I-80 Tolling Initiative

Joint Transportation, Highways, and Military Affairs Committee

Cheyenne, WY

August 13, 2019

I-80 Funding Needs

Overview

- WYDOT funding on the decline since 2010
- Total Construction/Maintenance Expenditures: **$182,769,354** (2016-2018)
- WYDOT spends about **$61 million** annually in construction and maintenance for the corridor
- Total of about **$350 million** in projects currently programmed into State Transportation Improvement Plan (STIP) through 2026
- Need about an additional **$41.5 million each year** to keep corridor in current condition

I-80 Funding Needs

Overview

I-80 Construction Costs	Fiscal Year				
Activity	***2016***	***2017***	***2018***	***Total***	***3-Yr. Ave.***
Construction	$39,504,954	$37,501,529	$52,132,707	$129,139,190	$43,046,397
Construction Engineering	$3,416,127	$4,066,887	$4,237,959	$11,720,973	$3,906,991
Damage Repairs	$0	$0	$1,396	$1,396	$465
Other Construction	$29,479	$0	$3,735	$33,214	$11,071
Preliminary Engineering	$1,851,551	$2,108,190	$1,697,188	$5,656,929	$1,885,643
Right of Way	$573	$70	$16,892	$17,535	$5,845
Other	$125,946	$140,020	$186,275	$452,240	$150,747
Total	**$44,928,629**	**$43,816,695**	**$58,276,153**	**$147,021,477**	**$49,007,159**
Federal	40,435,766	39,435,026	52,448,537	132,319,329	44,106,443
State Match	4,492,863	4,381,670	5,827,615	14,702,148	4,900,716

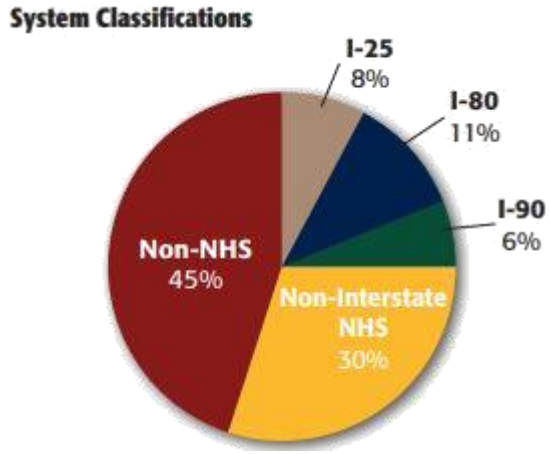
I-80 Maintenance Costs	Fiscal Year				
Specialty	***2016***	***2017***	***2018***	***Total***	***3-Yr. Ave.***
Intelligent Transportation (ITS)	$280,769	$301,746	$283,951	$866,466	$288,822
Maintenance	$12,186,252	$10,851,713	$9,539,834	$32,577,799	$10,859,266
Telecommunications	$57,637	$106,840	$27,424	$191,901	$63,967
Traffic Measures	$692,738	$682,409	$736,564	$2,111,711	$703,904
Total	**$13,217,395**	**$11,942,709**	**$10,587,773**	**$35,747,877**	**$11,915,959**

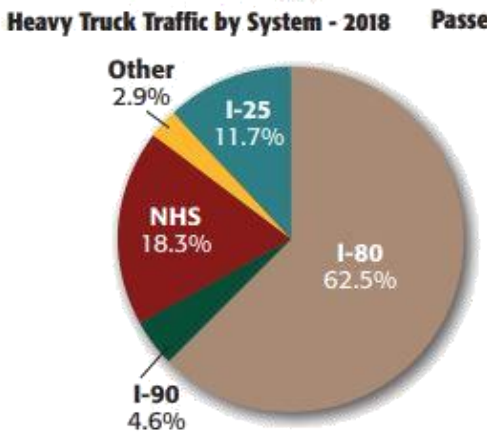
Total Construction & Maintenance	
Fiscal Year	Cost
2016	$58,146,024
2017	$55,759,405
2018	$68,863,925
Total	**$182,769,354**
3-Yr. Ave.	$60,923,118

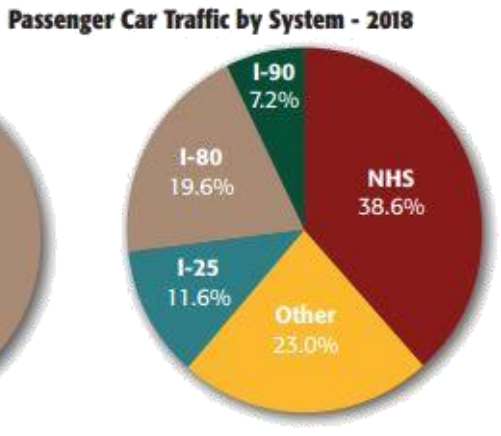
I-80 Performance Measures

Overview

- Over past 30 years:
  - Automobile traffic grew by **65%**
  - Heavy truck traffic grew over **150%**
- (2012-2016) I-80 crashes accounted for approx. **12%** or **8,555** of total statewide crashes
- (2012-2016) Of total crashes on I-80:
  - About **80%** or **6,844 crashes** were property damage only
  - About **20%** or **1,711 crashes** involved injury or fatality
- (2018) Of all traffic in Wyoming, I-80 accounts for:
  - **62.5%** all heavy truck traffic
  - **19.6%** of all passenger car traffic







