P3-VALUE: Orientation Guide

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1 Introduction

Purpose of Guide

This Orientation Guide (Guide) introduces P3-VALUE (Public-Private Partnership Value for Money Analysis for Learning and Understanding Evaluation) users to public-private partnerships (P3s) and the methods used in P3 evaluation. The Guide reviews the different types of P3s in the United States and their benefits and limitations, and explains how public agencies may evaluate different procurement options for a particular project. The Guide explains how P3-VALUE can help users understand the processes and considerations that go into a rigorous quantitative analysis of P3 procurement options for transportation projects. It is important to note that the Guide is based on the experience of the U.S. P3 market and therefore reflects the terminology and methodology practiced in the United States.

Overview of the P3 Toolkit and P3-VALUE

The Federal Highway Administration's (FHWA) Office of Innovative Program Delivery (OIPD) is producing a P3 Toolkit comprising tools and guidance documents to assist in educating public sector policymakers, legislative and executive staff and transportation professionals. The P3 Toolkit forms the base of a broader P3 capacity-building program which includes a curriculum of P3 courses and webinars. The P3 Toolkit will address Federal requirements related to P3s and four key phases in P3 implementation: (1) Legislation and Policy; (2) Planning and Evaluation; (3) Procurement; and (4) Monitoring and Oversight.

P3-VALUE and its accompanying evaluation resources are a key component of the P3 Toolkit. They serve as a reference for decision-makers and practitioners seeking to understand P3s as a financing alternative for major capital projects. The P3 Toolkit includes the following P3 evaluation resources:

- This *Orientation Guide* to summarize the issues and factors that are evaluated when considering a P3 as a financing and procurement mechanism;
- Three Primers, one each on *Risk Assessment* (reference for Risk Assessment Tool), *Value for Money Analysis* (reference for Public Sector Comparator and Shadow Bid tools) and *Financial Structuring and Assessment* (reference for Financial Assessment Tool);
- A suite of analytical tools called *P3-VALUE* to help practitioners understand the process for evaluating P3 approaches and to educate users on methods for assessing the viability of a P3 approach to infrastructure delivery. *User Guides* and *Frequently Asked Questions* provide technical advice in support of this suite;
- *Evaluation Guidebooks* (under development) for practitioners seeking a deeper understanding of evaluation processes and data sources as well as the concepts, assumptions, inputs and outputs involved in the above analyses; and

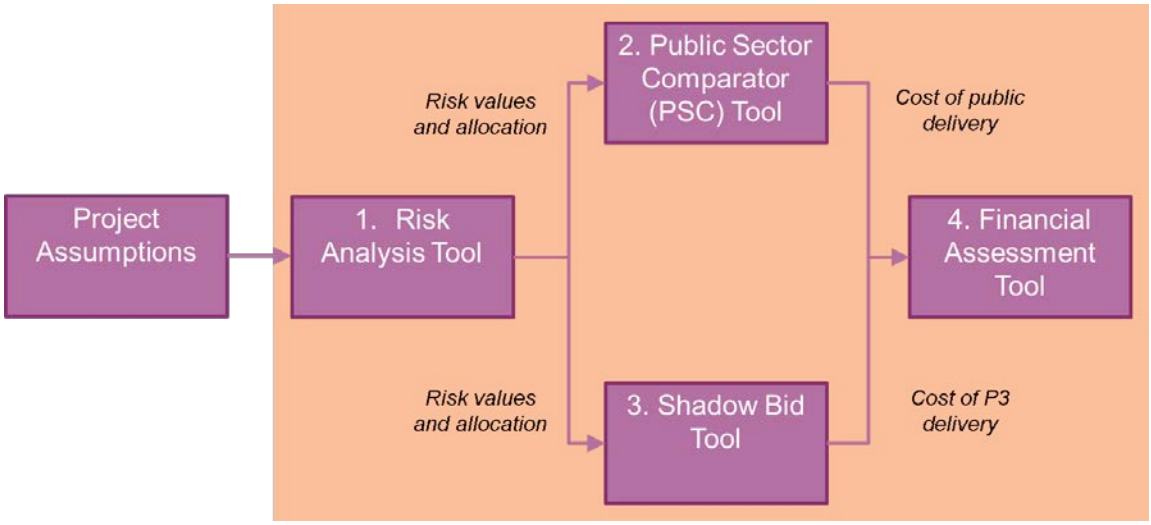
- *P3 Screening Tools* (under development) for the program development as well as the project development phases along with supporting user guides to assist practitioners seeking to perform a preliminary screening evaluation of the suitability of a P3 for major highway projects (costing $100 million or more).

The evaluation resources serve as references for decision-makers and practitioners seeking to understand P3s as alternative methods of delivering major transportation projects. P3-VALUE provides a set of integrated analytical tools to help practitioners understand processes used to quantitatively evaluate procurement options. Practitioners can use P3-VALUE to familiarize themselves with the process of evaluating procurement decisions, the data required to conduct quantitative assessments of procurement options and the impact that various assumptions can have on the desirability and feasibility of different procurement structures. P3-VALUE is for educational purposes only and is not intended to guide decisions on actual projects.

