </li> </ul>   |
| 11 | Interest rates         | <ul style="list-style-type: none"> <li>▪ Driven by credit rating and market conditions at time of issuance</li> <li>▪ Fixed and/or variable rate options</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Based on historic average interest rates for credit rating, plus a cushion               <ul style="list-style-type: none"> <li>○ To be finalized after review of traffic, revenue, and O&amp;M forecast</li> </ul> </li> <li>▪ 100% fixed rate debt</li> </ul> |

**Notes:** This analysis will provide an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis will be required. Further, institutional and legal actions would be needed. Preliminary financing assumption recommendations are subject to change following review of traffic, revenue, and O&M forecast.

## APPENDIX H – I-80 DEBT CAPACITY ANALYSIS

June 23, 2017



### I-80 Toll Study Debt Capacity Analysis

**Highlights** (see attached scenario summaries for details)

#### **6-Lane Widening**

- Projected net toll revenues from low or high diversion scenarios can cover the projected debt service to finance the 6-lane widening’s estimated capital cost.
- Capitalized interest and deferred principal repayment are necessary to comply with debt service coverage covenant and policy.
- Level Debt Service Structure: In early years, minimum debt service coverage covenant and policy are broken but debt service payments can be met in high and low diversion scenarios. In later years, minimum debt service coverage covenant and policy are exceeded in high and low diversion scenarios.
- Deferred Debt Service Structure: Debt service coverage policy of 175% is maintained reducing amount of project costs that can be financed to 76% in high diversion scenario and 93% in low diversion scenario.

**Table 1. 6-Lane Widening – Summary (dollars in millions)**

|                                   | Low Traffic Diversion |                    | High Traffic Diversion |                    |
|-----------------------------------|-----------------------|--------------------|------------------------|--------------------|
|                                   | Level Structure       | Deferred Structure | Level Structure        | Deferred Structure |
| Total Program Costs               | \$3,861               |                    |                        |                    |
| Total Net Revenues                | \$25,803              |                    | \$19,476               |                    |
| Total Debt Service                | \$7,936               | \$9,766            | \$7,936                | \$7,124            |
| Minimum Coverage                  | 137%                  | Set at 175% Policy | 100%                   | Set at 175% Policy |
| % of Project Costs Funded         | 100%                  | 93%                | 100%                   | 76%                |
| Excess Revenue after Debt Service | \$13,712              | \$11,881           | \$8,352                | \$9,164            |

#### **10-Lane Truck Only Toll Widening**

- Projected net toll revenues from low or high diversion scenarios cannot cover the projected debt service to finance the truck only toll 10-lane widening’s estimated capital cost.
- Level Debt Service Structure: Insufficient revenue to make debt service payments.
- Deferred Debt Service Structure: Through use of capitalized interest and deferred principal repayment:
  - 33% of project cost can be funded under low diversion scenario
  - 20% of project cost can be funded under high diversion scenario

**Table 2. 10-Lane Truck Only Toll Widening – Summary (dollars in millions)**

|                                   | Low Traffic Diversion |                    | High Traffic Diversion |                    |
|-----------------------------------|-----------------------|--------------------|------------------------|--------------------|
|                                   | Level Structure       | Deferred Structure | Level Structure        | Deferred Structure |
| Total Program Costs               | \$8,520               |                    |                        |                    |
| Total Net Revenues                | \$13,571              |                    | \$9,351                |                    |
| Total Debt Service                | \$18,227              | \$4,741            | \$18,227               | \$2,959            |
| Minimum Coverage                  | 24%                   | Set at 175% Policy | 14%                    | Set at 175% Policy |
| % of Project Costs Funded         | NA                    | 33%                | NA                     | 20%                |
| Excess Revenue after Debt Service | (\$6,342)             | \$7,144            | (\$10,101)             | \$5,167            |

June 23, 2017

**Financing Assumptions**

- Analysis provides a preliminary, planning level estimate of a toll supported financing to pay for total program costs of I-80.
- Prior to implementation of tolls and debt issuance, significant additional analysis will be required by a registered municipal advisor.\*
- Financing assumptions such as interest rates, coverages, reserves, costs of issuance, and debt service structure are subject to change based on market conditions and stress testing of traffic, revenue, and O&M forecasts by rating agency and investment bank credit analysts.
- Institutional and legal actions and authorizations are required to implement tolls on I-80, establish a toll authority, and issue bonds.
- Under Capitalized interest (Cap I) additional bonds are issued and proceeds are used to make debt service payments. While increasing overall debt service costs, Cap I makes the financing feasible.