I-80 Tolling Initiative

Program Overview

- Tolling generally not allowed on federal highways with few exceptions
- **Interstate Reconstruction and Rehabilitation Pilot (IRRP) Program**
  - 3 participation slots available and currently open for states
    - Oregon applied
    - Connecticut considering applying
  - Rigorous application process through FHWA
  - For final approval, state must have the following ready:
    - Tolling Authority
    - Financial Analysis
    - Facility Management Plan
    - Metropolitan Planning Organization (MPO) Consultation (Cheyenne)
  - Demonstrate that tolling is only possible means of paying for needed interstate highway reconstruction or rehabilitation
  - ***All toll revenue must be used on tolled facility***
  - Requires annual audit with results transmitted to FHWA

Proposed Bill

Based on SF 0035, 2010

- Grants tolling authority
- Authorizes bonding and loans to initiate work before tolling commences
- Provides for WYDOT to complete tolling master and financial plans
  - Submission to and approval by Transportation Commission
  - Submission to and approval by Wyoming Legislature

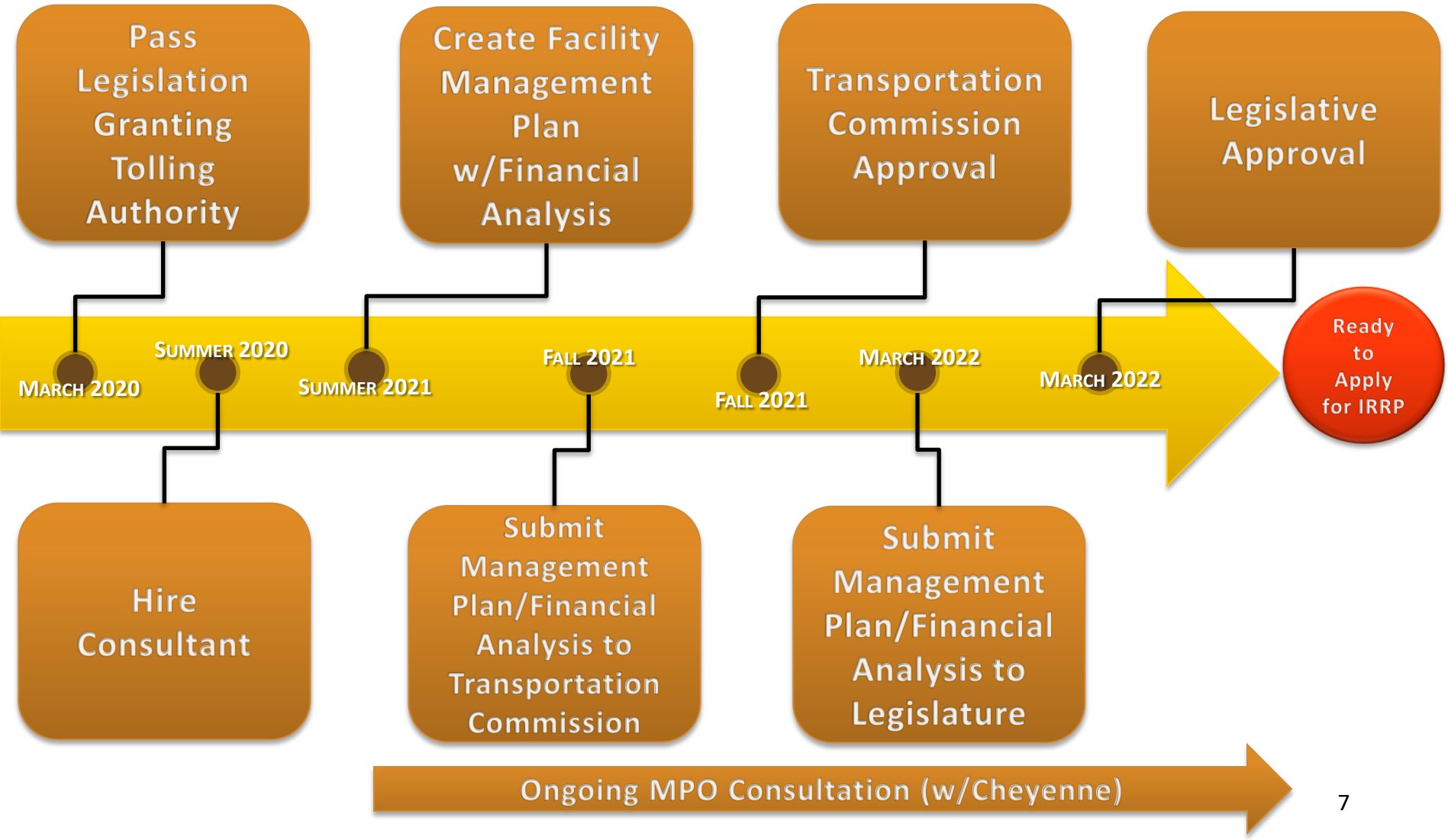
Timeline

Considerations

- The following timeline is an ideal scenario that accounts for minimal-to-no delays but assumes processes start after approval to minimize financial risk
- Applicants have 3 years from provisional approval to execute IRRP program agreement with USDOT Secretary
  - After 3 years (and possibly a 1-year extension), applicants lose slot reservation in program
- IRRP Program allows for possible 1-year extension once provisional approval/slot reservation is granted **if substantial progress can be proven in:**
  - **NEPA (environmental process)**
  - **Securing financial commitments (bonds, loans, etc.)**
  - **Working with MPO and other stakeholders**
- Depending on which tolling scenario is pursued, timeline could be extended further
  - For example: more tolling booths and infrastructure = longer timeline to prepare to begin tolling

