The Rigor of Negotiation;

Why Public Private Partnerships are Effective

By

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ABSTRACT

Public Private Partnerships (PPP) have been in use for years in the United Kingdom, Europe, Australia and for a shorter time here in the United States. Typical PPP infrastructure projects include a multi-year term of operation in addition to constructing the structural features to be used. Early studies are proving PPP delivery methods to be effective at construction cost containment. This paper will examine ***why*** PPP's are effective during this critical construction period of the facilities life cycle. Most PPP's are grounded in a contractual framework called a Concession Agreement (CA). The CA defines the roles and responsibilities of the Concessionaire (the Private side) and the Owner (the Public side) including constraints of construction and operations of a facility for a set period of time. The Concessionaire normally will create an entity that serves as the legal form of company organization that holds the contract, responsibilities and risk as delineated by the CA, this entity is normally termed a Special Purpose Vehicle (SPV). The Concessionaire will typically engage an Engineer and Constructor to perform the engineering and construction of the facility. The SPV will be utilized as the Proponent to an Owner during an initial period of bidding by competing Concessionaires or SPVs on a best value basis that results in one Concessionaire or SPV selected to be the "preferred proponent". The preferred proponent will then proceed to fulfill a set of prescribed conditions including a refined cost, schedule, financing and operational plan that conforms to the intentions of the Owner. There is a significant cost to the creation, understanding and ultimate refinement of the CA and SPV such that it meets the intentions of the

Owner and is financeable as delineated by the available markets for finance. All of which are centered on some sort of negotiation. An examination of the key elements that constitute the early stage negotiation reveal that there is room for negotiation created by the governing documentation while maintaining a competitive environment that brings the best value available to the Public entity. Studies are supporting the notion that these extensive discussions and elaborate agreements lead to better decisions being made by Owners, Concessionaires, Engineers and Builders that result in overall better constraint of cost through the construction phase of the projects examined. Prior to all of that activity a PPP should pass a Value for Money (VfM) examination. This is yet another feature of the PPP process that includes significant degrees of negotiation resulting from Private input. It is the intent of this study to examine why the features and outcomes of more or less negotiation and the degree of rigor associated with it.

DEDICATION

To WBM Jr. my Father, R.I.P. who never quit learning and agreed that…

I shouldn't either.

ACKNOWLEGEMENTS

Earning a second degree has (to date) been a twenty year endeavor. And only via an institution, namely Arizona State University (ASU), has this ability to continue this study over those twenty years been made possible. The degree of flexibility required affording me an opportunity to learn at a pace that has consistently been interrupted by the demands of work and family is testament to ASU as an institution that recognizes that we humans do really in fact learn at our own pace.

The accommodation is facilitated by the dedicated academics and administrators who have enabled my continuing educational goals. First an acknowledgment to Allan Chasey who exhibits patience in teaching that is only surpassed by his consistent encouragement to finish the task. And appreciations to the balance of my Graduate Supervisory Committee, Mounir El Asmar and Ram Pendyala. Lisa Hogle and Brian Goehner are to be recognized as well for their able assistance in traveling the maze inevitably that does come along with the institutional setting. And clearly the other instructors that have helped me remember that there are more facets to the industry we work in rather than the rather narrow field of vision we tend to focus on.

And it is also important to acknowledge my colleagues at Arup. Ignacio Barandiaran, who takes the whole of the PPP community to places they have not been before, a true leader, Dr. Henry Chan and Richard Kerrigan who have

provided me the space and time to pursue some unanswered questions concerning these studies and provided many robust discussions about these topics helping me to shape my views while we all endeavor to “Shape a Better World”.

And finally to my intelligent and beautiful wife Linda, for never failing to believe in me and the chance that I might take her to Hawaii again if I ever finish this study.

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CHAPTER 1 Introduction to Public Private Partnership

A Public Private Partnership (PPP) is an alternative delivery method to traditional means of delivery. For the purposes of this study the PPP context is within the space of delivering an engineered and constructed element in the built environment. In short a PPP is termed an alternative delivery method in contrast to other methods of delivery. A PPP is typically configured as detailed in Figure 1.

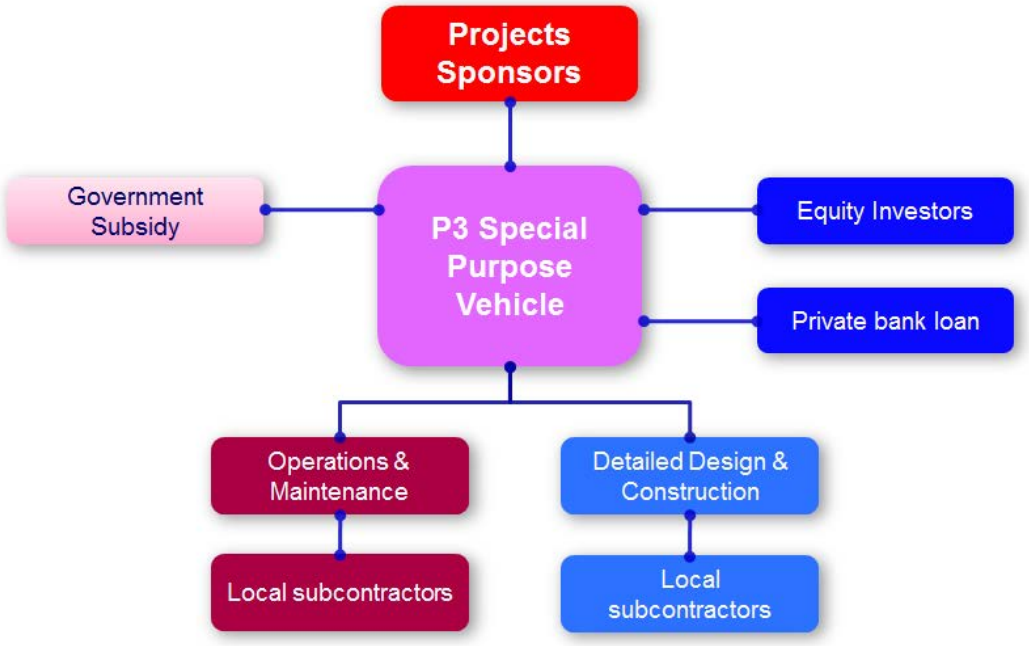

Figure 1 Typical Basic PPP Organization Chart (Yescombe 1999)

It can be seen that a PPP goes well beyond the context of just the design engineering and construction required to build. The difference between a PPP and more traditional types of delivery is best seen in Figure 2 that details the way the alternatives function.