|  | Assumptions   |
|--|---|
| Source(s) of financing                           | <ul style="list-style-type: none"> <li>▪ 33% TIFIA</li> <li>▪ 67% toll revenue bonds</li> </ul>   |
| Governance                                       | <ul style="list-style-type: none"> <li>▪ Independent Authority with autonomous toll setting authority</li> </ul>  |
| Repayment source(s)                              | <ul style="list-style-type: none"> <li>▪ Toll revenues only; non-recourse to IaDOT or State of Iowa</li> <li>▪ Estimated net revenues provided by Iowa DOT and Hg Consult</li> </ul>  |
| Rate covenant & projected debt service coverage  | <ul style="list-style-type: none"> <li>▪ Net revenue pledge</li> <li>▪ Bonds &amp; TIFIA:               <ul style="list-style-type: none"> <li>○ 1.25x rate covenant</li> <li>○ 1.75x projected coverage</li> </ul> </li> </ul>   |
| Debt Service Reserve Fund                        | <ul style="list-style-type: none"> <li>▪ Equal to lesser of maximum annual debt service, 125% average annual debt service, or 10% outstanding par</li> </ul>  |
| Final maturity                                   | <ul style="list-style-type: none"> <li>▪ Bonds: 35 years from issuance</li> <li>▪ TIFIA: 35 years from substantial completion</li> </ul>  |
| Amortization structure                           | <ul style="list-style-type: none"> <li>▪ Bonds: Level debt service after capitalized interest period</li> <li>▪ TIFIA: No repayments until 5 years after substantial completion followed by level debt service</li> </ul>   |
| Number of financings                             | <ul style="list-style-type: none"> <li>▪ Single bond issuance</li> <li>▪ Single TIFIA loan (drawn down as needed)</li> </ul>  |
| Costs of Issuance (incl. underwriter's discount) | <ul style="list-style-type: none"> <li>▪ \$4.75/bond, approximately 0.5% of par</li> </ul>  |
| Credit rating                                    | <ul style="list-style-type: none"> <li>▪ A rating</li> </ul>  |
| Interest rates                                   | <ul style="list-style-type: none"> <li>▪ Bonds True Interest Cost: From 3.5% to 4.0%, depending on scenario. Based on historic average interest rates for credit rating, and scales of similar bonds.</li> <li>▪ TIFIA Interest Rate: 2.9%</li> <li>▪ 100% fixed rate debt</li> </ul> |
| Capitalized Interest                             | <ul style="list-style-type: none"> <li>▪ Through construction period (2026 for 6-Lane and 2028 for 10-Lane)</li> <li>▪ Reinvest rate of 0.85%</li> </ul>  |
| Capital Cost & Schedule                          | <ul style="list-style-type: none"> <li>▪ Provided by Iowa DOT and Hg Consult</li> </ul>   |

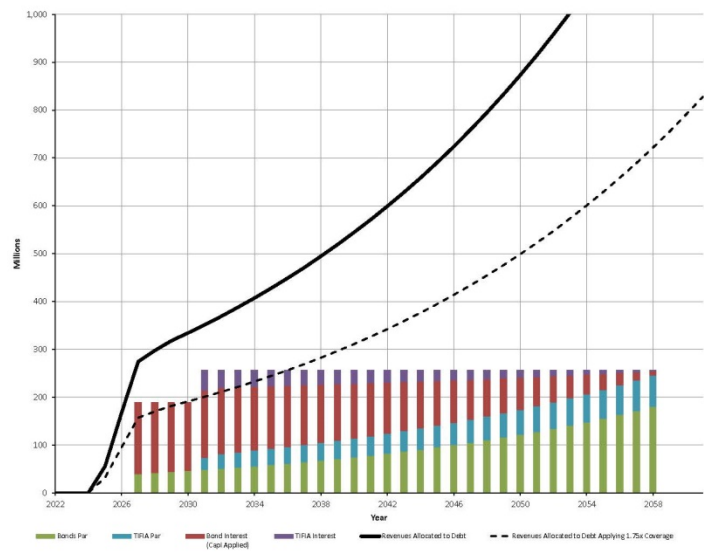
\* Hg Consult and its sub consultants are not registered municipal advisors.



Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 08/21/17

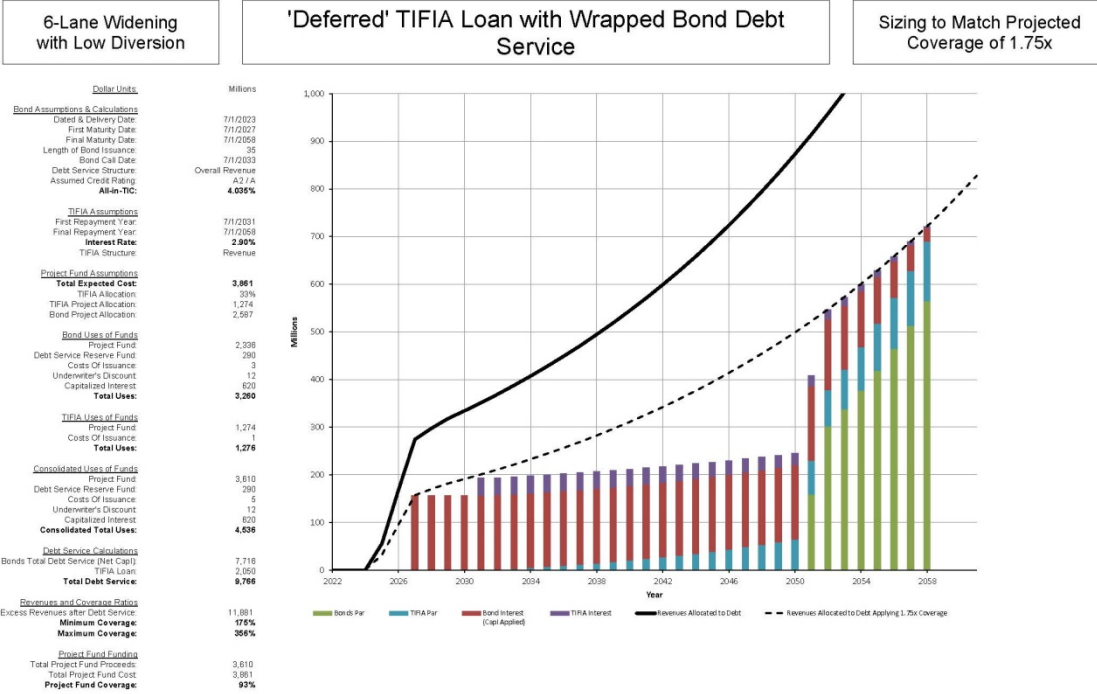
6-Lane Widening with Low Diversion      'Level' Bond Debt Service with Wrapped TIFIA Debt Service      Sizing to Match Project Size

| Debt Units                                 |               |
|--|---------------|
| <b>Bond Assumptions &amp; Calculations</b> |               |
| Dated & Delivery Date:                     | 7/1/2023      |
| First Maturity Date:                       | 7/1/2027      |
| Final Maturity Date:                       | 7/1/2059      |
| Length of Bond Issuance:                   | 35            |
| Bond Call Date:                            | 7/1/2033      |
| Debt Service Structure:                    | Level         |
| Assumed Credit Rating:                     | A-1/A         |
| <b>All-in-TIC:</b>                         | <b>3.555%</b> |
| <b>TIFIA Assumptions</b>                   |               |
| First Repayment Year:                      | 7/1/2031      |
| Final Repayment Year:                      | 7/1/2059      |
| <b>Interest Rate:</b>                      | <b>2.90%</b>  |
| TIFIA Structure:                           | Overall Level |
| <b>Project Fund Assumptions</b>            |               |
| <b>Total Expected Cost:</b>                | <b>3,861</b>  |
| TIFIA Allocation:                          | 32%           |
| TIFIA Project Allocation:                  | 1,274         |
| Bond Project Allocation:                   | 2,587         |
| <b>Bond Uses of Funds</b>                  |               |
| Project Fund:                              | 2,587         |
| Debt Service Reserve Fund:                 | 189           |
| Costs of Issuance:                         | 3             |
| Underwriter's Discount:                    | 11            |
| Capitalized Interest:                      | 444           |
| <b>Total Uses:</b>                         | <b>3,234</b>  |
| <b>TIFIA Uses of Funds</b>                 |               |
| Project Fund:                              | 1,274         |
| Costs of Issuance:                         | 1             |
| <b>Total Uses:</b>                         | <b>1,276</b>  |
| <b>Consolidated Uses of Funds</b>          |               |
| Project Fund:                              | 3,861         |
| Debt Service Reserve Fund:                 | 189           |
| Costs of Issuance:                         | 5             |
| Underwriter's Discount:                    | 11            |
| Capitalized Interest:                      | 444           |
| <b>Consolidated Total Uses:</b>            | <b>4,510</b>  |
| <b>Debt Service Calculations</b>           |               |
| Bonds Total Debt Service (Net Capl):       | 6,047         |
| TIFIA Loan:                                | 1,869         |
| <b>Total Debt Service:</b>                 | <b>7,916</b>  |
| <b>Revenues and Coverage Ratios</b>        |               |
| Excess Revenues after Debt Service:        | 13,712        |
| <b>Minimum Coverage:</b>                   | <b>137%</b>   |
| <b>Maximum Coverage:</b>                   | <b>493%</b>   |
| <b>Project Fund Funding</b>                |               |
| Total Project Fund Proceeds:               | 3,861         |
| Total Project Fund Cost:                   | 3,861         |
| <b>Project Fund Coverage:</b>              | <b>100%</b>   |