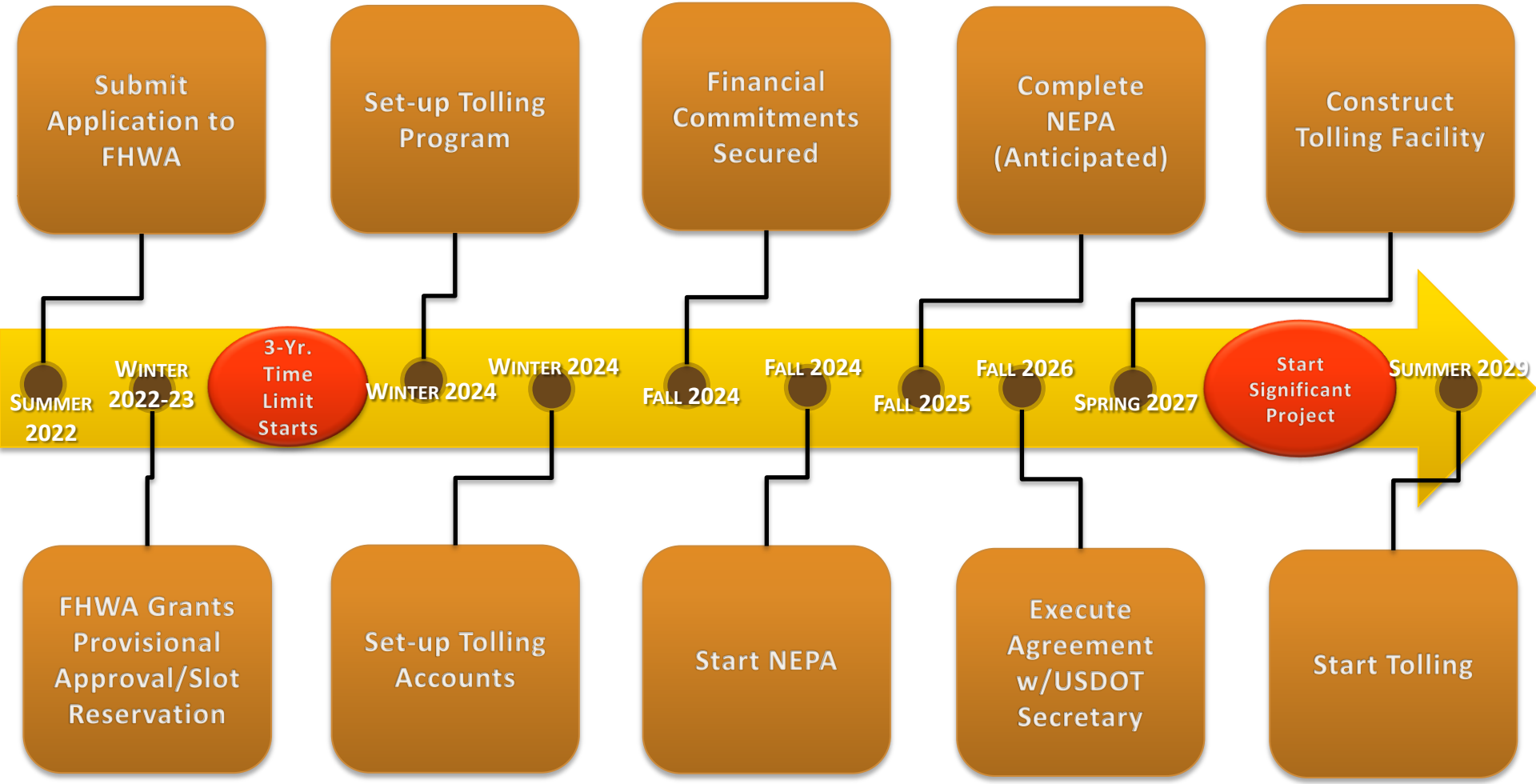
Timeline

State-Level Preparation



Timeline

IRRP Program Application Process



Additional Considerations

25 Cent/Mile Truck Rate (Numbers for 2025)

- Estimated Diversion Rate: **40%**
- **Rough estimate of $15 million** from Wyoming drivers (pending final study)
- Rate comparable with other rural states (see Appendix A)
- Undesirable for businesses along I-80 serving commercial trucking and travel truckers and travel

Toll Rate Assumption (per mile)	$0.25 (Heavy Trucks)/$0.025 (Cars)	
Toll Rate Escalation Assumption:	*2.5% Annual*	*1.0% Annual*
Gross Revenue Potential	$223 million	$190.5 million
Operating Expenses	$19.8 million	$19.6 million
Roadway Maintenance Expenses	$21.0 million	$21.0 million
Net Revenue Potential	$182.2 million	$149.9 million
Total Net Revenues (2025 to 2054)	**$12.4 billion**	**$7.7 billion**
Indicative Net Bond Proceeds	$2.2 billion	$1.7 billion

Additional Considerations

10 Cent/Mile Truck Rate (Numbers for 2025)

- Estimated Diversion Rate: **20%**
- **Rough estimate** of **$6 million** from tolling Wyoming drivers
- Better for businesses along I-80 that serve commercial trucking and the traveling public

Toll Rate Assumption (per mile)	$0.10 (Heavy Trucks)/$0.01 (Cars)	
Toll Rate Escalation Assumption:	*2.5% Annual*	*1.0% Annual*
Gross Revenue Potential	$125.3 million	$99.9 million
Operating Expenses	$19.8 million	$19.6 million
Roadway Maintenance Expenses	$21.0 million	$21.0 million
Net Revenue Potential	$84.5 million	$59.3 million
Total Net Revenues (2025 to 2054)	**$84.5 billion**	**$2.7 billion**
Indicative Net Bond Proceeds	$1.0 billion	$624.0 million

