Background Paper #6
Limitations of Studies Used to Advance Toll Projects

Developing toll projects rely on studies at every step of the way, and these studies are used by policy-makers to make important decisions about allocating scarce public resources. Those resources might be substantial dollars devoted to construction, or less substantial, yet important dollars devoted to planning and design or marshalling a public-private partnership proposal through review and negotiations. Although perfect information is never possible, it is important to understand the risk factors associated with the information used to make decisions at each stop of the project development process.

There are three legs that hold up the stool of a toll road development project: 1) traffic and revenue estimates; 2) cost estimates; and 3) financial plan. Limitations and risk factors of each of these are discussed below, including the limitations of these kinds of studies in general, as well as the work being done for this Comprehensive Tolling Study in particular.

Traffic and Revenue Estimates

When forecasting demand for any transportation facility, practitioners typically use complex computer models of the transportation system. These models are mathematical representations of the transportation system itself (i.e., the highways, arterials, and transit services), as well as of the demand for travel. The demand for travel is represented by various models of human behavior, including the amount of travel (trip generation), where that travel goes (trip distribution), what mode people choose (mode choice), and the path people choose to take (assignment). None of these models are perfect.

At any level of analysis, forecasting traffic and revenue for a potential toll project involves answering these questions:

- What is the basic demand for travel in the proposed corridor?
- How will that demand change over time?
- How many people will choose to use the facility if tolls are charged, and how will that number change with the amount of the toll?

It has never been easy to answer these questions with any kinds of certainty, and the complexity of toll projects being proposed today make these questions even more complex. Take, for example, a traditional toll road with these characteristics:

- Ten-mile urban limited access highway in a built up area;
- Parallel arterial routes (not limited access) that are heavily congested for many hours of the day; and
- A long-term history of growth in population and employment leading to rapid traffic growth.

Although this may be the simplest situation you can encounter in traffic and revenue forecasting, there are still uncertainties to be answered. For example:

- Is the traffic consistently congested everyday, or are there significant seasonal variations?
- What is the typical length of the trips causing the congestion? The entire length of the highway, or only a few miles?
- Is it easy for travelers to get to the highway? Will all the planned connections to the highway be built on time? Will there be adequate signage and marketing?
- Are the trips mainly by commuters, or for other trip purposes?
- What is driving the big increases in demand? Is the economy highly dependent on one industry, thereby, making it especially vulnerable to economic downturns?
- What is the distribution of income levels in the communities served by the project, and how does that translate into people's willingness to pay a premium to save time?

These factors, and many more cause uncertainty in even the simplest of circumstances. The situation becomes even more uncertain when a toll project is intended to serve traffic demand that has not yet materialized (e.g., for future growth), because even short-term hiccups in the economy can stall demand for traffic for years.

The new breed of toll road proposal adds even more complexity. These often involve tolling individual lanes of a highway, while the adjacent lanes have no toll (e.g., high-occupancy toll (HOT) lanes). In these cases, tolls are varied by time of day, or even dynamically depending on traffic levels. Since traffic levels can vary significantly from day to day, and are influenced by nonrecurring events around the transportation network, it is difficult to even get a good estimate of the time savings that would be realized by a new toll project.

Many of these issues are considerations when planning for non-tolled highways and transit systems as well. However, the consequences of forecasts not being met are less obvious on non-tolled projects. Although an underutilized free facility may cause the

public to receive less benefit from its investment than one that fully achieves its expected traffic levels, there are no impatient investors waiting for full and timely payment on their bonds. This feature of toll facilities puts tremendous pressure on the early years of tolling projects.

Levels of Detail from Exploratory to "Investment-Grade"

Traffic and revenue studies can be done at a variety of levels of detail for different stages in the project development process:

- **Exploratory** studies are typically done with a limited amount of existing data, and simple analysis tools using basic assumptions. These might take existing traffic volumes in a corridor, make some assumptions about potential market for a new facility, assume certain levels of toll, and certain levels of capture. The purpose of such a study would be to gain a sense of the market potential for a project to determine if more detailed studies might be needed.

- **Preliminary** studies provide additional analysis, and typically rely on more and better data, and regional travel demand models. These would use forecasts of population and employment that already have been prepared by others (typically a regional planning agency), and existing transportation models that might be modified to accommodate the analysis of people's choices between toll and non-toll projects. These would typically borrow data from elsewhere about responses to different price levels and time savings.