This analysis provides an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis would be required and institutional and legal actions would be needed. Preliminary financing assumptions are subject to change.

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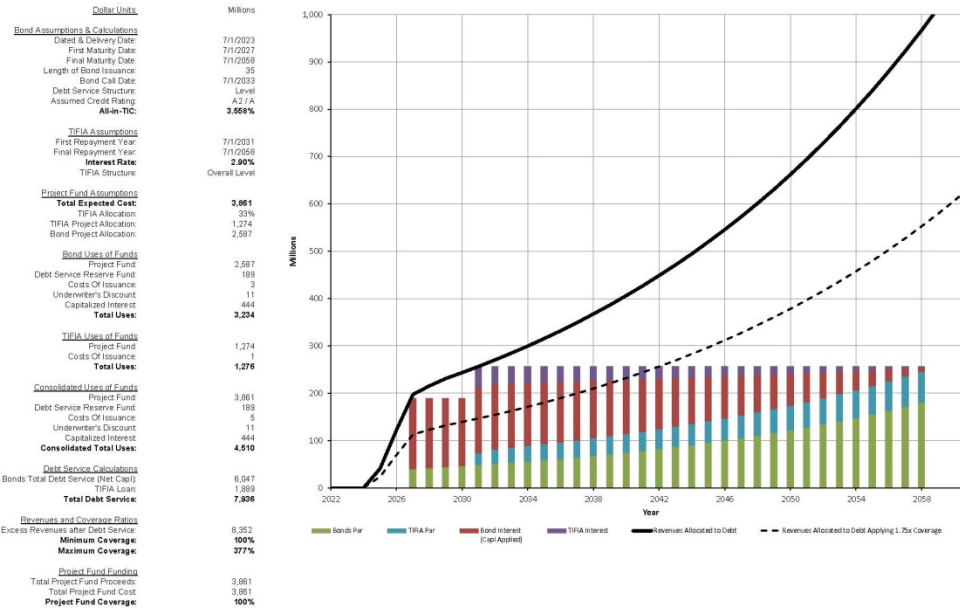
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Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 08/21/17