As depicted in Figure 1-1, P3-VALUE is comprised of four interactive, integrated spreadsheet-based analytical tools that allow users to explore different components of Value for Money Analysis (VfM) including:

- ***Risk Assessment Tool*** – This tool allows users to document project risks and risk management strategies and to estimate the costs of risks under different procurement structures.
- ***Public Sector Comparator (PSC) Tool*** – This tool allows users to calculate the risk-adjusted costs for a project that is designed, financed, constructed, maintained and operated under a traditional public sector delivery model.
- ***Shadow Bid Tool*** – This tool allows users to calculate the costs of payments to a private partner for delivering a project as a P3 concession.
- ***Financial Assessment Tool*** – This tool allows users to compare the PSC and Shadow Bid costs for procuring a project and to assess the financial subsidies required using different procurement methods.

Figure 1-1. P3-VALUE Overview



Accompanying user guides and other resources include:

- *User guides* for each analytical tool that explain how to use the tools; and
- *Evaluation Guidebooks* for practitioners seeking a deeper understanding of evaluation processes and data sources as well as the concepts, assumptions, data requirements, inputs and outputs of the above analyses.

2 Overview of P3s

Types of P3s

P3s for transportation projects have drawn much interest in the United States for their ability to address traditional financing constraints and to transfer certain project risks from the public sector to the private sector. P3s are contractual agreements between a public agency and a private entity that allow for greater private sector participation in the delivery and financing of transportation projects than with traditional approaches. With P3s, private firms take on the risks of some or all of the financing, designing, constructing, operating and/or maintaining a transportation facility in exchange for future revenues. The distinguishing characteristic between different forms of P3s is the degree of responsibility and risk that is transferred to the private sector (see Table 2-1 for typical risk transferals).

Table 2-1. Typical Risk Transferal to Private Partner by P3 Procurement Type

P3 Procurement Type	Design Risk	Construction Risk	Financial Risk	O&M Risk	Traffic & Revenue Risk
Design-Bid-Build (DBB)		Partly			
Design-Build	●	●			
Design-Build-Finance (DBF)	●	●	●		
DBFOM w/Availability Payment	●	●	●	●	
DBFOM w/Toll Concession	●	●	●	●	●

P3s differ from traditional publicly financed, design-bid-build (DBB) procurements of transportation projects where the different project delivery phases (design, construction, operation and maintenance) are each conducted by different public or private entities. 'Public-private partnership' describes a project for which a private entity (which may be a consortium of several private companies) assumes responsibility for more than one project delivery phase.

Design-Build (DB): The simplest form of P3 is design-build procurement. In this procurement model, a single private contractor is responsible for designing and building a project. The design-builder assumes responsibility for the majority of the design work and all construction activities, together with the risks associated with providing these services, for a fixed fee. When using DB delivery, public sector project sponsors usually retain responsibility for financing, operating and maintaining the project. While DB procurement has been more prevalent in private sector work, it is also gaining acceptance among many public sector transportation infrastructure owners.

Design-Build-Finance (DBF): In a design-build-finance structure, the design-builder takes on the additional responsibility of financing the project. The design-builder arranges financing for the

project and is repaid over an agreed upon period, often upon completion of the project. The public sponsor transfers financing risks to the private sector partner, thereby increasing the incentive for the partner to deliver the project in a timely and cost-effective manner.

Design-Build-Finance-Operate-Maintain (DBFOM): In this procurement structure, a private entity (usually a consortium of companies) assumes responsibility for designing, building, financing, operating and maintaining a project for an agreed upon period. While the public agency retains ownership of the project and must manage the project, the private partner assumes the long-term operations and maintenance risks of the project. The operations and maintenance period of the contract effectively acts as a warranty, enhancing the private partner's incentives to design and construct a quality facility that can be managed efficiently over a long period.

There are currently over 20 active DBFOM P3s in the United States. The majority of these projects are in Virginia, Texas, Florida and California. Generally, the projects range from a few hundred million dollars to several billion dollars. Many of them involve toll facilities, in which case the private partner receives compensation either directly from toll payments or from the public agency making regular "availability payments" based on project milestones or performance standards.

P3-VALUE Capabilities and Limitations: Procurement Structures

This Guide focuses on three P3 structures popular in the United States and modeled in P3-VALUE: Design-Build (DB), Design-Build-Finance (DBF) and Design-Build-Finance-Operate-Maintain (DBFOM). The analytical tools allow the user to assess the costs of delivering the project as a DBB, DB or DBF (using the PSC tool) and compare those to the costs of delivering a project as a DBF or DBFOM (using the Shadow Bid tool) as they would in a VfM analysis. P3-VALUE does not assess the benefits and costs of long-term leases of existing revenue generating facilities, a form of P3 otherwise known as a "brownfield" or "asset monetization." Specifically, the P3-VALUE Shadow Bid model does not calculate the payments that a private partner would make to the government entity in a brownfield scenario.