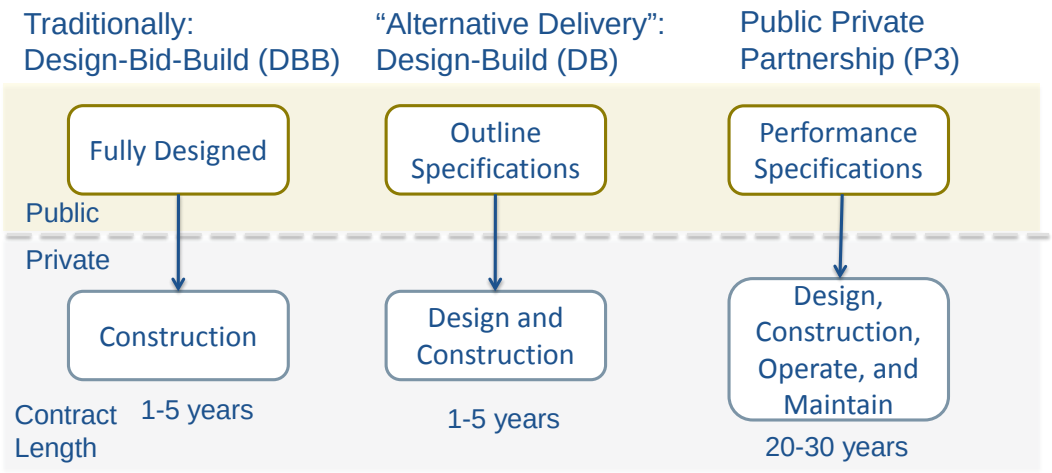

Figure 2 Functional Difference Between Public and Private Parties to a PPP (Arup/Parsons Brinkerhoff 2010)

The differing roles between the Public and Private sides of the delivery system are at the heart of the matter that this study explores.

DBB v. PPP

What follows is an examination of the reasons ***why*** one method of delivering a portion of the built environment will more effectively constrain the cost of construction over another. In this study's context the term "delivery method" is defined as the process of design, engineering and construction that results in a portion of the built environment to be left behind. The portion of the built environment left behind can also be described as the scope of work. The scope of work left behind may be essentially the same regardless of the delivery method implemented to achieve that scope of work; however the processes utilized can vary in substantial ways. A good analogy of this can be drawn for the production and use of a cubic yard of concrete. As the concrete is being batched, it does not know where it will ultimately be placed in its final resting position. It does not care. Nor necessarily do the people weighing the constituent ingredients, mixing them and delivering them. Where the concrete eventually goes does not matter to them. They will take the same care with a batch of concrete that goes into the floor of a doghouse as they do as that yard of concrete that will go into the skyscraper next door. If the as-yet not delivered concrete has been specified to yield an ultimate strength of 15,000 psi. There may be no difference in the basic procedures. Yet on a finite level there will be differences. The Specified level of strength for the high-rise and subsequently due to that level of assurance, there may be an additional cost. The dog house floor builder may not care to have that documented. This same case can be made for the project delivery method as it in

many ways is similarly separate from the built project yet tied intimately to it. The project can be built via disparate methods to the same end effect. But it is in that finite level of scrutiny that the cost of construction can be affected as determined by the varying methods of delivery. Over time as the procedures for the design engineering and construction process have evolved, the issue of how effective one method is over another has come under increasing scrutiny.

The premise herein is that a Public Private Partnership best serves the Public interest when design engineering and constructing large and/or complex infrastructure projects as a part of the built environment. PPP is a common acronym, but the terms P3 and PFI will also be seen in documentation from different locations around the globe. Even the vernacular may vary when describing the delivery method. The effects under examination herein are common regardless of the acronym used as a descriptor of the method or where in the world it is taking place. Within this paper the PPP delivery method is contrasted and compared to another more widely used and "traditional" engineering and construction delivery method known as Design, Bid, Build (DBB). Design Bid Build is commonly referred to by the acronym DBB. The issue is not whether one delivery method is superior to the other in terms of construction cost containment, this has been proven many times, (Sanvido and Konschar 1999) but ***why*** is that the case. There are those who still believe that DBB provides the best value (Beard, Loulakis and Wundram 2001). This is a mistaken notion when the projects are very large (over US$100 million) and recent studies have proven this to be the case. Figure 3 portrays this graphically.

Figure 3 Caltrans % of Cost Overrun Profile v. Size of Project (Arup/Parsons Brinkerhoff 2010)

Design Build (DB) provides better value (Warne 2005) (Shrestha 2006). Most PPPs utilize DB as a featured component of their delivery. And more recently when examining the effectiveness of alternative project delivery systems PPP's were found to be superior when compared to DBB and Design Build (DB) from purely a monetary examination of the completed construction phase (Chasey 2012). An excerpted graph from that study demonstrates this in Figure 4.

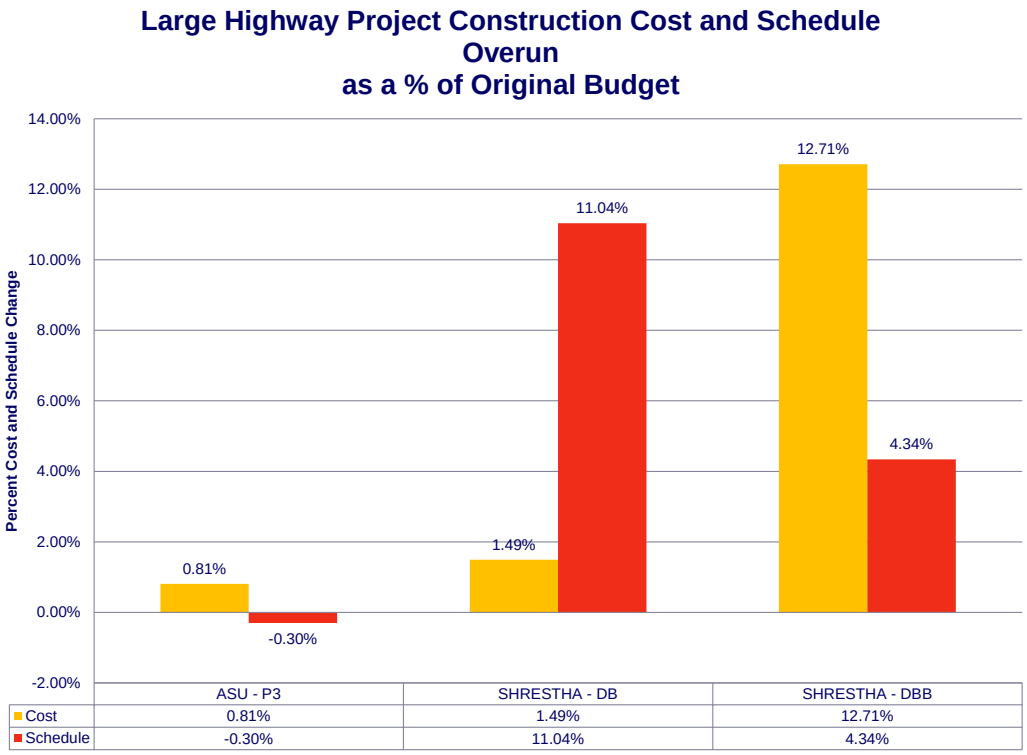

Figure 4 Large Highway Project Construction Cost and Schedule Overrun as a % of Original Budget (Chasey 2012)

This study has only considered the constraint of construction cost to its completion within the PPP. As the PPP moves through its phases or stages as the Australians have termed them, the construction stage is stage three of three (Infrastructure Partnerships Austrailia 2010). These were defined in that report as follows:

- Full Period - Original Approval to Actual Final;
- Stage 1 - Original Approval to Contractual Commitment;
- Stage 2 - Budget Approval to Actual Final; and
- Stage 3 - Contractual Commitment to Actual Final.