6-Lane Widening with High Diversion

**'Level' Bond Debt Service with Wrapped TIFIA Debt Service**

Sizing to Match Project Size



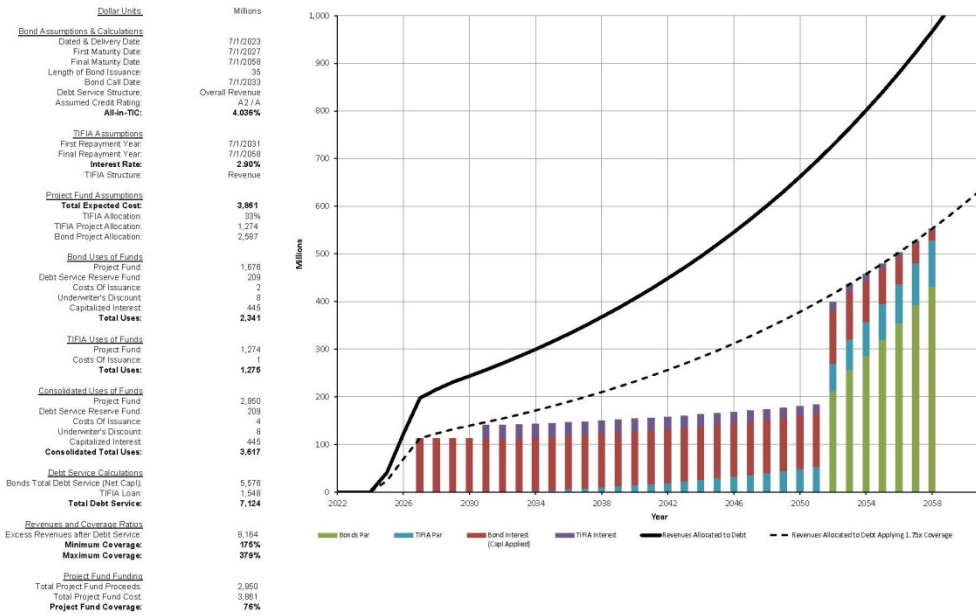
*This analysis provides an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis would be required and institutional and legal actions would be needed. Preliminary financing assumptions are subject to change.*

Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 09/21/17

6-Lane Widening with High Diversion

'Deferred' TIFIA Loan with Wrapped Bond Debt Service

Sizing to Match Projected Coverage of 1.75x

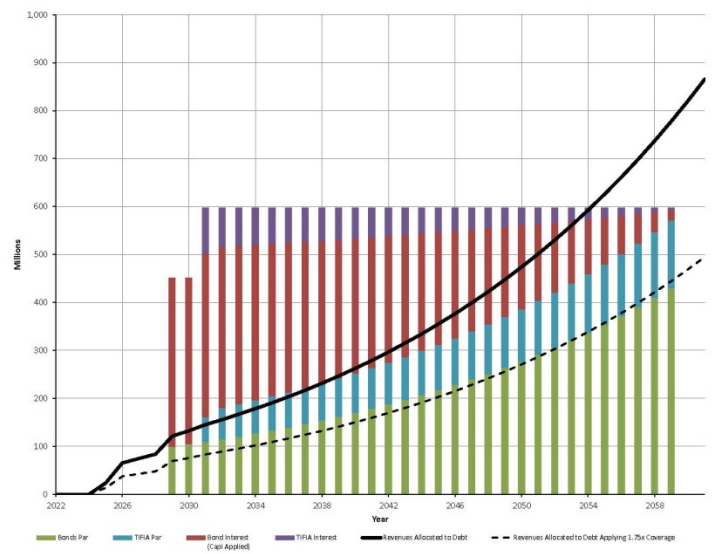


This analysis provides an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis would be required and institutional and legal actions would be needed. Preliminary financing assumptions are subject to change.

Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 08/21/17

10-Lane Widening with Low Diversion | 'Level' Bond Debt Service with Wrapped TIFIA Debt Service | Sizing to Match Project Size