- **Investment-grade** studies are those used to support financing. The term "investment-grade" actually refers to a rating given by a bond rating agency to a transaction that is better than "junk bond" status. An "investment-grade" study does not guarantee an investment-grade rating. Rather, it is a traffic and revenue study done with the care, sufficient detail, and transparent assumptions so that investors can understand the risks that they are taking. Such studies would include extensive studies with new data regarding traffic levels over the course of the year, travel times by various routes, trip origins and destinations in the corridor, and surveys of people's value of time. One of the most important elements of such studies is an objective assessment of the local economy and growth potential. Investment-grade studies also would explore numerous "what-if" scenarios to explore the potential downside (and upside) risks.

Just as an investment-grade study does not guarantee an investment-grade rating, it also does not guarantee that traffic and revenue will occur as forecast. Any forecast study is built upon layers of assumptions. Some of these assumptions relate to measurement of current conditions, such as traffic counts, traffic patterns, household incomes, and travelers perceived values of time. Even though these represent measurements of existing patterns, there are still bound to be inaccuracies in the measurements, no matter how carefully the studies are done. Even traffic counts, the most basic of measurement, varies from day to day and from season to season, making accurate measurement difficult.

Other assumptions relate to forecasts of the future. When and where will housing and employment grow? What is driving the economy, and how does the economic well-being of the region stack up against competing regions? What other transportation improvements will be built when? What will be the price and availability of fuel in the future? And finally, how will travel patterns change in response? Although sophisticated models can be built to try to anticipate these events, these allow for not much more than informed speculation. Consider the difficulties those top-level policy-makers, such as the Federal Reserve Bank, have of trying to forecast the national economy even quarter to quarter and make policy to try to influence it.

None of this is intended to degrade the value of a traffic and revenue study. These studies are disclosure documents that explore as accurately as they can current conditions, the potential for change in the future, and the traffic and revenue that would result from that change. The studies need to clearly lay out the assumptions used, and the forecasts that would result. Extensive sensitivity testing or the use of risk analysis mechanisms also is appropriate, thereby, providing the investor with a sense of the risks inherent in the forecasts.

Given the complexity and uncertainty of all the elements that go into a traffic and revenue forecast, it is not surprising that many forecasts are "inaccurate." However, since so many elements of the forecasts are out of the control of the analyst, it may be unfair to use the word, "inaccurate" to characterize a particular forecast. It is almost certain that a forecast will be inaccurate and it is prudent for the toll road developer, whether they be the public sector or private sector, to take appropriate actions to mitigate these potential risks. This could include doing enough sensitivity analysis to be reasonably confident that reality will be within the envelope of scenarios tested with some reasonable probability. Monte Carlo simulation techniques, in which numerous sets of assumptions are combined in random ways to simulate potential future outcomes, also have been used to achieve this goal. While inaccuracies resulting from forecast assumptions not coming to fruition are common, it also is possible for inaccuracies to result from flawed analytic tools. This type of issue can be resolved through more thorough quality assurance/quality control efforts, as well as adequate time and resources to complete projects.

Recent Studies of Forecast Inaccuracies

Although numerous projects have been built over the years that have achieved and/or exceeded the forecasts' uses to finance them, there is always more attention paid to the projects that have not achieved their forecasts. In 2002, the bond rating agency Standard & Poor's (SP) published a report on toll forecasting performance.[78] The basic argument in this report, and in three annual updates, has been that there is a considerable

[78]Standard & Poor's, *Credit Implications of Traffic Risk in Start-Up Toll Facilities*, August 15, 2002. Most recent update is *Traffic Forecasting Risk Study Update 2005: Through Ramp-Up And Beyond*, August 25 2005.

amount of optimism bias in toll revenue forecasts around the world. As noted in the discussion on investment-grade forecasts above, there is good reason to understand that actual results would vary, perhaps considerably, from the forecasts. However, if objective and balanced analyses were being performed, one would expect the variation to occur on both the upside and the downside. The point of the SP's work was that there was a considerable trend towards the overestimation of traffic and revenue, leading to their conclusion of an optimism bias.

S&P suggests that first-year toll revenue estimates have been overestimated by an average of 20 to 30 percent over the sample of projects that they studied. In the 2005 update to the study, they tested traffic performance through the fifth year, and did not find any marked improvement. They also looked at truck forecasts in particular, and found that these were a particular concern, because trucks typically pay considerably higher tolls than light vehicles, and variation in this forecast can have a much bigger effect on actual toll revenues. S&P also looked at the potential variation in traffic forecasts done by different consultants (or with different sets of assumptions). They found that the magnitude of the difference in forecasts can be significant over time, even if the differences in the input parameters are not significant.