It is interesting to note that although the fact that PPP has been shown to constrain the cost of construction more effectively on large complex projects, much of the writing from the Public reviews of the PPP method claim that this is still an area of uncertainty (CBO 2012) (Taylor 2012). This is not the case – that question has been settled. Figure 5 is a summary chart reflecting the results of numerous studies and shows that on average the increase in cost containment is over 10%, the arrows point out the difference that the studies reveal.

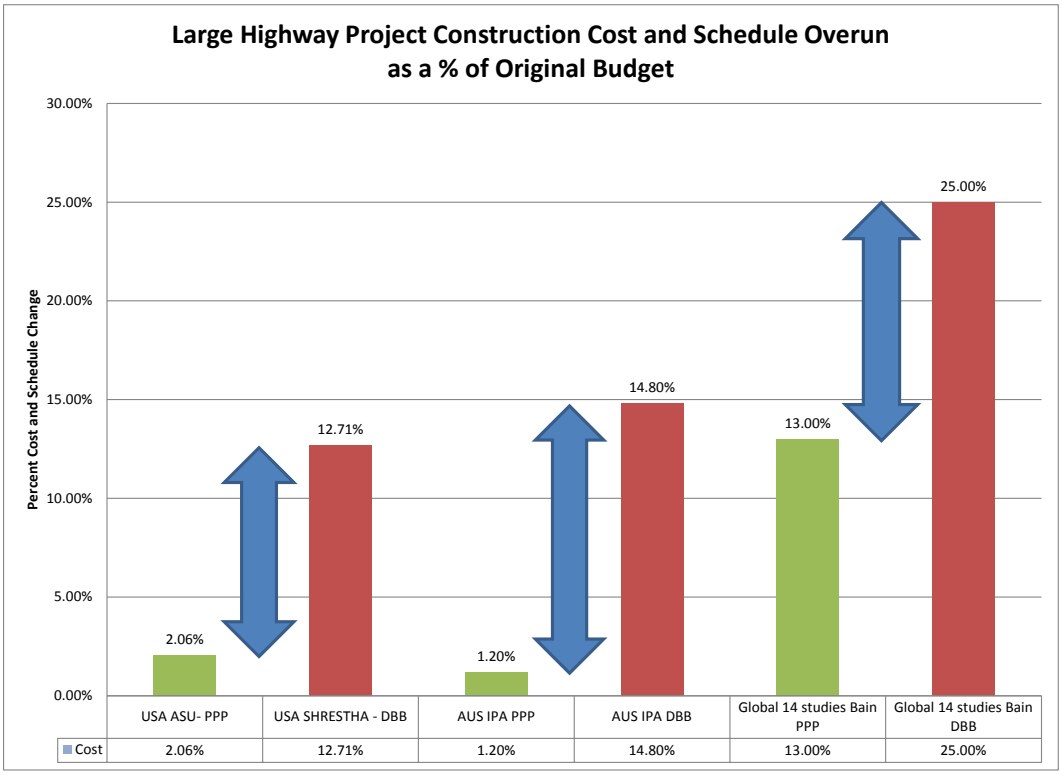

Figure 5 Large Highway Project Construction Cost and Schedule Overrun as a % of Original Budget-Global Results

The Bain study is actually a reflection of 14 studies (Bain 2010). It is a fact that a PPP will deliver more constraint to the cost of construction as measured from the

time the construction phase of the work is contracted for than any other delivery method in use.

While most studies to date focus on the contrasts between and "why" one delivery method works better or more appropriately than the other, this is a different why than the ***why*** the PPP method is working to constrain construction costs. This is distinct from the "why" a PPP or DBB should be used. That is a different issue. The question answered herein is ***why*** a PPP is so effective at constraining the cost of construction.

In these previously referenced studies, serving the Public interest is measured principally in monetary terms. In essence the total cost to construct that portion of the built infrastructure environment is the focus of the measure. This study is an examination of ***why*** the ability of one method of project deliverance, that being PPP, can deliver more efficacies in controlling the costs of construction. This differs from the reason why an Owner would want to use one method or another. There are other factors to consider such as availability of funds, the legislative context at work, etc. when making the selection and these may come in to view while pursuing the question ***why*** the PPP is in fact more effective at construction cost containment but they are not the focus of the study.

It is first important to define the boundaries of this examination via the identification of the constituents roles that are normally engaged in PPP's and

DBB's deliverances to make these projects happen as well as the basic structures or organization of the two types of project deliverance methods. By understanding these roles and structures the differences may be drawn out and compared in a meaningful manner. A view toward the historical context is of secondary importance although still key to understanding the ***whys*** of the PPP's efficacy in constraining the construction costs of a project. And it is within this historical context that the examination starts.

Historical background

Since the earliest days of humankind wandering the planet via footpaths that later turned into roads, these types of commonly used features of the built environment have been vital to survival and prosperity. Some of the earliest endeavors have included huge investments of time, materials and other resources measured in terms of treasure and lives to affect Public works for the benefit of human kind. The extent to which they are funded and executed in their final locations has varied widely. But the manner in which they are delivered has always been the subject of discussion, debate and sometimes controversy and worse, including conflict. In North America these discussions, debates and conflicts have been happening since the beginning of the continents occupation as the newly arriving inhabitants pushed their way into largely un-inhabited places. As the novel formed governmental entities were founded and created, the subject of how to fund and build publically accessible infrastructure became the focus of debates between such luminaries as Thomas Jefferson and John Adams. That debate focused centrally on the subject of who could best serve the public interest, Private entities or Public entities. This debate continues today although the issues swirling around the debate are generally more complex. The results of these early North American debates and controversies were seen in the way projects were delivered much as they are today. Including the manner in which the built environment investments are funded. Because the types of built environment have dramatically changed as there has been much written about that history,

there is no need to delve any deeper into the funding or history except to look at the more recent record as it relates to ***why*** the DBB method has been the major deliverance method in the modern post World War Two era.

In the United States over the past sixty years, government legislation have supported the notion that competition is the best way to extract the lowest cost and most value from the construction industry when constructing Publicly funded infrastructure. A congressional study done in the fifties supported this notion and has endured in certain circles even today. This notion extends to a perspective on the best means of exacting that competition for engineering design and construction. This "traditional" or DBB process of engineering and constructing is intended to separate the design from the construction. The rational is that the engineering is a function that is separate from the construction process. And that the process is consecutive. The applied thought that forms the basis for the structural, mechanical, and electrical engineering are carefully considered from the conceptual through detailed design engineering phases of the engineering process and represent, in the end, what the end users of the facility want. The manners in which these endeavors are carried out are slightly different between the engineering and construction. There is a paradigm that is supported by a three party relationship between the Public as Owner, Engineer as technical facilitator and Contractor as Builder that is central to the sharing of risks, a division of specialist's roles and what to date has been presumed to be the best way to bring

the highest level of value to the Public. Figure 6 details the split of risk as it is generally applied in a DBB context.