Potential Benefits of P3s

P3s allow public agencies to access private equity capital to finance projects. This can help public agencies achieve their goals in a number of ways: expanding the capacity of states to finance infrastructure projects; reducing delivery times and project costs; transferring project risks; and improving the cost-effectiveness of long-term maintenance (see Table 2-2). Public agencies often use P3s to accelerate project delivery by leveraging future revenue streams to bring in upfront private capital for project delivery without assuming additional financial risk. Additionally, by bundling project delivery phases, P3s can result in more cost-efficient project delivery and can create incentives to better manage the project's life cycle costs. P3s can also reduce the risk to the public sector that a project may experience cost overruns, schedule delays or lower-than-expected traffic demand and revenue. An optimum transfer of risks to the private sector is a primary driver of P3 benefits. The public sector pays a premium to the private sector to manage those risks, but

under an optimal risk transfer, this premium is less than the cost to the public sector of retaining those risks.

Table 2-2. Primary Public Benefits of P3s

Benefit	Description
Increased capacity to finance projects	Using private equity and debt to help finance a project lessens the amount of public funds required in the short-term to support a project. In addition, the private partners may be less risk-adverse than the public sector allowing them to leverage greater up front capital from anticipated project revenue than the public sector can. By accessing private financial resources, P3s can free up public funds to be used on other worthwhile transportation projects that may not be suitable for P3 delivery.
Accelerated infrastructure provision	P3s may provide public agencies access to upfront capital needed to complete major projects that is not subject to annual budget constraints or public debt caps.
Improved reliability of project delivery	Many P3s create incentives for the private sector to design and construct a project more efficiently. Several studies have found that P3 projects are more likely to be completed on time and on budget than projects using traditional procurement methods.
Improved allocation of resources over the project life cycle	In P3s where the private sector is responsible for operating and maintaining the asset, the private sector has a strong incentive to minimize operations and maintenance costs over the life of the project by improving quality of initial construction.
Transfer of selected risks to the private sector	Public sponsors can transfer risks, such as construction and financial risks, to the private sector.

P3-VALUE Capabilities and Limitations: Project Delivery Schedule

As in a VfM analysis, P3-VALUE allows users to quantitatively assess the benefits derived from more efficient project delivery and from improved risk management that P3 procurement options may offer. P3-VALUE does not quantitatively assess the non-financial benefits from accelerated infrastructure provision as this is beyond the scope of traditional VfM analysis.

Limitations of P3s

P3s do not allow public agencies to transfer *all* project risks to the private sector. While a P3 can enhance a public agency's financial capacity, a P3 is not a source of funding and does not provide new revenue for a project. A P3 can accelerate project delivery, by providing upfront capital, and potentially reduce the overall life-cycle costs of a project, but that upfront capital is not a substitute for revenue and must be paid for over time with future revenue. P3 agreements often involve the commitment of a long-term revenue stream to pay back lenders and private investors. Private lenders and investors typically demand a higher rate of return than investors in tax-exempt municipal bonds; so, the cost of private financing is generally greater than that of public financing. Public agencies must carefully analyze these and other tradeoffs when deciding whether to pursue private financing of transportation projects. Furthermore, P3s are not appropriate for all

transportation projects. FHWA is developing a screening tool to assist in assessing the appropriateness of a major project (costing $100 million or more) for P3 procurement.

Some aspects of P3s cost more than traditional project delivery. The additional costs of P3s include higher transaction and financing costs and the payment of premiums to transfer risks to the private sector. To be worthwhile to the public agency, the anticipated benefits of delivering a project via a P3 must outweigh these higher costs.

Due to the size and complexity of P3 agreements, greater time and expertise is necessary to develop P3 procurements, thereby raising transaction costs. Higher transaction costs of P3s mean that the use of P3s is generally limited to large and complex projects.

Financing costs are typically higher because, unlike the municipal bonds typically used by public agencies to finance transportation projects, private finance is not tax-exempt and is not backed by the "full faith and credit" of the state agency. Furthermore, private equity investors demand a competitive return on their investment. Higher financing costs may more accurately represent the true costs of the risks associated with a project that are otherwise borne by the public; nonetheless, they represent higher actual costs to the procuring agency.

P3-VALUE Capabilities and Limitations: Financial Costs

P3-VALUE allows users to assess differences in transaction and financing costs between different procurement options as well as savings generated by more efficient risk management. The tools can only give a rudimentary measure of potential differences in financing costs, however, as they use a simple form of modeling financial cash flows that cannot accurately represent the complex structure of most P3 financial plans, which are highly leveraged and which utilize multiple sources of financing.

The benefits of risk transfer can be undermined, however, if the public agency fails to adequately enforce the contract or seeks to renegotiate the contract when risk events occur. Once partners agree to a contract and a project is underway, the public agency responsible for managing the contract must be careful not to take back risks unintentionally by:

- Requesting scope or design changes;
- Modifying performance specifications; or
- Not following the performance management provisions.

Finally, by entering into long-term contracts for providing operations and maintenance of a facility, public agencies can secure specified levels of service, but they may lose flexibility to respond to changing policy goals or technologies, as agencies must negotiate changes to levels of service with the private partner.