On a similar note, Fitch Ratings published a report in 2003 that highlighted some of the difficulties associated with achieving "accurate" traffic and revenue forecasts.[79] Among the issues they cited were:

- **Model Input Risk –** Models used for regional planning do not necessarily consider the same factors that traffic forecasters for toll projects consider important. Regional forecasts of population and employment are often used to support other decisions that may not have the same need for conservatism in forecasting. Such models also are not concerned with the up and down cycles of the economy, which can cause significant variation in toll road forecasting.

- **Ramp-Up Risk –** Ramp-up is a term used to describe the period from when a toll road first opens to traffic until it achieves the steady-state traffic flows predicted by rational travel models. It accounts for the time needed for toll paying customers to find and become acquainted with the project, and to decide whether it offers a good value proposition. Ramp up is not well understood, and can last from a few months to several years.

- **Event and Political Risk –** Whereas, the ups and downs of the economy are clearly out of the control of the forecasters, so are the actions of governments. The timing of improvements that access or compete with a toll facility also is uncertain, and can lead to unexpected results.

[79] Fitch Ratings, *Bliss, Heartburn, and Toll Road Forecasts*, November 12, 2003.

The lesson that can be learned from these studies is that recent trends are not necessarily indicative of future performance, and that it is crucial for the traffic and revenue studies to take a skeptical view of locally or regionally driven expectations of performance, and consider the very real potential of changing patterns over the course of the development time horizon of a project.

Limitations of This Comprehensive Tolling Study

This Comprehensive Tolling Study is structured to take a preliminary look at several illustrative examples of potential toll projects in Washington State, with the purpose of guiding overall policy-making with regards to tolling. In the early phase of the project, the consultant team will work with the Commission to recommend the scenarios that best represent the kinds of projects that might be considered in the State in the near, medium, and long term. Since the entire universe of potential projects is not being considered, this study is not intended to definitively determine the suitability of any particular project for tolling or pricing, nor as a means to priority rank projects. And it is certainly not intended to be an investment-grade analysis.

Travel Models

Therefore, the traffic and revenue analysis in this project will use the best models and procedures available within the timeframe and resources of this study. For example, the Puget Sound Regional Council (PSRC) recently updated its regional travel demand model for use in the Congestion Relief Analysis Phase 2. The update now lets the model reflect changes when people travel in response to congestion and pricing. It also uses recent research on elasticity of demand to toll prices.

The revised model is well suited to considering the regional implications of pricing strategies. In addition to addressing time of travel, it also considers changes to travel patterns and travel modes. Regional changes in vehicle miles and vehicle hours of travel can be distinguished.

However, this regional model is not effective at analyzing the detailed operational nuances of a particular corridor. While a lot of congestion can be attributed to traffic demand and too little mainline capacity, the true problems in the system are at bottlenecks and incidents of nonrecurring events. These are interchanges, on/off ramps, lane drops, grades, narrow lanes, solar glare, and other particular highway features. Such features cause traffic congestion that is not well represented in regional travel demand models, and can only be addressed through microsimulation procedures. Such modeling is time consuming and costly, and not feasible for this study.

When we look at projects outside of the PSRC region, they will not have access to the same modeling tools, so more caution is needed. We will consider the specific circumstances of each non-PSRC-region project in developing the appropriate strategy to assess traffic and revenue related to pricing. It may be appropriate for us to migrate toll elasticity factors from similar projects in the PSRC region, or develop other techniques entirely.

Socioeconomic Data

One of the most important drivers of travel demand is growth in household and employment growth and income levels. We are using the socioeconomic data approved for use by the planning agencies within each of the regions. Although these forecasts may be developed with care for the purpose for which they were intended, they have not been evaluated for their suitability for use in traffic forecasts intended to provide conservative assumptions for purpose of revenue estimates. Indeed, planning forecasts for typical projects may be "conservative" in the other direction, trying to anticipate the worst-case situation for future highway needs. An investment-grade study would consider factors influencing the regional economy, as well as factors within a particular corridor that might vary considerably from the generally accepted forecasts.