| Dollar Units                               |               |
|--|---------------|
| <b>Bond Assumptions &amp; Calculations</b> |               |
| Dated & Delivery Date:                     | 7/1/2024      |
| First Maturity Date:                       | 7/1/2029      |
| Final Maturity Date:                       | 7/1/2059      |
| Length of Bond Issuance:                   | 35            |
| Bond Call Date:                            | 7/1/2034      |
| Debt Service Structure:                    | Level         |
| Assumed Credit Rating:                     | A2/A          |
| <b>All-in-TIC:</b>                         | <b>3.361%</b> |
| <b>TIFIA Assumptions</b>                   |               |
| First Repayment Year:                      | 7/1/2031      |
| Final Repayment Year:                      | 7/1/2059      |
| <b>Interest Rate:</b>                      | <b>2.95%</b>  |
| TIFIA Structure:                           | Overall Level |
| <b>Project Fund Assumptions</b>            |               |
| <b>Total Expected Cost:</b>                | <b>8,520</b>  |
| TIFIA Allocation:                          | 326           |
| TIFIA Project Allocation:                  | 2,811         |
| Bond Project Allocation:                   | 5,708         |
| <b>Bond Uses of Funds</b>                  |               |
| Project Fund:                              | 5,708         |
| Debt Service Reserve Fund:                 | 452           |
| Costs of Issuance:                         | 7             |
| Underwriter's Discount:                    | 28            |
| Capitalized Interest:                      | 1,392         |
| <b>Total Uses:</b>                         | <b>7,885</b>  |
| <b>TIFIA Uses of Funds</b>                 |               |
| Project Fund:                              | 2,811         |
| Costs of Issuance:                         | 3             |
| <b>Total Uses:</b>                         | <b>2,814</b>  |
| <b>Consolidated Uses of Funds</b>          |               |
| Project Fund:                              | 8,520         |
| Debt Service Reserve Fund:                 | 452           |
| Costs of Issuance:                         | 10            |
| Underwriter's Discount:                    | 28            |
| Capitalized Interest:                      | 1,392         |
| <b>Consolidated Total Uses:</b>            | <b>10,400</b> |
| <b>Debt Service Calculations</b>           |               |
| Bonds Total Debt Service (Net Cap):        | 14,009        |
| TIFIA Loan:                                | 4,218         |
| <b>Total Debt Service:</b>                 | <b>18,227</b> |
| <b>Revenues and Coverage Ratios</b>        |               |
| Excess Revenues After Debt Service:        | (8,343)       |
| <b>Minimum Coverage:</b>                   | <b>24%</b>    |
| <b>Maximum Coverage:</b>                   | <b>130%</b>   |
| <b>Project Fund Funding</b>                |               |
| Total Project Fund Proceeds:               | 8,520         |
| Total Project Fund Cost:                   | 8,520         |
| <b>Project Fund Coverage:</b>              | <b>NA</b>     |



This analysis provides an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis would be required and institutional and legal actions would be needed. Preliminary financing assumptions are subject to change.

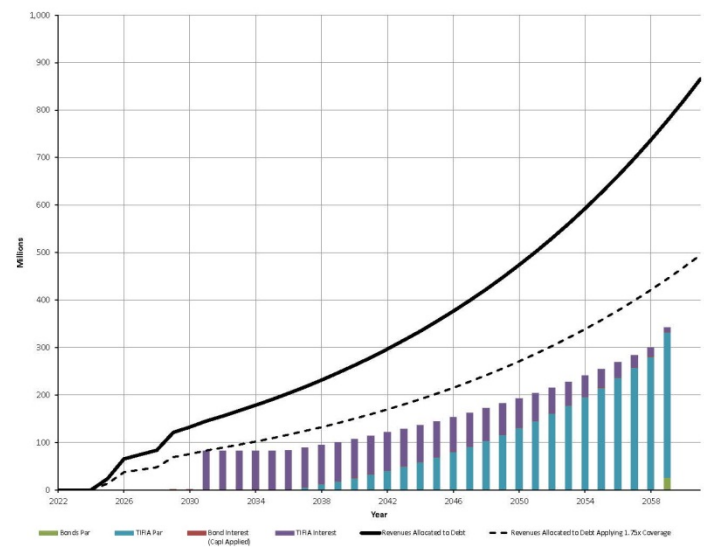
Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 08/21/17