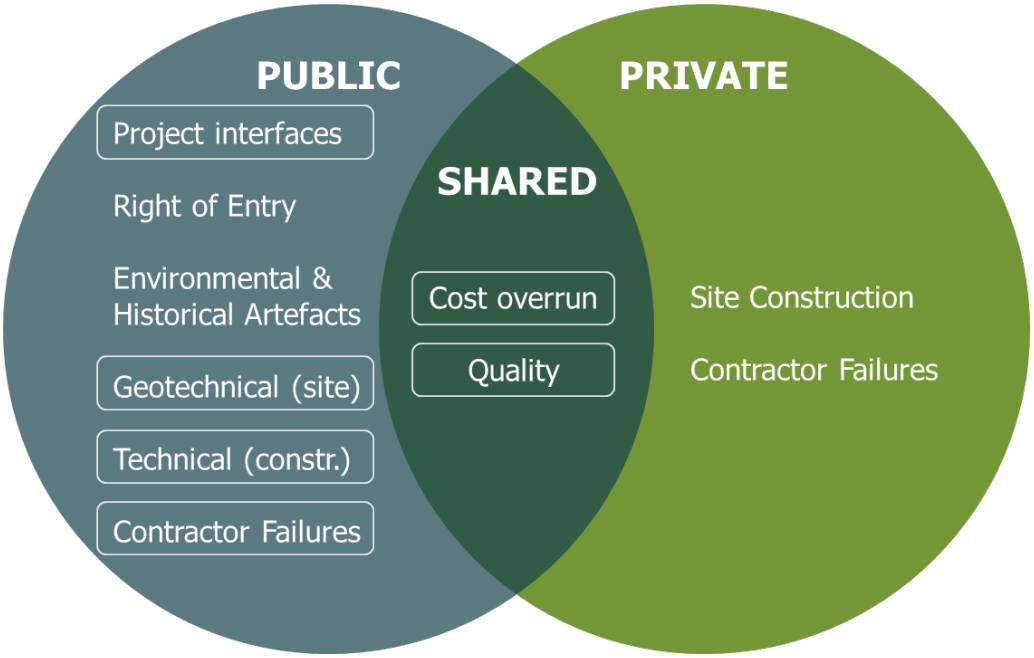

Figure 6 Typical Risk Split for DBB (Arup 2012)

In this context the Owner and the Engineer were often found on the Public side and the Contractor or Builder was on the Private side. There has been a shift away from the Public side carrying much of the load in terms of engineering from the Public to the Private side. Thus the risk profile shift is subtle yet significant ways when utilizing the PPP method as can be seen in Figure 7.

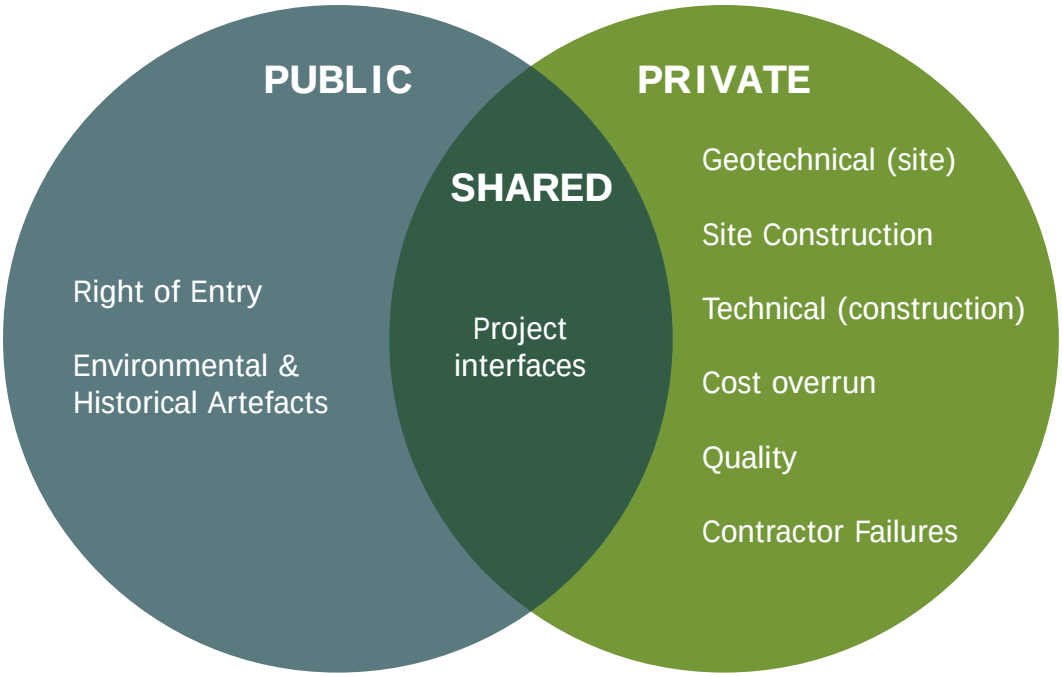

Figure 7 Typical Risk Split for PPP (Arup 2012)

The studies that pointed to the DBB or traditional method of delivery had focused on the beginning of the construction process as the benchmark. That is the time that engineering is presumed to be 100% complete and the construction cost has been set by a firmly bid and surety bond guaranteed contract that the scope of work envisioned will be delivered on time and on budget. As it turns out this point of measuring value ignored the balance of the constructive process. That is the front end work. Studies in recent years have demonstrated that this point of demarcation was missing the balance of effort time and cost associated with actually achieving the built environments end configuration.

The DBB method of delivery is widely used in all facets of publicly funded engineering and construction contracts and over time a nationally understood

paradigm has developed that includes a set of standard contracts supported by standard specifications and standard plans. These do vary from state to state within the United States and from Province to Province within Canada but they have significant commonalities. The DBB method is further supported by a body of legislation, regulations, as well as legal precedent documented by the judicial system, that the wider community of practicing professionals understands. This body of governing documentation includes guidance to not only the Engineers and Contractors, whom are the principal actors within the process, but the lawyers, bankers and a host of consultants that all serve to support the design and construction process.

One of the major contentions of this writing concerning the ***whys*** is that this governing set of standard documents and contracts when utilized in everyday practice limits the degree to which the actors may communicate. And more specifically that this restriction in terms whereby there is no negotiation, hence communication, needlessly and expensively raises the ultimate cost of construction. The difference in cost can be and has been documented. In fact when considering large or complex portions of the built environment, the DBB method of delivery does push the cost of the constructed built environment above what it could be when delivered as a PPP.

The monetized difference between the delivery types will be considered as a measure, although it is difficult to define exactly where the difference in cost may stem from, the inputs to the PPP method of delivery are examined and compared

to the DBB method. Inputs considered include the additional level and degree of scrutiny that a PPP affords. The consultative processes that are brought to bear on the PPP process as delegated to the Commercial, Legal, Technical, Insurance and Financial experts need examination. Additionally, the considerable expense to pay for that expertise should also be understood. The superior results being garnered from the PPP deliverance is a given, it is the ***why*** this occurs that is examined in each category of consultative expertise.