Additional Considerations

Possible Tolling Scenarios

Single Point Cash/Electronic Tolling

- Tolling Point(s): **1**
- Number of Booths: **2**
- Location: ***Middle of corridor***
- Capital Cost (2017): **$12.5 million**

Multiple Point Cash/Electronic Tolling

- Tolling Point(s): **5**
- Number of Booths: **10**
- Location: ***Roughly every 80 miles***
- Capital Cost (2017): **$30.5 million**

Multiple Point All-Electronic Tolling

- Tolling Point(s): **5**
- Number of Booths: **0**
- ***Transponder and video tolling/enforcement only***
- Capital Cost (2017): **$19 million**

Appendix A

Tolling Study Update Technical Memorandum

INTRODUCTION

The Interstate 80 (I-80) Master Plan Study projects would benefit users by enhancing mobility and increasing safety. I-80 is a critical route for in-state and interstate movement of people and goods, including many commerce movements of national scope. Maintaining interstates to a high standard that allows for safe travel is becoming more expensive, as the roadways are reaching the end of their useful lives. Departments of transportation across the nation are seeking approaches to preserve pavement quality and extend the lives of roads, knowing that reconstruction will inevitably be necessary.

I-80 through Wyoming is a road that has endured heavy truck traffic and harsh winter conditions for decades. WYDOT understands that significant costs for maintenance, reconstruction, and expansions are looming, and the Wyoming Interim Joint Transportation Highways and Military Affairs Committee (the Committee) is actively seeking ways to plan for these costs with revenue solutions. This key element of the I-80 Master Plan Study is discussed in detail in the Financial Strategy chapter of the *I-80 Corridor Study Master Plan Implementation Report* (HDR 2018). Tolling is one of many potential funding options for I-80. Details on the various aspects of tolling are contained in this memorandum, which builds upon previous work conducted by WYDOT in 2008 and 2009.

In 2008 the Committee commissioned the I-80 Tolling Study which WYDOT carried out in two phases, culminating in the 2009 *Interstate 80 Tolling Feasibility Study* (Parsons Brinckerhoff 2009). The 2009 study broadly covered all aspects of tolling—including the concept of operations and associated capital and operating costs, revenue projections, financing and public-private partnership approaches, potential economic and fiscal impacts of tolling, and legislative needs—that would allow tolling in Wyoming on an interstate.

A notable part of the 2009 Study was a public and stakeholder outreach campaign that gathered perspectives of stakeholder groups including a few major logistics companies in the corridor, the Wyoming Trucking Association (WTA), the Wyoming Contractors Association (WCA), and the public at a series of meetings held in the five major metropolitan areas along I-80 (Cheyenne, Laramie, Rawlins, Rock Springs, and Evanston). These meetings helped WYDOT and the consultant team understand with specificity the issues these groups have with conversion of I-80 to a tolled facility, including:

- People living in these communities use I-80 multiple times daily to commute, access recreation areas, shop, and conduct other daily business. There are few alternative routes, which means tolling I-80 could create undue burden on businesses and residents of the corridor.

- Many businesses along the I-80 corridor serve the trucking industry and tourists from out of state, including service stations, hotels, mechanics, and restaurants, among others. The 2009 Study suggested that 25 to 45 percent of through truck traffic could divert to other routes if the roadway is tolled, depending on the toll rate. This would directly reduce the customer base of many businesses.
- The WTA is against tolling, claiming that it places an undue burden on truck operators who must already pay fuel taxes, registration fees, and overweight/special load permit fees. The WTA would be more likely to support motor fuel tax increases than tolls.
- The WCA is against tolls to the extent that toll revenues would be used to repay debt, which could allow a large financed construction project to be bid out by WYDOT. Wyoming contractors are not equipped with labor, equipment, or balance sheet capacity to undertake very large construction projects. Therefore, they would be at a disadvantage relative to out-of-state contractors who are accustomed to larger ($200 million+) projects. The WCA is also opposed to the passage of design-build project delivery legislation for highways because Wyoming contractors are not familiar with these delivery tools and would, again, be put at a disadvantage to out-of-state contractors with design-build expertise.

These concerns were discussed during the I-80 Master Plan Study Steering Committee meetings that were held approximately monthly during the summer and fall of 2017. The public was not represented at these meetings; however, WCA and WTA representatives were present at most of the meetings. WCA and WTA representatives were also engaged outside of the meetings as part of the research update to document concerns and perspectives on tolling I-80.

This tolling study update is technical in nature. However, WYDOT recognizes the importance of highlighting the concerns of these important stakeholders and the public. If legislative change is initiated, stakeholder and public concerns would be known, and potential negative impacts can be mitigated to the extent possible. For instance, tolling points could be located away from the population centers, reducing the impact on residents and businesses. There may also be opportunities to set the toll rate structure to provide discounts for local trips or residents. Concerns about significant diversion could be mitigated by setting toll rates low enough that diversion is not economical for most trips. For instance, tolling at a rate of 25 cents per mile for heavy trucks (comparable to other rural interstate toll road rates) is contemplated below. If tolls were set relatively low at 5 cents per mile for heavy trucks and 1 cent per mile for cars, diversion and financial impacts to drivers would be limited. And WYDOT could still potentially pay for all roadway operations and maintenance costs plus a $300 million I-80 capital program. These scenarios are discussed in detail later in this memorandum.