3 Overview of P3 Evaluation Methodologies

P3 Evaluation Methodologies

In determining whether to deliver a project as a P3 and how to optimally structure a P3, agencies may compare the financial impacts on their budgets as a result of different procurement options for a project. P3 financial evaluation methodologies include:

- **Value for Money analysis** – This methodology compares the time-discounted, risk-adjusted, financial costs and benefits of delivering the same project over the same period under different procurement approaches. Qualitative analysis may be helpful in advance of, or as a supplement to, VfM analysis to account for considerations that are not quantifiable in VfM analysis such as political or legal issues or differences in scope or timing between different procurement options.
- **Cash Flow Analysis/Financial Assessment –** This methodology compares nominal cash flows to assist in determining the affordability of different procurement options.

The evaluation method appropriate for a particular project, or at a particular phase in project development, depends on the question the public agency is trying to answer and the quality of the data available to answer the question. An agency may apply both methodologies to the same project. Also, they may both be applied at different points in the project development process.

Overview of Value for Money Analysis

VfM analysis allows decision-makers to compare the risk-adjusted net present costs to the public sector sponsor of different project delivery options. A VfM analysis compares the estimated risk-adjusted financial costs and benefits of a P3 project over an anticipated concession period to the financial costs and benefits of delivering a project over the same period using a traditional procurement approach.

VfM analysis provides a tool for policymakers to better understand the value of transferring or retaining project risks and to assess the overall value of a potential concession to a public agency. As such, public policymakers may use VfM analyses to assist in:

- Selecting a preferred procurement option for a project;
- Selecting a preferred bidder;
- Negotiating with a selected bidder prior to finalizing the P3 agreement; and
- Communicating procurement decisions to the public.

Steps in Determining Value for Money

While there are important variations in the application of VfM methodologies, the basic steps of VfM include:

1. Create a baseline Public Sector Comparator (estimate hypothetical life cycle costs of procuring the project through a traditional approach, including capital and operating costs and costs of financing);
2. Identify and assess the timing, probability and consequence of project risks and allocate them between the public and private sectors;
3. Adjust the PSC for the costs of risks and competitive neutrality and subtract project revenues such as tolls;
4. Estimate the hypothetical risk-adjusted life cycle costs of the P3 alternative (Shadow Bid), including costs directly borne by the public agency; and
5. Compare the costs of the two approaches.

Value for Money Assumptions

The core assumptions necessary to conduct a VfM analysis are estimates of project life cycle costs, estimates of the value of retained and transferrable risks, adjustments for competitive neutrality, and discount rates. The following assumptions make up the core components of quantitative VfM Analysis:

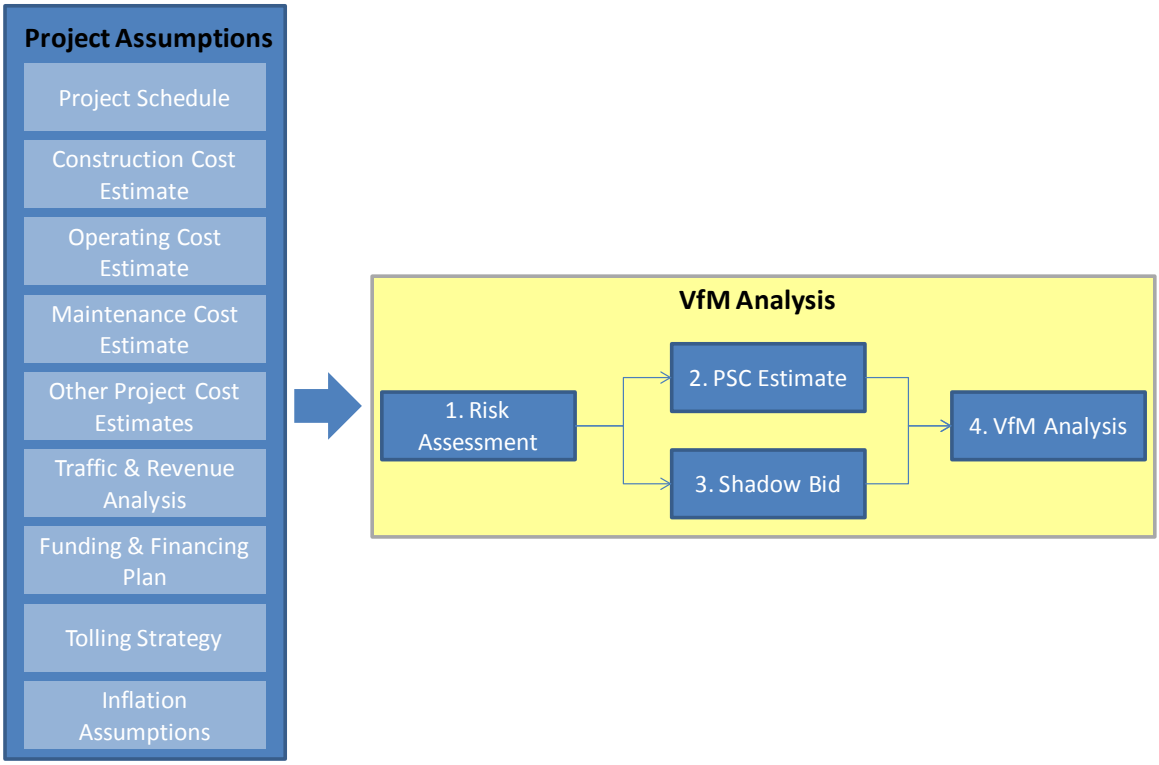
- **Project life cycle costs**: construction costs, procurement and oversight costs, operation and maintenance costs, financing costs, taxes and inflation.
- **Risk adjustments:** the estimated value of retained and transferrable risks under different procurement options.
- **Competitive neutrality adjustments:** adjustments to account for competitive advantages and disadvantages inherent to public agencies.
- **Discount rate:** adjustment to cash flows over time to account for the time value of money.