Although the vast majority of work is delivered via the DBB method there are reasons that the PPP is regaining favor for certain types of work. Most interestingly it is the lingering effects of the 2008 -2012 recession that have prompted an increasing interest of the PPP delivery method. At least that is the common belief. But the use of the PPP method of delivery began well before the aforementioned recession. This notion is considered closer by examination in the study as well. There could be reason to believe that this method was imminent to be used in a wider sphere of geography and type of construction even without the acute financial pressures in the contemporary environment. The study will examine the notion that the increased use of PPP's is due in part to a combination of recent fiscal challenges but more consistently the drive to perform more work faster, cheaper and better that has resulted in the movement on the Public side from DBB to PPP as a delivery method. The migration to the PPP method to build a project is defined by the level of understanding that the decision makers have in regards to the costs and benefits. Costs and benefits are correctly

examined at the extrapolated end points in the constructive process, not the beginning. This paper examines the move from the traditional manner of deliverance in the form of DBB project delivery toward the PPP method simply to explain the reason ***why*** the PPP is so much more effective at constraining the cost of construction.

There is certainly more than one measure of the value of one delivery type over another. The monetary value often trumps the others. The others; the value to society of an investment in the built environment measured in terms of increased efficiency in the use of any particular facility, the increase in overall value of a communities real estate, quality of life, safety in use, etc. are hard to capture and are beyond the scope of this study. The focus is squarely on the cost of the completed work under examination at the completion of the construction stage.

The *why* of PPP effectiveness

The central question posed then is: ***Why*** do PPP's provide more value? The quick answer proposed is negotiation: negotiation performed in a rigorous manner. But the simple reason ***why*** a PPP is superior in terms of stage three construction cost has not been documented. It could be that the answers are not really simple, but in fact quite complex. Much has been written concerning the results of completed PPP's and DBB projects as it relates to lessons learned. Over time these study efforts have led to various attempts to document best practices. The ***why*** question in this study extends beyond the determination of best practices. Although best practices support the how questions – as in how to best utilize the delivery method, the how's do not provide the deeper level understanding of the ***why*** PPPs are more effective at constricting capital expenditures beyond approved budgets (Morallos, et al. 2008).

The reasons for this effectiveness can be tied to a variety of key aspects. Foremost among them is communication. Communication between constituents parties is largely absent in the DBB setting. The communication nuances in delivery methods are found in the contractual framework that each method is constrained or empowered by negotiation. The degree to which a project may be examined as it comes to fruition and solidifies as a contract document carried forward into the construction process is the essence of the notable differences of delivery methods. The communication via negotiation that is afforded by the PPP contractual

framework is generally embodied in the Concession Agreement (CA). The term CA is used as a generic term to describe the agreement between a Public entity and proposers as respondents to a request for proposal (RFP). The CA steers proposers to a particular form of organization that is designed to provide the most competitive response that additionally provides the best value to the Public entity. The communication via negotiation that occurs is facilitated by the contractual framework as this study will demonstrate.

There are now a plethora of studies and reports that prove the effectiveness of PPP for large infrastructure projects yet what is lacking is the most fundamental assessment for why the PPP delivery method is effective (Bain 2010) (Infrastructure Partnerships Austrailia 2010). In short this study compares the efficacy of negotiation and the communication that accompanies that negotiation, its rigor and impact upon the ultimate outcome of construction cost containment when endeavoring to bring maximum value to the Public while building large infrastructure projects in North America.

In large part understanding the effectiveness of the PPP delivery methods seems to be a very complex undertaking, when in fact the concepts are simple. Government is slow to accept the deluge of factual data that is available. This slow rate of acceptance is found within the governmentally produced reports (CBO 2012) (Taylor 2012). This is likely because there are political pressures at

work and because our US centric views of the experiences from other countries as difficult to internalize. That topic is left to another set of writing.

CHAPTER 2 Background Literature

A very large body of work has been produced as a result of projects studied that serves to underscore the notion that by simply providing the opportunity to candidly vet the important issues that can ultimately cause a project to exceed its expected budget projects may yield better outcomes in terms of their construction cost containment. Part of that body of work has been drawn on to identify that assertion and is included in the reference list herein – and there is much, much more available than this list details.

The issue of construction cost overrun seems to have been brought to light in a contemporary and substantial way in 1997 via a report to the United States Senate by the General Accounting Office of the United States that found the reasons for large project overruns could not be ascertained because the cost data was not even clearly available of evident. And five years later a study covering the previous 20 years of large projects found the cause was termed "Optimism Bias" to be the case in the United Kingdom as well. As defined in that report "Optimism bias is the tendency for a project's costs and duration to be underestimated and/or benefits to be overestimated. It is expressed as the percentage difference between the estimate at appraisal and the final outturn" (Mott McDonald 2002).
Bent Flyvbjerg most notably called the issue to the attention of policy makers when he reported that roads suffer an average cost escalation of 20.4% of their original budgeted cost (Flyvbjerg 2003). The results were worse for more

complex construction efforts with fixed links (including tunnels and bridges) of 33.8% with rail projects worst of all infrastructure elements studies at 44.7%. In addition to pointing out that overruns of construction cost are significant across the infrastructure spectrum, the other important lesson learned is that project type matters. Figure 8 provides a glimpse of the variety of delivery methods from the view of the federal government.

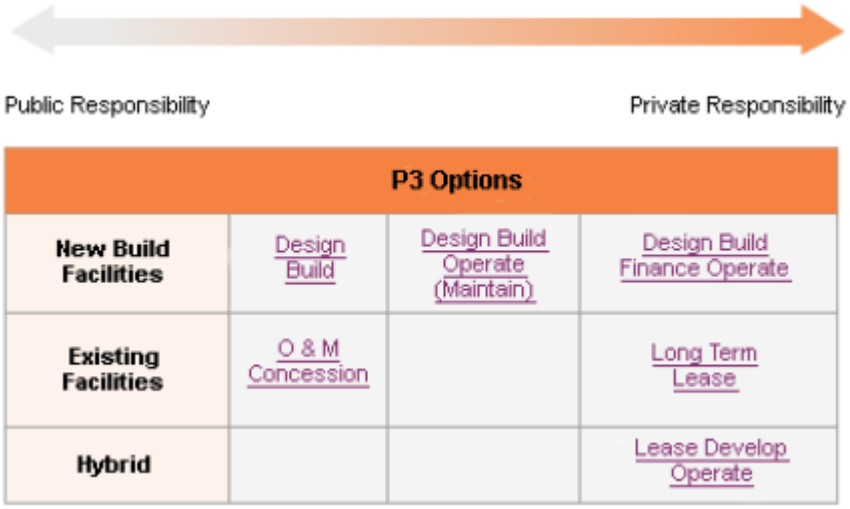

Figure 8 Spectrum of PPP Responsibilities Public to Private (Infrastructure Partnerships Austrailia 2010)

Thus when studying the effects of a project delivery type it is important to segregate the project type. Conclusive recommendations are rightly segregated by the size, degree of complexity and a number of other very specific issues around any particular projects set of circumstances. Flyvbjerg goes on to postulate the reasons for the overruns and concludes that it is attributable to “Optimism Bias”. Flyvbjerg and others have asserted that in some cases the early stage under-estimating is due to simply lying (Flyvbjerg 2002). This is a fanciful conspiracy

theory that points toward a communicative issue to wit, a lack thereof, in a transparent manner. It lends entirely too much credence to the notion that great minds are thinking of ways to fool the Public when in fact the contractual framework negates and clouds effective transparent and honest communication. Coining a new term such as "Optimism Bias" is a good move toward understanding the ***whys*** simply because the term represents the up-front efforts or lack thereof that go into selection of the right means of project delivery. And reaching further Flyvbjerg seeks to proscribe the means with which that early work is done properly.