SUMMARY OF 2009 STUDY ELEMENTS THAT WERE UNCHANGED

The 2009 Study provided a moderate amount of detail on a wide variety of aspects of tolling, both generally and as applied to I-80. The tolling approach and financial feasibility aspects were conducted to estimate the maximum amount of capital that could be raised by tolling I-80 with an eye toward funding a third lane across the state. It is widely understood that congestion levels on I-80 do not necessitate a third lane in all areas and a more prudent investment in I-80 could be to pay for maintenance of the facility while implementing capital projects that provide meaningful benefits to the traveling public.

Most of the 2009 Study analysis and research is valid today. The basic construct of the tolling organization, approaches to tolling, interoperability issues, and public acceptance issues have not changed. These elements can be adapted to the project size, location, and overall funding goals, but the tools have not changed.

Similarly, financing options, public-private partnership components, and Federal Highway Administration (FHWA) programs for tolling have not changed significantly. The way that public and private organizations evaluate toll revenue risk and the terms of debt transactions that aim to mitigate those risks are the same now as they were in 2009. Some of the financing programs available to project owners have evolved and interest rates have dropped, but overall, the financial capacity calculations and structures used to estimate bonding capacity have not changed.

Another important part of the 2009 Study was estimation of the fiscal impacts to the state that could result from tolling and related diversion from I-80 to other roadways outside of Wyoming. The 2009 Study used comparisons of statewide vehicle miles traveled (VMT) with and without tolling to estimate the impacts on state sales taxes, motor fuel taxes, and county sales and lodging taxes. The study found that at a diversion rate of about 20 percent, state motor fuel tax receipts could decline by 7.5 percent, vehicle fees could decline by approximately 4.3 percent, and state sales taxes could decline by about 1.7 percent. While significant, these declines represent a fraction of potential toll revenues that could be generated on I-80, such that these amounts could be effectively backfilled to the respective government recipients with excess toll revenue.[1]

[1] FHWA restricts spending toll revenue to on-facility and Federal-Aid Highway uses, but other state-controlled sources of WYDOT revenue could be diverted to backfill lost tax revenues at the state's direction.

REFINED TOLLING CONCEPT OF OPERATIONS

One element of the 2009 Study that has been expanded and refined as part of the current study is the cost estimate and concepts of various tolling configurations based on current technology and experience from other tolling facilities. Three scenarios have been estimated for the Toll Collection System.

- **Scenario 1.** *Single Point Cash and Electronic Tolling*. Single point tolling in each direction would be located somewhere in the middle of the state to capture most through traffic, like what was proposed in the 2009 Study. This scenario includes two toll booths for cash collections and two lanes of open road tolling (using transponders) in each direction. The toll booths and the open road tolling lanes would all include transponder-based tolling capability and a video violation system. Capital cost: $12.5 million (2017).
- **Scenario 2.** *Multiple Point Cash and Electronic Tolling*. This scenario is the same as Scenario 1 but includes five total tolling points in each direction, so that tolls could be sized to roughly 80-mile segments of the road. For instance, someone driving from Cheyenne to Laramie would pay a toll of about 1/5 of the cost someone would pay to drive the entire length of I-80, from Nebraska to Utah. Capital cost: $30.5 million (2017).
- **Scenario 3.** *Multiple Point All-Electronic Tolling*. This approach assumes a modern tolling operation of all electronic tolling with five tolling points in each direction. Essentially, it is the same as Scenario 2 but does not have cash collection. It assumes transponder-based tolling and video tolling/enforcement only. Capital cost: $19 million (2017).

All three scenarios include the same capital cost for the customer service center building, host computer, customer service center software, and transponder procurement. Transponders are relatively inexpensive, approximately $1 each, and could be given out to regular users of the road and truckers at weigh stations to increase penetration quickly. Some marketing costs are also accounted for in the transponder procurement estimate.

All three scenarios include the same field equipment for a video violation system or a video tolling system. The primary difference between a video violation systems and video tolling is the business rules that govern the operation and the resulting operational cost.

A Violation Enforcement System captures images of vehicles traveling without a transponder or driving through the toll booth without paying the toll. The images are used to identify the vehicle's license plate. Division of Motor Vehicle searches are utilized to identify the vehicle’s registered owner, who then receives a violation notice/fine in the mail.

Video Tolling (sometimes referred to as video billing or image-based tolling) uses the same process to identify a vehicle’s registered owner who then receives a toll bill o in the mail. When toll agencies remove the ability for a customer to pay the toll with cash, they must provide customers some other avenue to pay when they do not have an account, and Video Tolling is

typically used. Some toll roads also offer web-payment options that allow drivers to pay their tolls online within a certain time period (1 or 2 days) at a discounted rate from the typically higher rate charged for video tolling over transponder tolling.

Employing staff to collect cash tolls in toll booths is a somewhat expensive operational element that is used where transponder penetration is weak and video tolling is ineffective because of a large number of out-of-state vehicles. This would be the case in Wyoming; though, many long-haul truck drivers are accustomed to using transponders and can be incentivized to obtain one if the transponder toll rate is set appropriately below the video toll rate.

Scenario 2 has a much higher capital cost because it includes 20 toll booths (5 tolling points times 4 lanes) and 20 camera sets; as opposed to Scenario 1 which only has 1 tolling point, or scenario 3 which does not include toll booths.

Video Enforcement and Video Tolling carry higher operational costs than transponder-based tolling. The cost is driven by the need to identify vehicle owners and mail toll bills or violation notices to those owners. The toll leakage (unpaid tolls) increases when finding vehicle owners becomes difficult, either because the license plate image is unreadable or DMV searches are not allowed, which reduces the toll agencies' ability to track down a vehicle's registered owner.