An understanding of the project schedule is also necessary to estimate the timing of risks and life cycle costs accurately since they affect project cash flows.

There must be sufficient data to assess project risks and to estimate project life cycle costs. Sufficient preliminary design work should be completed on the project to understand the project's basic scope, alignment, potential revenue sources and procurement structures. If the project is tolled, a traffic and revenue (T&R) study can be a useful source for estimating potential revenues and operations costs. Figure 3-1 lists the assumptions required to develop a comprehensive VfM analysis. Initial sources of data and assumptions may include:

- Preliminary engineering cost estimates;
- T&R study; and
- Project funding and financial plan

Figure 3-1. Assumptions in VfM Analysis



Gathering the data and conducting the analysis required for a comprehensive VfM analysis can take more than six months; therefore, it is useful to consider conducting a VfM analysis sufficiently in advance of the completion of the environmental review process to prevent delays to procurement. The analysis may be revisited throughout the project development process as assumptions are refined.

Limitations of VfM Analysis

Whereas an agency may use a benefit-cost analysis (BCA) to determine whether a project's societal benefits are worth the cost to society, agencies typically conduct a VfM analysis once it has made the decision to undertake a project and wishes to evaluate how best to deliver it. Furthermore, since VfM analysis considers only financial costs and benefits, it does not consider the benefits to society from accelerating project delivery. VfM analysis primarily focuses on the financial impacts of different procurement models from the perspective of public sector project sponsors. Non-

financial impacts such as benefits to users or non-users of a facility are not considered or are relegated to a qualitative evaluation.

A critical assumption in VfM analysis is that the procurement options considered are technically, legally and financially feasible and that the project can be delivered over the same time period using the different procurement options. Thus, a VfM analysis that compares a publicly financed PSC to a privately financed Shadow Bid would not be appropriate in cases where an agency decides to pursue a P3 because traditional publicly financed procurement options are not available. That said, VfM analysis may be used to compare two privately financed procurement structures such as a DBF and a DBFOM.

Another consideration is treatment of toll revenues. Toll revenues are in effect a direct payment from the public to the toll operator. If the P3 concessionaire is responsible for setting toll rates, the concessionaire may be able to increase toll revenues by charging higher rates to the public (within limits imposed by the P3 agreement). If this additional revenue is included in a Shadow Bid for the toll concession model, a lower Net Present Value (NPV) that compares favorably with the PSC may result, even if there is no difference in total costs.

Treatment of Federal financing support is another consideration. The Federal government has provided a number of direct and indirect opportunities for subsidized financing of transportation infrastructure, including tax-exempt debt (such as municipal bonds or private activity bonds); tax credit bonds (such as Build America Bonds); and subsidized direct loans such as loans under the Transportation Infrastructure Finance and Innovation Act (TIFIA). Accounting for such subsidies within the VfM financial analysis could potentially produce different results from analyses that treat these subsidies as being external from the perspective of the state, local public agency or P3 concessionaire.

Another issue that a VfM analysis may not consider is any differences in the profiles of the public agency's long-term payments. For example, the PSC involving DBB or DBF may involve much higher payments in earlier years, relative to availability payments made over a longer period of time to a DBFOM concessionaire. When the patterns of payment streams for alternatives differ significantly, the discount rate can have a significant impact on the analysis results because payments in early years have a higher present value when compared to payments made in later years.

4 Assessing Project Risks

Identifying and assessing risks is a critical first step in evaluating the costs and benefits of different project procurement options. Risk assessment involves evaluating the probability that an uncertain event will occur over a given period and the likely severity of the effect on a project's objectives if the event occurs. Typical project risks include technical, political and environmental issues, as well as financial risks associated with variables such as interest rates and inflation. Since P3s derive much of their worth from the effective transfer of risks to the private sector, it is important for public agencies to understand the value of transferring those risks.

Risk workshops are formal meetings where project team members, subject matter experts and others responsible for estimating the costs and schedule of a project work together to identify and analyze risks. Assessments also consider the timing of when an event might occur, the probability that the event will occur during that time, and the range of consequences that could result from the event occurring. The output of risk workshops can include a list and description of significant risks, qualitative assessments of risk probability and impact and risk mitigation strategies. Agencies can document these outputs in a risk register.

A risk register allows agencies to capture information on risks, the probability of risks occurring, the consequences of a risk event occurring and strategies to reduce the probability of risk events occurring or to mitigate the consequences if a risk event were to occur. A risk matrix, such as the one provided in the Risk Assessment Tool, provides a format for visualizing an assessment of the severity (i.e., high, moderate or low) of a risk based on the likelihood and consequences of identified risks (see Figure 4-1).