The collected literature shows a progression of the state of awareness regarding the cause and effect relationship between the type of project delivery method and the importance of selecting the right type of delivery for different projects and their degree of complexity and size. From an early study (Wiss 1997) wherein the new methods of procurement are evolving toward Design Build Operate to the more recent results oriented studies of completed PPP's (Infrastructure Partnerships Austrailia 2010). A study of the Presidio Parkway (examined as a case study later in this thesis) conducted by two Private firms (Arup/Parsons Brinkerhoff 2010) yielded what the author believes to be a portrait of the paradigm currently the result of traditional deliverance on the wide range of sizes and complexities of construction projects. As projects become larger in terms of dollar expenditures and more complex by nature of the larger scope the ability of a public agency to effectively manage the process while constraining the cost of construction diminishes. This is clearly shown in Figure 3 Caltrans % of Cost

Overrun Profile v. Size of Project that details the range of projects that Caltrans has taken on and the cost containment effectiveness or lack thereof. The picture could not be clearer in terms of framing the problem. Hence, the "whys" are essentially known concerning the dilemma of large projects over-running budget to an unacceptable level, thus the focus on large projects as a first hurdle to consideration.

As PPP projects begin to grow as a percentage of the total make-up of the infrastructure put in place, a broader understanding of the ***why*** they work as a means of effective cost control is important to understand. Best practices that are essentially under development can be guided by this sharper perspective of ***why*** they work (Sharma 2010).

CHAPTER 3 Methodology

In posing the query as to ***why*** a PPP should be able to contain the construction phase cost more effectively than other methods of project delivery several key aspects must be considered. The first is what do we already know and second a close examination of a current PPP effort. The context of these two aspects needs to be focused in such a way that the confounding dimensions of divergent comparative project types do not cloud the observations. For example if the results of school construction program that included a DBB delivery were compared to a highway – the results would be subject to criticism due to the inherent differences between the types of construction. A focus on highways will provide that focused basis for analysis.

The methodologies supporting the results of this study are two-fold. First a literature review has been conducted that included a wide spectrum of global geography. The various studies and reports were scanned to compile a comprehensive view as to the ***whys*** of PPP effectiveness. Public and Private entities experiences and reports are all in consideration. Having done this and concluding that there has not been any examination of this aspect the second step is through an examination of a very unusual PPP as a Case Study. The Presidio Parkway is worthy of examination now as it is being constructed and will likely provide additional insights in the future as the work nears completion. It has already withstood the rigor of the Value for Money (VfM) phase and is entering

the construction phase. A first phase of the project having been built under a DBB methodology should provide a remarkable comparison. The Author participated in the development of the VfM study and has additionally been involved in various aspects of the procurement and on-going construction phase monitoring. The project has been split in two roughly equal halves. The first being a DBB delivery and the second half is being performed as a PPP. A most unique case.

CHAPTER 4 Presidio Parkway case study

The central hypothesis of this study is that the PPP contractual framework accommodates a more candid and open set of communicative opportunities. In short, many of the arguments that may be had later in the constructive process are brought forward in a virtual sense and quicker resolutions are imagined and acted upon without the added complexity of constructive time and cost pressures. The pressures of getting the CA finalized and into the construction phase are no less difficult but the rigor brought to bear in anticipating the effects from causes that can be imagined is a key differentiator between PPP and DBB in terms of outcomes. These early phase communications are done with a degree of rigor that is not available or valued within the DBB means of delivery (Ahadzi and Bowles 2004).

The central issues under examination are-

- Negotiation through contractual empowerment-a comparison of DBB and PPP via sample agreements and specifications and the operative words therein.
- Risk allocation-how does it differ between DBB and PPP.
- Time spent during procurement including outside consultants for issues around insurance, legal, financial and technical aspects of the project.

A PPP can be examined in terms of its organization and contractual framework when compared to the organization and contractual framework of a DBB. DB's are not contrasted as the PPP almost without exception embodies a DB as the delivery method within the PPP framework. That difference is set aside within this study. The delivery method for the construction phase is a matter of choice left to the Concessionaire. And almost without exception the delivery method chosen has been DB. There is an alternative delivery method that embraces the Owner performing the design engineering to 100% and proceeding to the Bid phase with the low bidder then obligated to arrange financing as well. This is sometimes referred to as Design Build Finance (DBF). But this is not a study of the subtypes of deliverance but rather a look at the reasons why a PPP is more effective at controlling the cost of construction. Some authors most notably the FHWA consider DB as a part of the PPP spectrum as depicted in Figure 9.

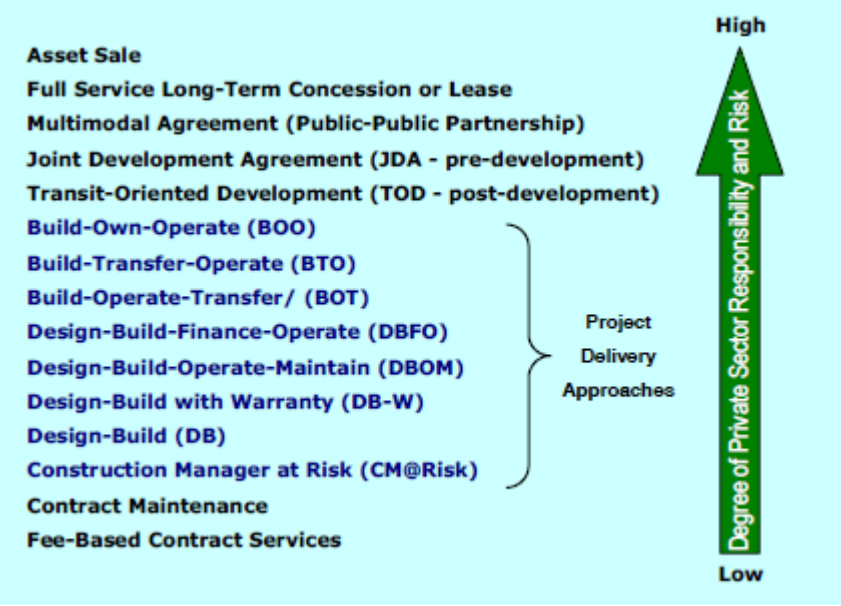

Figure 9 FHWA PPP Spectrum (Carollo, et al. 2012)

And indeed the choices of delivery method are points along a spectrum. As the risk to the Public increases so too does the level of prescriptiveness. DB lessens that prescriptive nature and lets the DB provider have a larger say in the details of the work being built. And the language of the contracts will change to suit that condition.