Based on the high percentage of out-of-state vehicles, WYDOT would likely incur very high collections costs and realize high unpaid receivables if it were to rely on video tolling alone. Installing toll booths and incurring the cost of cash collections is not a contemporary approach to tolling. However, it is one way to encourage payment by infrequent out-of-state travelers. Another approach is to encourage transponder use by distributing transponders to truckers at weight stations, through marketing campaigns, and by charging lower toll rates for transponder use compared to cash collections.

Installing multiple tolling points is one way to avoid over-burdening people who live or work nearby the one single tolling point. Having multiple toll points to spread the burden to people all along the corridor is one approach to achieving fairness; though, considerably more expensive to install, maintain, and operate than a single point. Another approach to addressing the equity issue of a single tolling point would be to use discounts for registered local frequent users such that their burden is reduced.

In short, there are multiple ways to keep capital and operating costs low while implementing an equitable tolling approach. The tolling configuration should be refined to fit the capital improvement locations and the FHWA tolling program that WYDOT applies for. For instance, if tolling is conducted under a Section 129 Tolling Agreement based on a bridge replacement, then tolling near the bridges may be desirable. If the Interstate System Reconstruction and Rehabilitation Pilot Program is used, tolling locations evenly dispersed across the corridor could be more desirable, particularly if a program to mitigate local user burden through discounts and refunds is not established.

TRAFFIC AND REVENUE METHODOLOGY AND DATA SOURCES

The tolled traffic and revenue forecasting model used in this study is the same model used in the 2009 Study. It accepts several inputs to simulate I-80 tolling operations under various tolling point configurations and assumptions for costs, policies, and attributes of the economic environment. These inputs can be changed individually or in combination to test the impact on traffic and revenue. Key inputs include:

- Length of forecast period, the duration of construction, and inflation assumptions
- Construction, toll facility operations, and roadway maintenance costs
- Truck origin and destination data
- I-80 traffic volume forecasts (cars and trucks)
- Truck operating costs and associated toll diversion assumptions
- Finance assumptions, including interest rates, coverage ratios, and reserve accounts

The mechanics of the tolled traffic diversion and revenue forecasting model are discussed in detail in the 2009 Study. The model forecasts free traffic and estimates the percentage of traffic that would divert to another route. This was accomplished by comparing a theoretical toll rate to the marginal cost to divert, based on time-value, fuel, and other truck operating costs. For example, if a trucker heading west on I-80 chose to avoid a toll in Wyoming and instead divert in Nebraska to the I-76/I-70/US 6/I-15 route through Colorado and link back up with I-80 in Salt Lake City, this would add 125 miles to the trip. If the cost to drive the additional 125 miles is less than the theoretical toll rate on I-80, the model assumes that the driver would take the alternative route instead of driving on I-80 through Wyoming and paying the toll. If the marginal cost is more than the toll, the driver is assumed to use I-80 and pay the toll.

This comparison is calculated for hundreds of origin-destination pairs within Wyoming and across the United States (U.S.) based on the FHWA Freight Analysis Framework database of freight movements. The remaining I-80 traffic is multiplied by the toll rate to estimate gross revenue potential for the facility at the respective rate.

The potential net revenue available for debt service is then calculated by subtracting an estimate of unpaid tolls and operations and maintenance costs from gross revenues. Operating costs include variable costs such as the cost per transaction for the vendor operations system, the cost of toll violations, and credit card fees. Fixed costs include general administrative, enforcement, and back-office staffing costs. Maintenance costs include toll equipment maintenance and all typical roadway maintenance costs, such as crack sealing, snow removal, mowing, and guardrail repair.

The financing assumptions are then applied to the net revenue available for debt service to determine the amount of debt that could be issued, as well as the amount of funding that could be made available to pay for capital costs after appropriate reserve accounts are established. Debt service includes junior and senior lien Current Interest Bonds and junior and senior lien Capital Appreciation Bonds.

TRAFFIC AND REVENUE MODEL ASSUMPTION AND INPUT CHANGES

The following major input and assumption changes were made to the 2009 Study model as part of the I-80 Master Plan Study.

- **Traffic Volume Forecast.** WYDOT maintains a database of historical traffic volumes at different points along I-80 that includes truck and passenger vehicles separately. The methodology for forecasting truck traffic using U.S. Imports in a regression framework is detailed in the 2009 Study Report. This same approach was used in the current effort; however, recent forecasts of U.S. Imports were used along with the most recent historical traffic data from WYDOT.

  The recent forecast for U.S. Imports was relatively similar to what was used in the 2009 Study. However, the historical traffic volume data from WYDOT was much lower—with the current forecast truck volumes nearly 20 percent lower in 2015 than the forecast values for 2015 in the WYDOT data used in the 2009 Study. This lower base traffic volume data resulted in a decrease in forecast traffic, and subsequently lower toll revenue. The negative revenue impact from the lower forecast traffic volumes is approximately 12 percent.

- **Freight Analysis Framework (FAF).** The FAF is a database of freight origin and destination data that was initially developed by FHWA decades ago and is updated periodically with actual data on modes, commodity types, and volumes. The 2009 Study used the FAF version 2.1 which was developed in 2002. The current study uses the FAF version 4.2 which was developed in 2015 and contains much more recent and complete coverage of national freight movements. Updating the traffic diversion model with the current FAF data set caused a small change in the model's revenue forecast, decreasing forecast revenue by less than 2 percent.