P3-VALUE Capabilities and Limitations: Assessing Risks

The Risk Assessment Tool provides a list of risks commonly associated with P3 projects, a risk register for documenting risks and a risk matrix to facilitate qualitative risk evaluation. The Risk Assessment Tool runs a Monte Carlo simulation that calculates a range of aggregate risk costs based on users' assumptions about the probability and consequences of risks. The calculations derived from the simulation approximate the potential effect of those risks on project schedule and costs.

The Risk Assessment Tool allows users to run a Monte Carlo simulation to model the potential effects of those risks on project schedule and costs. Using Monte Carlo simulations can be challenging because it requires users to estimate the probability distribution (mean, standard deviation, and distribution shape) of specific risks occurring. Some risks, however, cannot be easily quantified and data on risks affecting major surface transportation projects can be scarce or of poor quality. Nonetheless, the Monte Carlo method is a common method of project risk analysis because it provides detailed, quantified information about risk impacts on the project cost and schedule.

It is important to consider risk allocation and to document it in the risk register. Different P3 procurement options allow public agencies to transfer varying degrees of risks. Depending on the P3 structure, risks may be fully transferred to the private sector, retained by the public sector, or shared. Calculating the costs of transferring and retaining risks under different procurement options is a critical aspect of VfM analysis. The Risk Assessment Tool allows users to assess the timing and impact of both retained and transferrable risks.

Figure 4-1. Sample Risk Assessment Matrix

Level	Likelihood
A	Remote
B	Unlikely
C	Likely
D	Highly Likely
E	Near Certainty

ASSESSMENT GUIDE

Likelihood	a	b	c	d	e
E	M	M	H	H	H
D	L	M	M	H	H
C	L	L	M	M	H
B	L	L	L	M	M
A	L	L	L	L	M

Consequence

Level	Schedule	and/or	Cost
a	Minimal or no impact		Minimal or no impact
b	Additional resources required; able to meet		<5%
c	Minor slip in key milestones; not able to meet need date		5-7%
d	Major slip in key milestone or critical path impacted		7-10%
e	Can't achieve key team or major program milestone		>10%

RISK ASSESSMENT

High (Red)
Unacceptable. Major disruption likely. Different approach required. Priority management attention required

Moderate (Yellow)
Some disruption. Different approach may be required. Additional management attention may be needed

Low (Green)
Minimum impact. Minimum oversight needed to ensure risk remains low

For more information on risk assessment, refer to FHWA's primer on Risk Assessment (see Appendix A).

5 Developing a Public Sector Comparator (PSC)

The PSC is a cost assessment of delivering the project using traditional public sector delivery methods. It serves as a benchmark for comparison with the Shadow Bid estimate of the costs of delivering the project as a P3. The PSC should represent the most likely project delivery option alternative to a P3, which may be a DBB, a DB, or DBF procurement, depending on the procuring agency. The PSC Tool models risk-adjusted project life cycle costs to calculate the costs of delivering the project using the PSC procurement approach.

In constructing the PSC, the procuring agency must first estimate project life cycle costs (see Table 5-1). Project life cycle costs include the costs of procuring, designing, constructing, financing, operating and overseeing a project over a defined period. The PSC should also consider potential project revenues derived from tolls or other sources as well as potential funding and financing for the project. The PSC tool allows users to enter cost and revenue assumptions, which the tool uses to model baseline project cash flows from preliminary project design and procurement through the proposed concession period.

Table 5-1. Cash Flow Elements for Life Cycle and Financing Costs

Cost Item	Description
Capital Costs	Includes costs for development of the project, including planning, environmental documents, design and procurement, right-of-way acquisition and construction.
Operations Costs	Day-to-day costs of operating the project such as snow and ice removal.
Maintenance Costs	Items such as replacement of lighting.
Reconstruction and Rehabilitation	Items such as bridge or pavement replacement.
Financing Costs	Costs associated with the interest charged on public or private debt, returns to private equity, as well as other costs, such as issuance fees

Estimated project cash flows are then adjusted for the costs of risks and for competitive neutrality. Outputs from the Risk Assessment Tool may guide user's assumptions concerning risk adjustments to the PSC. The costs of both retained and transferrable risks are added to the baseline PSC cash flows in different project phases depending on when the risks are likely to have an impact on project costs. To calculate the net present value (NPV) of project cash flows, a discount rate is applied. The discount rate represents the time value of money – cash flows in later years are valued less than cash flows in earlier years.