Verifying Local Conditions and Trends

Since this study is looking at numerous corridors and systems throughout the State, we are not in a position to carefully evaluate current traffic conditions for each project corridor. Although we will attempt to validate the travel models for the corridors, we will not be doing extensive field analysis of travel times and conditions for each.

Values of Time

A key determinant as to whether someone chooses to pay a toll or use an option that does not involve a toll is how they value the time savings (or other benefits, such as reliability or safety) over the alternative. The changes to the PSRC model have reflected the most recent national data for values of time, but do not incorporate local conditions.

Future Travel Behavior Will Be Similar to Current Travel Behavior

This is one of the most troublesome realities of forecasting. The only tools we have are to look backwards, try to forecast today's conditions from history, and assume that those relationships will hold over time as we use forecasts of different parameters (e.g., land use, incomes) to try to estimate future travel patterns. The reality is that things change over time. For example, between the 1950s and the 1980s, women entered the work force at a far greater pace than anyone in 1955 might have anticipated. Increasing disposable income led to higher-car ownership rates and growth in vehicle miles of travel well in excess of what a simple model based on population would have revealed.

Future changes in the social and economic relationships are unknown. We can only speculate, and be sure that we will be surprised in the future. An example apropos of today's headlines would be trying to forecast the price of fuel five years from now, and how that might impact travel behavior over the long term.

Cost Estimates

The cost estimates for this project will be conceptual in nature, based largely upon available data, with some additional analysis where necessary. In the normal project development process, cost estimates are refined as the scope of a specific project is developed and defined to a point where all issues that could influence project costs are known. A tiered evaluation process is used to screen and identify candidate projects early in the process of project development. In the preliminary phases of a tiered process, cost estimates are prepared using existing project documents and planning-level assumptions.

As the project advances, tolling plans are revised and the project is developed through the design process. Generally, the design of tolled highways is nearly completed before the plan of finance is prepared as part of the offering document, thus, allowing detailed estimations of cost with a high degree of confidence.

For planning-level analyses and at the early project screening process, "off-the-shelf" estimates are often adapted from environmental studies, or unit costs derived from comparable projects are used to estimate cost. These cost estimates need to include all related project costs that may be part of the project financing. Related project costs include soft costs (design and professional fees), right-of-way acquisition (including property damages), operating and maintenance costs, capital renewals, payment systems and the costs of administration.[80]

Specific Assumptions and Limitations

The limitations on the cost estimates developed for the preliminary screening process are briefly outlined below.

Project Scope

A limiting factor of the cost estimates is that project scope may change as specific projects advance towards implementation. Projects that are under development through planning studies and environmental clearance process will be reasonably well defined in terms of project scope, including typical sections and alignment. For well developed projects, some adjustments that may be needed are those required to accommodate toll collection systems, specialized signing, advance traveler information systems, back-office needs, and customer service facilities.

[80] The cost of finance is addressed in the subsequent section addressing limitations related to the financial plan.

For other less developed projects, the alignments themselves, along with the basic sections, will have to be established. For this study, it will be important to recognize that project scope may change as specific projects advance towards implementation.

Price Volatility

Construction prices have become volatile due to a wide range of factors that include local construction volume, material supply and demand, oil prices, and environmental issues. To account for this volatility, contingencies are included at the project conceptual level, and, as the design is developed, the contingencies are reduced to reflect an increasing level of confidence in the definition of the scope of the project.

At the conceptual level, cost estimates have a degree of uncertainty that is at least partially addressed by the inclusion of responsible contingencies in the estimate. To manage this limitation, it is recommended that a range of possible costs be developed for larger projects spanning several years of design and construction, and where there is a long-term risk of escalating costs over time.

The Association for the Advancement of Cost Engineering (AACE) publishes risk factors for cost estimates. These recommended accuracy factors are summarized in Table 6.1. These expected accuracy ranges reflect the limitations and uncertainty in predicting construction costs for projects in the screening, or feasibility stages. It is important to understand, however, that even Class 1 cost estimates have had variations greater than those shown here for a variety of reasons. Most recently, this has been caused by many factors, including but not limited to, high fuel costs, "China effect" (increased demand by China for steel and cement), and effects of natural disasters (short- and long-term impact of Gulf region reconstruction).