- **Truck Operating Cost.** The 2009 Study calculated the operating cost of a truck from a variety of sources, adding fuel costs, driver wages and benefits, truck operating costs, insurance, and several other elements. This cost estimating approach was replaced in the current study with the truck operating cost-per-mile calculated by the American Transportation Research Institute (ATRI) in its annual report, "An Analysis of the Operating Cost of Trucking" (ATRI 2016)

  Using the ATRI report findings, the operating cost per mile assumption was lowered to $1.68 per mile in 2016 terms from about $1.85 per mile used in the 2009 Study. This lower cost

makes diversion less expensive for truckers, thereby increasing the percent of trucks assumed to divert at a given toll rate, as well as decreasing the revenue potential of the I-80 facility by about 20 percent.

The diversion function of the model is based purely on a comparison of the marginal operating costs to divert and the toll rate. There are many other factors that truckers might take into consideration when deciding to divert away from a toll facility, including seasonal elements, the type of load they are pulling, their payment terms, and company policies, among others.

- **Toll Rate Escalation.** The three items above (traffic volumes, FAF data, and truck operating costs) reflect assumptions based on the best available data at the time of the analysis. Another major assumption in the toll revenue forecasting model is the rate at which toll rates are increased over time, which is a policy decision as opposed to a hard data input. If tolling is implemented, the toll rate escalation policy would impact the forecast of revenues as well as the credit of any bond issuance. The faster rates increase, the more revenue can be generated. Programmed rate increases, or at least the ability to raise rates as needed, would positively impact rating agency opinions of the bond issue, and potentially qualify the issuer for lower interest rates.

  In the 2009 Study, toll rate increases were assumed to be in line with assumed inflation at 2.5 percent. Understanding that most publicly operated toll facilities do not increase rates annually with inflation, a scenario was run where rates were increased at 1 percent annually. Because toll rate escalation is a policy decision, the greater latitude the toll operator has to change rates, the more able it will be to react to changing market conditions and guide tollway performance.

  The impact in assuming a toll rate escalation between 2.5 percent and 1 percent is substantial; representing a 14 percent decrease in the potential gross revenue expected in 2025 (in the 1 percent scenario). Over time the impact to the amount of potential revenue grows and is reflected in the difference between the net bond proceeds of the two scenarios of nearly 24 percent as discussed in the financial analysis section below.

- **Tolling Operations and Back-Office Costs.** The four assumptions above impact gross revenue potential—the top line revenue that could be collected by the tolling operation. Tolling operations and back-office costs are estimated at approximately $13 million annually in 2025. Costs incurred by the tolling operation includes administrative staff salaries, transaction processing, delinquent accounts collection, and customer service. Staffing costs are estimated based on other toll operations in the U.S. and include about 75 full-time equivalent positions at various salary levels. Other associated costs include office space, equipment, marketing, and other general and administrative expenses.

  While some staff would be necessary to provide oversight, some of the back-office operations and transaction processing could be outsourced to a third party on a per-transaction basis. Outsourcing could be done to a private party or an operating toll road authority such as the

E-470 Public Highway Authority[2]. Pricing would vary depending on the services negotiated but could range between 20 cents and 40 cents per transaction. With expected annual volumes in 2025 of about 2 million transactions, there may be an opportunity to reduce operating costs by outsourcing these transactions and customer service items.

The net impact from these assumption changes (relative to the 2009 Study) is a reduction in the 2025 potential annual gross revenue estimate from $305 million to $223 million, or about 27 percent, assuming a 2.5 percent annual toll rate escalation. If toll rates are assumed to be escalated at 1 percent annually, the 2025 potential gross revenue estimate falls to $191 million, as summarized in Table 1.

These revenue projections assume a toll rate of 25 cents per mile for five-axle trucks and 10 percent of this for automobiles. This is in line with toll rates per mile for five-axle trucks on other rural interstate tollways, which hover in the 15 to 32 cents per mile range (Table 2).

Table 1. Summary of Potential Annual Toll Revenues and Costs (2025) at 25 Cent/Mile Truck Rate

Toll Rate Assumption (per mile)	$0.25 (heavy trucks) / $0.025 (cars)	
Toll Rate Escalation Assumption:	2.50% annual	1.00% annual
Gross Revenue Potential	$223.0 million	$190.5 million
Operating Expenses	$19.8 million	$19.6 million
Roadway Maintenance Expenses	$21.0 million	$21.0 million
Net Revenue Potential	$182.2 million	$149.9 million
Total Net revenues (2025 to 2054)	$12.4 billion	$7.7 billion
Indicative Net Bond Proceeds	$2.2 billion	$1.7 billion

Table 2. Comparable Toll Rates for Five-Axle Trucks

Kansas Turnpike	15 cents/mile
Indiana Toll Road	27 cents/mile
NY State Thruway	32 cents/mile
Ohio Turnpike	21 cents/mile
Oklahoma Turnpike	28 cents/mile

Revenue and cost estimates summarized in Table 1 are discussed in detail below. These figures and supporting assumptions are all provided for the operating year 2025, assuming a 25-cent per mile toll rate and 2.5 percent toll rate escalation. The toll configuration assumed is Scenario 1 (one tolling point in the center of the state near Rawlins), similar to the 2009 Study.

[2] The E-470 Public Highway Authority conducts transaction processing, enforcement, and customer service for several non-E-470 Public Highway Authority-owned toll facilities in the Denver Metropolitan Area.