6 Developing a Shadow Bid

The estimated risk-adjusted, whole-life, net present costs (NPC) of the PSC are compared to the estimated risk-adjusted, whole-life, net present costs of delivering the project as a P3. This estimate is called a "Shadow Bid." The process of developing a Shadow Bid is similar to the process of developing a PSC, though the hypothetical costs to the private sector to deliver the project as a P3 are considered instead. The Shadow Bid Tool allows users to model private sector cash flows to calculate the payments the private partner would require to deliver the project under different privately financed procurement structures. The costs of the Shadow Bid include the net present costs of payments to the private partner, which include compensation for life cycle costs, financing costs, and costs of transferrable risks, plus the costs to the public agency for retained risks and the costs of procuring and overseeing the project. The Shadow Bid tool allows users to model those costs to calculate the payment required by a potential private partner under different procurement and compensation models

The Shadow Bid incorporates many of the same life cycle cost assumptions incorporated in the PSC, though some of the values may vary. For example, the Shadow Bid may reduce construction or operations and maintenance costs if it is reasonable to assume that the P3 procurement structure will allow the private sector to manage costs more efficiently than the public sector. Additional efficiencies may be assumed in the private sector's risk management, which thereby lowers the costs of risk adjustments to the Shadow Bid cash flows. Finally, differences in the private sector's financing costs and tax burden are important to consider in calculating the payments demanded by the private sector under a P3 procurement structure. Table 6-1 summarizes the differences between the PSC and the Shadow Bid. For more information, refer to FHWA's primer on Financial Structuring and Assessment for Public-Private Partnerships (see Appendix A).

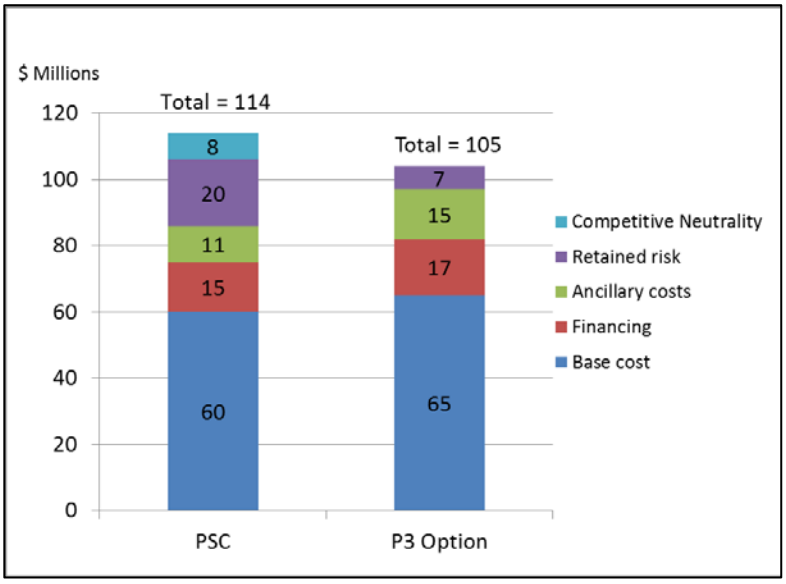
Table 6-1. Differences between the PSC and Shadow Bid

Assumption Type	PSC vs. Shadow Bid
Construction, Operations, and Maintenance Costs	The bundling of project delivery phases under a single contract may allow the private sector to more efficiently manage project costs.
Financing Costs	The Shadow Bid will likely assume higher financing costs to account for equity returns and higher interest rates demanded for non-recourse debt.
Taxes	The tax burden to the private partner may be different under the P3 procurement model, so corporate tax rates (and depreciation adjustments to income) will need to be considered for the Shadow Bid.
Risk Adjustments	The private sector may be more capable of managing certain transferrable risks than the public sector, so private delivery should lower the costs associated with those risks.
Competitive Neutrality	The costs of the PSC may be adjusted to neutralize the public sector advantages that are not equally available to private bidders, such as tax exemptions and the ability to self-insure risks.

7 Comparing Costs of the Shadow Bid and the Public Sector Comparator

VfM is expressed as the percentage difference between the costs of delivering the project through the PSC and the costs of the Shadow Bid. To determine VfM, the costs of financing and delivering the PSC, including adjustments for risks and competitive neutrality, are compared to the net present costs of payments to the private sector and adjustments for retained risks and any additional procurement and oversight costs (see Figure 7-1). A P3 offers better VfM if the total costs calculated by the Shadow Bid or preferred actual bid are less than the costs calculated by the PSC.

Figure 7-1. Example Value for Money Comparison



An agency may use the results of the VfM analysis in different ways. An agency can develop and compare a PSC and Shadow Bid during the initial project financial assessment and feasibility study, prior to determining the procurement method and issuing the solicitation. After agencies receive bids in response to a Request for Proposals (RFP), they may compare the PSC to the actual bids received to assess if VfM is still achieved prior to awarding the contract as a P3. In negotiating with the bidders, agencies may use the models to calculate the costs of transferring different risks to the private sector, sharing them, or retaining them, to understand tradeoffs. Finally, once an agency reaches its decision, it may use the results of the VfM analysis to demonstrate its rationale for choosing a particular procurement method. For more information on VfM analysis, refer to FHWA's primer on the subject (see Appendix A).

The example depicted in Figure 4 portrays a comparison between a public procurement with a baseline present cost of $60 million and a P3 Shadow Bid for which the baseline present cost (net of financing costs) is $65 million. While the baseline P3 cost is $5 million more and imposes an additional $6 million in ancillary and financing costs, the $13 million reduction in the costs of risk due to transfer of some risks to the private sector and $8 million in competitive neutrality adjustments overcome these cost differences and result in a net savings to the government of $9 million overall, offering 7 percent in VfM. This example illustrates the central trade-offs that often characterize P3 procurement: the government trades away significant risks in exchange for higher baseline costs and financing costs in the P3 scenario.