Table 6.1 AACE Expected Accuracy Ranges for Cost Estimates

Estimate Class	Level of Project Definition	End Usage	Expected Accuracy Range (L = Low; H = High)
Class 5	0% to 2%	Screening or Feasibility	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Concept Study or Feasibility	L: -5% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget, Authorization, or Control	L:-10% to -20% H: +10% to +30%
Class 2	30% to 70%	Control or Bid/Tender	L: -5% to -15% H: +5% to +20%
Class 1	50% to 100%	Check Estimate or Bid/Tender	L:-3% to -10% H: +3% to +15%

Source: Skills & Knowledge of Cost Estimating, AACE International, Fifth Edition.

Right-of-Way Acquisition

The cost of right-of-way and property damages are a very significant component of the overall project cost, and can be subject to great uncertainty, especially if the project's anticipated construction is many years away. For projects in the conceptual stages, right-of-way costs are developed based on per square foot costs from comparable projects. As the candidate projects advance, designs can be optimized to reduce the impact and cost of new rights-of-way and property damages. Toll roads funded without use of Federal funds may be able to take advantage of advance purchase programs and/or more efficient right-of-way acquiring processes. The use of comparable projects, rather than reliance on specific project data to estimate right-of-way costs and property damages, are limitations of the conceptual level cost estimates.

Procurement and Project Delivery

For this study, cost estimates will be prepared assuming conventional design-bid-build project delivery process. In reality, other procurement methods might be used. These methods could change (usually reduce) the cost. However, it is not possible to anticipate what these savings would be without knowing which alternative procurement process is utilized.

Soft Costs and Construction Engineering/Inspection

Soft costs represent all of the design and professional fees that will accrue during the project development process and implementation phases. These costs and the costs for construction engineering/inspection need to be estimated using percentages of the construction cost estimates. For this study, the percentages will be derived from comparable projects. Since these estimates are derived as a percentage of the construction costs, these will be adjusted as the project scope is refined.

Operating, Maintenance, and Administrative Costs

Annual operating, maintenance, and administrative costs need to be estimated for the life of the proposed bond issue and escalated annually. The tolling components of these costs will be derived from comparable toll projects at existing toll agencies, while the roadway and bridge structure components will be based on established WSDOT data. A limitation of this analysis is that technology, the administrative structure of the operating agency, and the size of the system are not certain at the conceptual phase. Also, annual escalation factor can often exceed the rate of inflation, and may vary from the experience of other agencies depending on the administrative structure and technology deployed.

Capital Renewals

The cost of periodic capital renewal for major infrastructure items, such as pavement and bridges can be reasonably estimated based on life-cycle estimates. The replacements of

technology, Intelligent Transportation Systems (ITS), and payment systems are components of the capital renewal estimates. A limitation of the early cost estimates is that technology, ITS, and payment systems are not fully defined at the conceptual phase.

Technology, ITS, Payment Systems, Customer Service, and "Back Office"

Detailed specifications and building programs for these elements will not be available during the conceptual phase. Over time technology choices and the range of available options could change. Also, the "back office" functions can vary in scope and allocation to a single project, depending on whether a single project or a system of projects is evaluated. These factors are all limitations of the estimation of technology, ITS, payment systems, customer service functions, and "back office" facilities.

Schedule Limitations

The length of the construction period from the close of financing through opening of the project (and the collection of toll revenues) is a critical factor in the estimation of finance costs, when sale of bonds is used in financing the project.

In order to minimize the finance costs during construction, the schedule needs to be relatively aggressive, but at the same time responsible and achievable. The potential for weather delays and cost premiums for provisions such as liquidated damages could impact both schedule and the cost of the project.

■ Financial Plan

For this project, a simplified plan of finance needs to be developed in order to identify the potential bonding capacity of the toll project. To keep things simple, level debt service can be assumed, although more favorable terms can probably be achieved as more detailed finance plans are prepared as projects progress. The factors used in the finance plan used for this study, as well as when individual projects might progress, need to be based on conservative assumptions and include the cost of finance, interest rates, coverage ratios, and reserve accounts.

Most start-up toll projects today need some kind of credit enhancements and guarantees sufficient to gain an investment quality rating of BBB, or above. Absent this level of credit rating, it is practically impossible to market bonds. Even alternative finance strategies involving private equity investments are difficult to structure if the underlying credit rating would not achieve an investment grade.

Revenue guarantees from an established toll system/network can be utilized as toll equity for credit enhancement of a new toll project within that system.

Specific Assumptions and Limitations of Those Assumptions

The specific limitations of the financial plan are as discussed below.