- **Gross Revenues.** By 2025 toll-free traffic in the vicinity of the tolling point is expected to grow to about 4,125 trucks per day in each direction (8,250 total) and 3,225 cars per day in each direction (6,450 total). Diversion of trucks, at the 25-cent per mile rate, is estimated to be 43 percent.
- **Operating Expenses.** Electronic transactions are assumed to cost $0.02 per transaction, and 10 percent of electronic transactions are assumed to be violations, adding additional costs of $15 per violation. Credit card fees are assumed to be 5.5 percent of the toll rate for booth transactions and 2.5 percent for electronic transactions. Overall, the variable transaction and violation costs total an estimated $8.83 million in 2025. Fixed costs include administrative costs, legal, marketing, banking, utilities, office equipment, consulting support, and toll system maintenance. These non-labor fixed costs were estimated to total approximately $6.3 million in 2025. Labor costs were estimated to total approximately $4.7 million in 2025.
- **Maintenance costs** include pavement maintenance, snow removal, and the periodic replacement of items like signage and guardrails for the entire length of I-80. Maintenance costs were estimated to total approximately $21 million in 2025. Both operating expenses and maintenance costs are estimated to total approximately $41 million in 2025.
- **Net Revenue.** Operating expenses and maintenance costs are subtracted from gross revenues to establish the free cash flow that could be used for capital projects, either to repay debt or as a pay-as-you-go revenue source. In the scenario outlined above, a more aggressive (2.5 percent) rate escalation policy would drive net revenue to approximately $182 million in 2025. And a moderate (1 percent) policy would result in approximately $150 million in net revenue. These annual revenues would grow over time, providing significant capacity for capital projects. Total collections over a 30-year timeframe are estimated at $12.4 billion and $7.7 billion, respectively, for the two rate escalation scenarios.
- **Net Bond Proceeds.** Using the net revenue streams noted above (to calculate the potential proceeds from a non-recourse toll revenue), bond issue results in over $2.2 billion in capital funding under the 2.5 percent toll rate escalation scenario and $1.7 billion in the 1 percent toll rate scenario. These calculations assume conservative interest rate assumptions and debt service coverage ratios near twice the available revenues. Capitalized interest, issuance costs, and debt service reserve accounts are also accounted for.

While the 25 cents per mile (2017) rate assumption is in line with other rural interstate toll facilities, it is expected to cause diversion in excess of 40 percent—which is undesirable for businesses in the corridor who serve truckers and the traveling public. Further, the 25-cent rate may not be necessary, depending on the capital program that WYDOT wishes to fund with toll revenues.

Reducing toll rates to 10 cents per mile for five-axle trucks and 1 cent per mile for passenger cars would result in lower diversion from I-80, estimated at approximately 20 percent. This scenario is presented in Table 3 for both 2.5 percent and 1 percent toll rate escalation policy

scenarios. The resulting annual net revenues are $84.5 million and $59.3 million, respectively, with potential bond proceeds estimated at $1 billion and $624 million, respectively.

Table 3. Summary of Potential Annual Toll Revenues and Costs (2025) at 10 Cent/Mile Truck Rate

Toll Rate Assumption (per mile)	$0.10 (heavy trucks) / $0.01 (cars)	
Toll Rate Escalation Assumption:	2.50% annual	1.00% annual
Gross Revenue Potential	$125.3 million	$99.9 million
Operating Expenses	$19.8 million	$19.6 million
Roadway Maintenance Expenses	$21.0 million	$21.0 million
Net Revenue Potential	$84.5 million	$59.3 million
Total Net revenues (2025 to 2054)	$5.8 billion	$2.7 billion
Indicative Net Bond Proceeds	$1.0 billion	$624.0 million

CONCLUSIONS

There is significant revenue potential in an I-80 tolling program if tolling is found to be a palatable solution for Wyoming. Even at toll rates that are much lower than comparable tolled rural interstates, tolling on I-80 could raise annual revenues that exceed the revenue currently generated from motor fuel taxes statewide in Wyoming. This revenue would roughly double the amount of funding available for regular maintenance on I-80. It would provide for a capital improvement program that allows WYDOT to meet its safety and capacity goals. It would also free up the revenue WYDOT currently spends on I-80 for other purposes.

Another important finding from the I-80 Master Plan Study is that there are two FHWA programs that would allow tolling on I-80, and neither of these would impact current flows of federal funding to WYDOT. This is a change from 2009 when the I-80 Tolling Study was conducted. Both the Section 129 General Tolling Program[3] and the Interstate System Reconstruction and Rehabilitation Pilot Program[4] are suitable fits for I-80. Excess toll revenues generated under these programs could be used by WYDOT to pay for maintenance or improvements to other Federal-Aid Highways in Wyoming. These programs differ slightly from each other—the Interstate System Reconstruction and Rehabilitation Pilot Program is focused on maintenance while the Section 129 General Tolling Program applies more broadly to both capital and maintenance costs. The Section 129 General Tolling Program would be preferable for I-80 given WYDOT's goals for the facility. The tolling approach, rates, and overall structure of the organization should be tailored to the capital program and other objectives of WYDOT.

[3] The Section 129 General Tolling Program allows tolling on new highways and new lanes added to existing highways, and on the reconstruction or replacement of bridges, tunnels, and existing toll facilities.

[4] The Interstate System Reconstruction and Rehabilitation Pilot Program was authorized under TEA-21 to permit three facilities to be tolled. On October 20, 2017, the FHWA published a solicitation for candidate projects, with applications due February 20, 2018. Should the FHWA award fewer than three provisional approvals, it may re-solicit applications at a future date.

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