8 Qualitative Analysis

Deciding how best to procure a project also requires consideration of a number of factors that are not easily quantified. A comprehensive VfM analysis should not ignore qualitative factors that influence procurement decisions. Such factors include:

- Speed of delivery;
- Political and institutional support;
- Quality of facility and service;
- Differences in scope;
- Ability of the public sector to enforce performance standards;
- Value to the public sector of cost and schedule certainty;
- Effects on public sector debt capacity and cash flow; and
- Degree of market interest and macroeconomic conditions.

Qualitative factors may have significant influence over the final decision. Indeed, where the results of the quantitative assessment yield marginal differences in the costs of different procurement options, or where there is a high level of uncertainty around input variables, the qualitative analysis of procurement options may be more heavily weighted than the quantitative analysis.

Agencies may use qualitative analysis to determine which projects have the potential for P3 delivery and should be subject to a more comprehensive evaluation. Qualitative screening criteria can be applied on a project-by-project or on a programmatic basis to screen out those projects for which it is unlikely that a P3 delivery method would be worthwhile. Screening criteria may include:

- Does the agency have statutory authority to procure the project as a P3?
- Is the project of sufficient size to justify increased transaction costs associated with P3s?
- Are there potential efficiencies in contracting out design and construction responsibilities to a single entity?
- Are there potential efficiencies in allowing for private sector provision of long-term operations and maintenance?
- Does the project have strong political support?
- Is it likely that the project will receive environmental clearance within two years?

FHWA is developing a screening tool to assist in assessment of the appropriateness of a major project (costing $100 million or more) for P3 procurement.

9 Financial Feasibility Analysis

While VfM analysis may help a public agency decide the most efficient way to procure a project, additional analysis is necessary to determine if it is financially feasible to procure the project as a P3. Public agencies use financial cash flow models similar to those in the PSC and Shadow Bid models to help determine the potential costs of a P3. An assessment of projected bid prices and financial cash flows under different procurement models may inform an agency's final determination as to when and how best to procure a project.

Financial feasibility analysis may include a cash flow analysis to assess the impact of each delivery option on the agency's budgeted cash flows, rather than on a net present basis. Models developed for financial feasibility analysis can also help public agencies determine:

- How best to structure debt to manage project cash flows;
- The amount of public subsidy that might be needed to ensure a competitive bidding process; and
- The effects of variation in critical variables on financial feasibility indicators such as annual debt service coverage ratio.

The Financial Assessment Tool provides a simple project viability evaluation that allows users to calculate the level of funding required to deliver a project and the financing costs associated with providing funding.

10 Summary

P3 procurement methods offer many potential benefits for public agencies responsible for delivering major transportation projects. They can accelerate project delivery, improve cost and schedule certainty, and lower the overall life cycle costs of transportation facilities. These benefits may be offset by additional costs incurred by P3s including higher transaction and financing costs and the payment of premiums to transfer risks to the private sector. P3-VALUE provides a set of tools to help practitioners consider the financial costs and benefits of different procurement options.

P3-VALUE allows users to assess the potential costs and risks (and the value of transferring those risks) and to develop cash flow models that allow users to compare the costs of different procurement options. P3-VALUE is designed to demonstrate the process of evaluating procurement decisions, the data required to conduct quantitative assessments of procurement options, and the impact that critical assumptions can have on the desirability and feasibility of different procurement structures. P3-VALUE is for educational purposes only and is not intended to guide decisions on actual projects. When using P3-VALUE, users should keep in mind the limitations of both the tools and of VfM analysis in general. Users may refer to user guides, primers, and other resources available on the FHWA IPD website for further guidance.

Appendix A: Additional IPD Resources on P3s and VfM

P3 Concepts

- FHWA Public-Private Partnerships website, www.fhwa.dot.gov/ipd/p3/
- Public-Private Partnership Concessions for Highway Projects: A Primer, www.fhwa.dot.gov/ipd/p3/resources/primer_highway_concessions_p3.htm
- Challenges and Opportunities Series: Public-Private Partnerships in Transportation Delivery www.fhwa.dot.gov/ipd/forum/challenges_and_opportunities/index.htm
- Establishing a Public-Private Partnership Program: A Primer, www.fhwa.dot.gov/ipd/p3/

Value for Money

- Value for Money State of the Practice, www.fhwa.dot.gov/ipd/pdfs/p3/vfm_state_of_the_practice.pdf
- Value for Money for Public-Private Partnerships: A Primer, www.fhwa.dot.gov/ipd/forum/vfm_for_ppps/index.htm
- Financial Structuring and Assessment for Public-Private Partnerships: A Primer, www.fhwa.dot.gov/ipd/forum/vfm_for_ppps/index.htm

Risk Assessment

- Risk Assessment for Public-Private Partnerships: A Primer, www.fhwa.dot.gov/ipd/forum/risk_assessment/