Credit Quality

Most new stand-alone toll projects and projects undertaken by start-up agencies involve project equity contributions and guarantees for both capital investment and ongoing operations. These can take the form of project development costs, direct capital contributions, assumption of schedule risk, operating and maintenance subsidies, and ridership guarantees.

Statutory Limitations

Legislation must be in place to allow an agency to form, issue investment quality debt, and for the State to support the financing of the project at the levels necessary to achieve an investment-grade rating. An element of this study will be to review those limitations.

Debt Service Repayment

For the purposes of this project, level debt service payments may be assumed. As the candidate projects are advanced, the tolling agency will want to hire a Financial Advisor to evaluate other potential debt structures to maximize bond proceeds.

Debt Service Reserve Accounts

The finance plan needs to include debt service reserve accounts funded by the bond issue. The reserve accounts in the preliminary finance plan are usually equal to 125 percent of the average annual debt service amount. In the event that additional reserve amounts are needed to achieve an investment-grade rating, other sources of funds will be needed to create these additional reserves.

Debt Service Coverage

When projects are financed, one of the mechanisms used to protect investors from revenue risk is to require that annual revenues exceed debt service by a certain ratio. The riskier the project, the higher this ratio will be. A debt service coverage ratio range of 1.4 to 1.7 times the annual debt service repayment amount is typically required for senior lien debt. This value could be even higher for a project that is perceived to be riskier. For this study, we will apply an appropriate value to the project within this range. The use of this coverage ratio is appropriately conservative based on the start-up nature of the projects and the underlying assumption of a BBB rating.

Capitalized Interest During Construction

Interest rate payments for the period between issuance of bonds and the start-up of revenue collection need to be capitalized and included in the bond amount. As noted above, it is desirable to minimize the need to capitalize interest during construction without risking the quality of the project itself.

Cost of Finance

Finance costs include bond underwriter fees, rating agency costs, preparation of bond documents, and other costs of issuance. For this project, we will assume that the cost of issuance is 1.5 percent of the bond size. This assumes that the debt is not insured to gain a higher rating. Ultimately, an evaluation as to whether insurance costs are offset by reduced interest rates would need to be conducted by a financial advisor as the candidate projects advance and more detailed plans of finance are prepared.

Period of Finance and Interest Rates

In today's cost and finance environment, a 40-year plan of finance is most suitable for the purposes of this preliminary study. In the past, this was closer to 30 years. Most private concession contracts are now 40, 50, or in the case of the recent Chicago Skyway sale, 99 years. The interest rates used need to be commensurate with a BBB rating, plus 50 basis points. Given current conditions, we anticipate that an interest rate in the range of 5.0 to 6.0 percent is reasonable. Interest rates are volatile, and changing rates over time can impact the feasibility of projects and the financial structure. We will test the impact of higher rates to determine the impact on project finances.

Underlying Revenues

The preliminary finance plan is to be based upon the traffic and revenues that are produced as part of this preliminary study. As the candidate projects advance, more detailed, investment-grade revenue studies need to be conducted, and the plan of finance would be refined accordingly.

Project Equity and Secondary Sources of Funds

Project equity and secondary sources of funds that might include subordinate debt, Transportation Infrastructure Finance Innovation Act (TIFIA) loans,[81] or direct contributions to the project may be required in order to finance the candidate projects. The need for project equity and secondary sources can be identified in the preliminary

[81] TIFIA is a Federal program developed in Transportation Equity Act for the 21st Century (TEA-21) that provides credit enhancements to major projects. Credit enhancements could include subordinate loans or loan guarantees.

screening process, but these strategies need to be addressed in specific detail as the candidate projects advance to the preparation investment-grade revenues and more detailed plans of finance.

Implications for This Study

The overall financial feasibility approach involves screening and evaluating toll policies and candidate toll projects. The ultimate goal of these toll feasibility tests is to provide an estimate of the total project cost compared with the economic value of a candidate toll project, typically expressed as the potential for the project to be funded through bonds. Due to conservative nature of these analyses, a further fine tuning of assumptions and a more detailed screening process may be necessary before an investment-grade analysis leading to a bond sale can take place.

As the results of this study are developed, we will:

- Clearly identify key risk factors in traffic/revenue, cost, and finance;
- For each factor, make conservative assumptions for analysis; and
- Perform range of sensitivity tests for each key factor or identify level at which (say for bond interest cost) project likely to not be viable.

This will provide the audience for the work an appreciation for the risk factors and limitations of the analysis.

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