The complimentary contractual language that supports the enhanced communication is central to the issue and an examination of the body of contracts that define the roles and degrees of freedom to candidly approach substantive issues is the focus of this study. The operative functions of the parties to the processes of creating, implementing and operating a Public infrastructure construction effort have a direct bearing on the outcomes. These roles are examined in this study as well. Those roles are examined in the "Time" issue portion of the study.

Much if not all of the data required to understand the issues under examination is available in the Public domain. The processes and timelines to the endeavor and the outcomes are also largely public and easily found. Some of the underlying issues are not as easily identified and consequently will be explained based on first hand experiences of the author and then used as tools to test the notions regarding the efficacy of one delivery system compared to the others.

One set of differentiators between DBB and PPP project are the inputs to the construction contracts will include the typical language that enables enhanced discussions around sensitive areas such as cost and risk. The advisors and their roles in those discussions, including Insurance, Legal, Technical and Financial inputs are examined. The ability to influence the ultimate contract for construction as well as the creation of incentives to constrain the ultimate costs through the construction process is looked at. This is a very significant feature as studies are proving the effectiveness at constraining the cost of construction to budget to very high levels of certainty (NAO 2009).

Finally the roles of the respective parties to the construction contracts, Engineers, Constructors, Owners, and Concessionaires are examined in the context of the differences between the PPP and DBB method of deliverance.

This study does not consider the effects on construction cost containment from differences in funding sources, cost of finance or means of payment to the Concessionaire.

PPP aspects and characteristics

A look at the typical make up of a PPP compared to a DBB is illustrative. Figure 10 details the key aspects of the DBB.

Aspect	Characteristics
Design	Detailed and 100% complete
Bid selection	Multiple bidders competing on construction price
Operation and Maintenance	By public agency
Funding of project	Public finance (bond)
Repayment of project	N/A

Figure 10 Aspects and Characteristics of DBB Contracts (Arup 2012)

Figure 11 provides a glimpse of the aspects central to a PPP in similar format.

Aspect	Characteristics
Design	Often incomplete
Bid selection	Proposers compete on price, design, and operation and maintenance plan for best Value for Money (VfM)
Operation and Maintenance	By private developer
Funding of project	Mixture of public (bonds) and private (debt and equity)
Repayment of project	User fee (toll) or Availability Payments from the government.

Figure 11 Aspects and Characteristics of PPP Contracts (Arup 2012)

The fundamental makeup of a PPP invites more specialized parties and entities to the process. Figure 12 details the PPP to a more finite degree. SPV is also sometimes referred to as the Project Company as in the organization chart below.

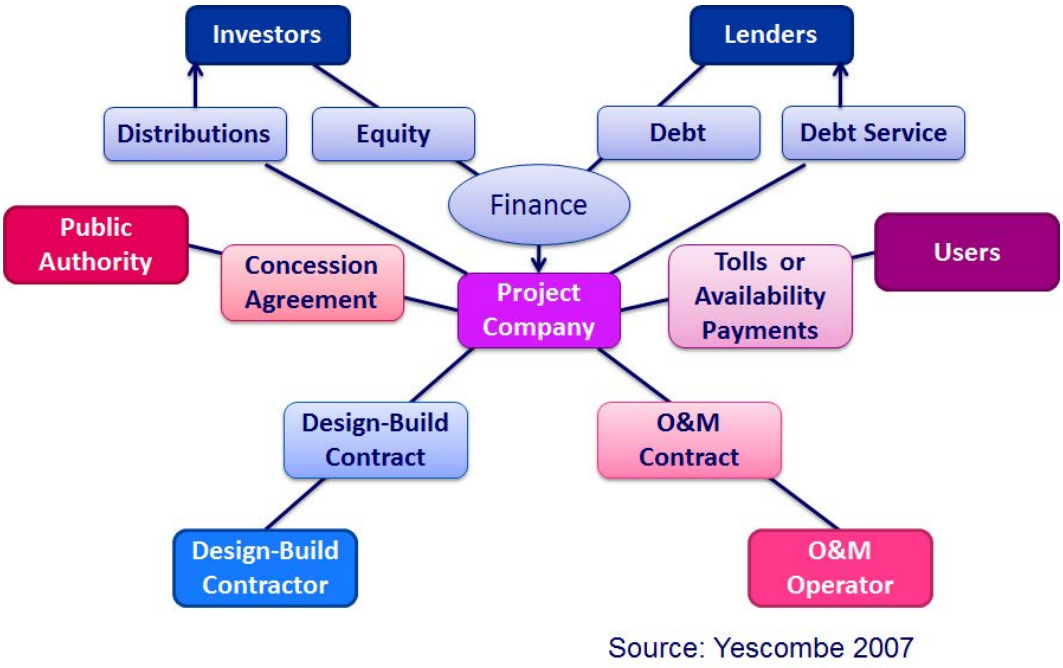

Figure 12 PPP SPV Detailing Private Side

The added rigor comes principally from the degree of risk assumed by the Private Investors and Lenders. Within those two entities the entire process of procurement takes on an added dimension with the three categories of scrutiny applied with an increased degree of rigor.

Negotiation

Bid delivery type selection is completely dependent upon the contractual documents that form the basis of agreements are but one of the aspects, yet they are key. As the characteristics are contrasted between DBB and PPP the contractual documents are the driving differentiator between the delivery types. The usual form of agreement includes a master document that is called by various names and for the sake of brevity in this report the term Concession Agreement will represent the master document that binds the Public and Private parties together. The Concession Agreement (CA) holds the key attributes of the PPP. It is within this document that the outcomes of the work done prior to contract award and the start of construction that will most significantly differentiate the methods. The CA defines the latitude allowed by the Public via the communicative processes that better establish the scope and breadth of work. It sets the legal framework supported by the appropriate legislative authority to do so. The CA is looked at from the perspective of how it contrasts with the DBB governing documents. Some early lessons learned from the PPP experience have demonstrated the need for negotiation as the central tenant of the PPP process (Wiss 1997).

A typical set of State Department of Transportation Standard Specifications have been chosen as representative of most used in the North American Region. When a scan for the word “negotiate” is complete within the text, the word appears zero times. The word “must” appears twenty seven times and the word “shall” appears

ten thousand four hundred and eighty one times (CALTRANS, Standard Specification Department of Transportation 2006). That is incredible because that figure is spread over eight hundred and seventy two pages, which works out to the use of the word shall 12 times per standard specification page. This speaks not only to the prescriptive nature of the contractual environment that the typical DBB project suffers but more importantly the lack of empowerment that Public officials have in terms of communicating with the Constructor on a DBB contract. In contrast, a search of the word "negotiate" within one of the first California Highway PPP agreements (Presidio Parkway) yields 22 uses of the word. The instances are relevant to discussions around utilities, a barrier movement system contract transferred from the State to the Concessionaire, fixing a firm price, to arrange a Government guaranteed loan, refinancing, and several other similar instances. Significantly the price of construction itself is not within the negotiation venue as delineated. The word "must" is used thirty six times and the word "shall" is used one thousand six hundred and thirty three times (CALTRANS 2011). This shift in language is significant in that there is some opening for the Private side to be heard by the Public side as parties to a contract. Another PPP agreement, the Port of Miami Tunnel Project, contains the word "negotiate" twelve times including in the context of the utilities and geotechnical issues as well as the notable establishment of the original agreement in a very broad manner. The word "must" appears fifty five times and the word "shall" arises one thousand three hundred and thirty seven times. This is in comparison to the use of the word "negotiate" in the Florida Standard Specification which

appears one time, “must” is used four hundred and nine times and “shall” appears two thousand two hundred and seventy one times over nine hundred and ninety six pages.