10-Lane Widening with Low Diversion

'Deferred' TIFIA Loan with Wrapped Bond Debt Service

Sizing to Match Projected Coverage of 1.75x

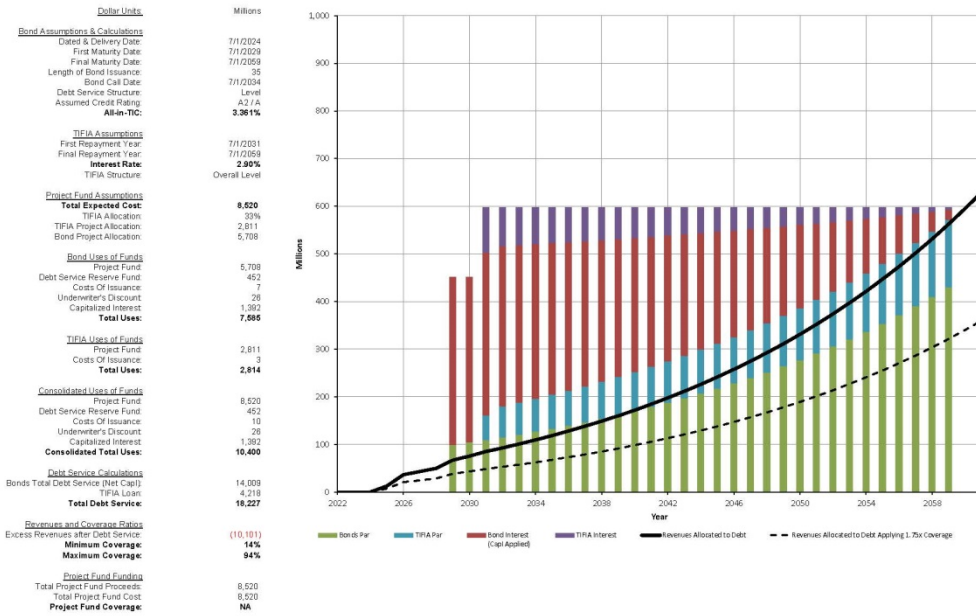
|  |                  |
|--|------------------|
| <b>Dollar Units</b>                        |                  |
| <b>Bond Assumptions &amp; Calculations</b> |                  |
| Dates & Delivery Date                      | 7/1/2024         |
| First Maturity Date                        | 7/1/2029         |
| Final Maturity Date                        | 7/1/2059         |
| Length of Bond Issuance                    | 35               |
| Bond Call Date                             | 7/1/2034         |
| Debt Service Structure                     | Overall Revenue  |
| Assumed Credit Rating                      | A2 / A           |
| <b>All-in-TIC:</b>                         | <b>3.682%</b>    |
| <b>TIFIA Assumptions</b>                   |                  |
| First Repayment Year                       | 7/1/2031         |
| Final Repayment Year                       | 7/1/2059         |
| <b>Interest Rate:</b>                      | <b>2.95%</b>     |
| TIFIA Structure                            | Revenue          |
| <b>Project Fund Assumptions</b>            |                  |
| <b>Total Expected Cost:</b>                | <b>8,520</b>     |
| TIFIA Allocation                           | 33%              |
| TIFIA Project Allocation                   | 2,811            |
| Bond Project Allocation                    | 5,709            |
| <b>Bond Uses of Funds</b>                  |                  |
| Project Fund                               | 18               |
| Debt Service Reserve Fund                  | 3                |
| Costs Of Issuance                          | 0                |
| Underwriter's Discount                     | 0                |
| Capitalized Interest                       | 7                |
| <b>Total Uses:</b>                         | <b>27</b>        |
| <b>TIFIA Uses of Funds</b>                 |                  |
| Project Fund                               | 2,811            |
| Costs Of Issuance                          | 3                |
| <b>Total Uses:</b>                         | <b>2,814</b>     |
| <b>Consolidated Uses of Funds</b>          |                  |
| Project Fund                               | 2,829            |
| Debt Service Reserve Fund                  | 3                |
| Costs Of Issuance                          | 0                |
| Underwriter's Discount                     | 0                |
| Capitalized Interest                       | 7                |
| <b>Consolidated Total Uses:</b>            | <b>2,842</b>     |
| <b>Debt Service Calculations</b>           |                  |
| Bonds Total Debt Service (Net Cap)         | 69               |
| TIFIA Loan                                 | 4,653            |
| <b>Total Debt Service</b>                  | <b>4,741</b>     |
| <b>Revenues and Coverage Ratios</b>        |                  |
| Excess Revenues after Debt Service         | 7,144            |
| <b>Minimum Coverage</b>                    | <b>175%</b>      |
| <b>Maximum Coverage</b>                    | <b>over 500%</b> |
| <b>Project Fund Funding</b>                |                  |
| Total Project Fund Proceeds                | 2,829            |
| Total Project Fund Cost                    | 8,520            |
| <b>Project Fund Coverage</b>               | <b>33%</b>       |



This analysis provides an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis would be required and institutional and legal actions would be needed. Preliminary financing assumptions are subject to change.

Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 09/21/17

10-Lane Widening with High Diversion | 'Level' Bond Debt Service with Wrapped TIFIA Debt Service | Sizing to Match Project Size



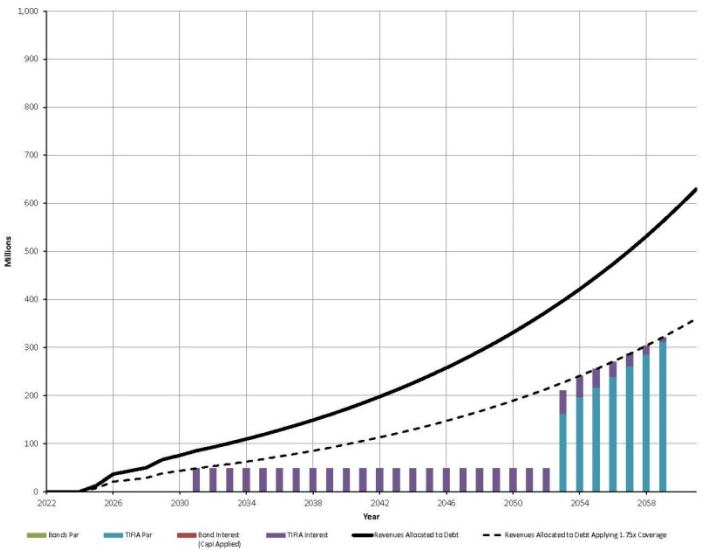
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Planning Level I-80 Toll Study Debt Capacity Analysis, For Internal Review Only, 08/21/17

10-Lane Widening with High Diversion | 'Deferred' TIFIA Loan with Wrapped Bond Debt Service | Sizing to Match Projected Coverage of 1.75x

| Dollar Units                               |                  |
|--|------------------|
| <b>Bond Assumptions &amp; Calculations</b> |                  |
| Dated & Delivery Date:                     | 7/1/2014         |
| First Maturity Date:                       | 7/1/2029         |
| Final Maturity Date:                       | 7/1/2059         |
| Length of Bond Issuance:                   | 35               |
| Bond Call Date:                            | 7/1/2034         |
| Debt Service Structure:                    | Overall Revenue  |
| Assumed Credit Rating:                     | A-1/A            |
| <b>All-in-TIC:</b>                         | <b>0.000%</b>    |
| <b>TIFIA Assumptions</b>                   |                  |
| First Repayment Year:                      | 7/1/2031         |
| Final Repayment Year:                      | 7/1/2059         |
| <b>Interest Rate:</b>                      | <b>2.90%</b>     |
| TIFIA Structure:                           | Revenue          |
| <b>Project Fund Assumptions</b>            |                  |
| <b>Total Expected Cost:</b>                | <b>8,020</b>     |
| TIFIA Allocation:                          | 234              |
| TIFIA Project Allocation:                  | 2,811            |
| Bond Project Allocation:                   | 5,708            |
| <b>Bond Uses of Funds</b>                  |                  |
| Project Fund:                              | 0                |
| Debt Service Reserve Fund:                 | 0                |
| Costs Of Issuance:                         | 0                |
| Underwriter's Discount:                    | 0                |
| Capitalized Interest:                      | 0                |
| <b>Total Uses:</b>                         | <b>0</b>         |
| <b>TIFIA Uses of Funds</b>                 |                  |
| Project Fund:                              | 1,674            |
| Costs Of Issuance:                         | 2                |
| <b>Total Uses:</b>                         | <b>1,676</b>     |
| <b>Consolidated Uses of Funds</b>          |                  |
| Project Fund:                              | 1,674            |
| Debt Service Reserve Fund:                 | 0                |
| Costs Of Issuance:                         | 2                |
| Underwriter's Discount:                    | 0                |
| Capitalized Interest:                      | 0                |
| <b>Consolidated Total Uses:</b>            | <b>1,676</b>     |
| <b>Debt Service Calculations</b>           |                  |
| Bonds Total Debt Service (Net Cash):       | 0                |
| TIFIA Loan:                                | 2,859            |
| <b>Total Debt Service:</b>                 | <b>2,859</b>     |
| <b>Revenues and Coverage Ratios</b>        |                  |
| Excess Revenues After Debt Service:        | 5,187            |
| <b>Minimum Coverage:</b>                   | <b>175%</b>      |
| <b>Maximum Coverage:</b>                   | <b>over 500%</b> |
| <b>Project Fund Funding</b>                |                  |
| Total Project Fund Proceeds:               | 1,674            |
| Total Project Fund Cost:                   | 8,520            |
| <b>Project Fund Coverage:</b>              | <b>20%</b>       |



This analysis provides an order of magnitude estimate of the potential financing proceeds that could be generated from tolling I-80 to cover capital reconstruction costs. Prior to implementation of tolls and debt issuance, additional analysis would be required and institutional and legal actions would be needed. Preliminary financing assumptions are subject to change.