The word negotiate is vital to the outcome of a project during construction due to the time that it takes to resolve issues that require negotiation. Researchers have found that 80% of the time spent in negotiation is spent arguing (Kennedy and McMillian 1987). Time spent during the construction period is the most costly time to delay the entire process. Negotiation is so vital to the success of a project that studies of PPP’s have shown that open/frank communication during the negotiations are a key attribute of successful Concessionaires (Ahadzi and Bowles 2004) or their failure.

A state of the art DB contract in California yielded the following: “negotiate” is found sixteen times, again, principally around changes to the contract and utilities. The word “must” is used nineteen times and the word “shall” is used one thousand and four times (USDOT 2012). In Figure 13 this data is tabularized for the California comparison.

Number of times the word *negotiate, must* and *shall* are found within the text		
	CALTRANS Standard Specification	California approved PPP CA
negotiate	0	22
must	27	36
shall	10488	1623
page count	872	333

Figure 13 Comparison of Key Operative Words in DBB v PPP Documents

This very small opening to the process in terms of negotiation is fully taken advantage of. The degree of effort expended by the parties to the support of the decisions made by Investors and Lenders is significant. The degree of due diligence that is aligned with the various parties to the PPP process and the degree of expertise is usually undocumented. That is the Private side of the process. These inputs come from a variety of experts with varying degrees of expertise. The knowledge held by the Legal experts used to examine the documents, contracts, agreements, and compendium of laws that apply is far superior to that applied to simpler and less costly infrastructure projects. The reviews that PPP are subject to from the technical perspective include proposed construction agreements in the form of draft contracts, subcontracts, purchase orders and the like. The engineered solutions are investigated and discussed and input is offered for better, safer, more constructible and less costly solutions. The estimates of cost and price are reviewed for reasonableness and accuracy. The levels of insurance are scrutinized and assessed from the perspective of adequacy of coverage and cost. Finally the Lenders and Investors themselves add all of the inputs gathered in their own financial models that test the inputs and the degrees of sensitivities to assess the level of risk of the particular PPP. It is within these specialists roles and the discussion that are often essentially negotiations that get at the most sound responses to the PPP RFP in the form of a proposal that make a PPP a best value delivery method in the end. The discussion and negotiations sometimes lead to decisions by the principal parties to an SPV to not submit a proposal as the result of a failed negotiation.

The process affords additional negotiation within the Public side as well. Figure 14 details the means by which the Public side brings in additional levels of effort to the negotiations whether it is from within or with the assistance of external Consultants.

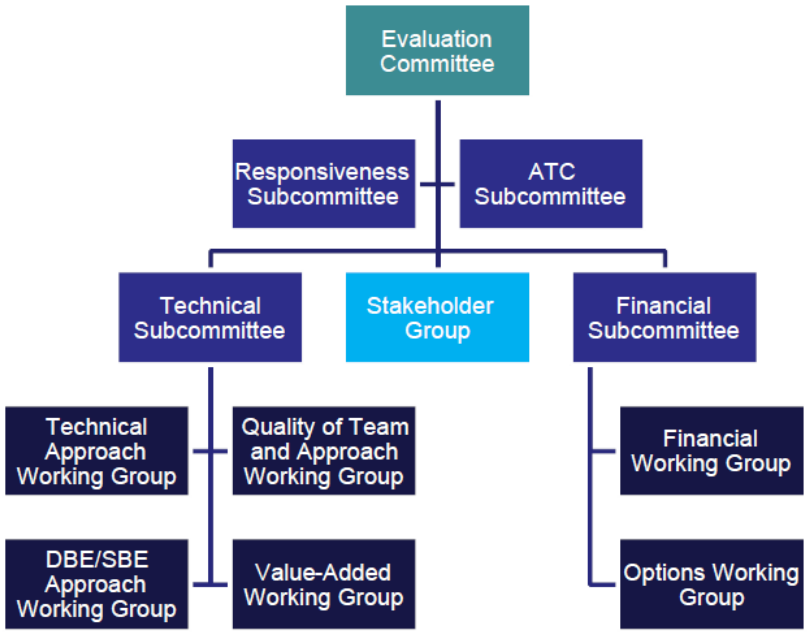

Figure 14 PPP Evaluation Organization on Public side (Arup/Parsons Brinkerhoff 2010)

Public entities that are sponsoring a PPP have additional time to scrutinize the RFP and through the VfM process become better acquainted with the particulars via negotiation internally and at the end of the procurement process with the respondents to the RFP. This all takes an effort that requires outlays of cost in advance of the projects contract beginning.

A recent study conducted in Canada found that the costs that are meant to deal with negotiation that may normally come later in the DBB project are shifted toward the front end of a projects construction phase, i.e. the negotiation phase. And that these could amount up to 3.5% of the total capital cost (Canada 2010). This same study attributed the higher costs of a PPP to the front end costs of pre-contract negotiations when compared to DBB. It is precisely the negotiation attribute that deals forthrightly with issues that are usually suppressed by the lack of communication in a DBB – spelt negotiation. The issues are pushed later in the process, i.e. when construction is occurring and the costs of negotiation are exacerbated. Figure 15 details the flow of a PPP when considering the VfM at various points within the PPP front end lifecycle.

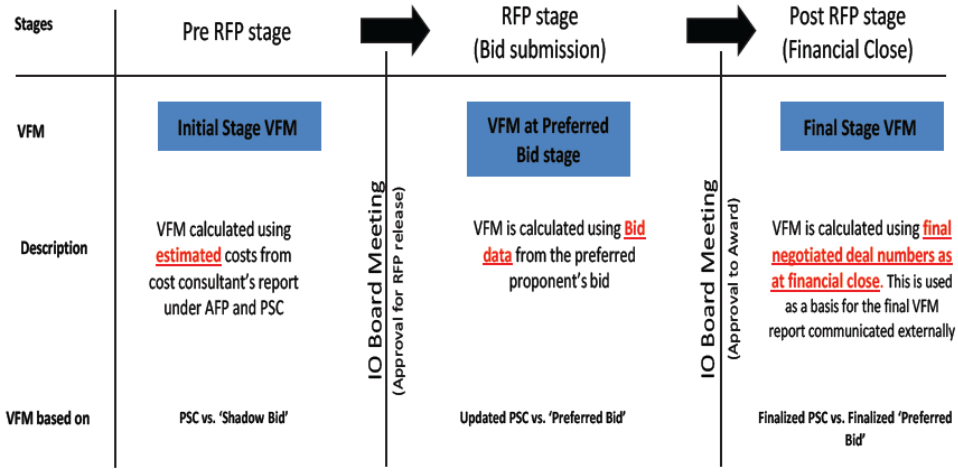

Figure 15 VfM PPP Progression (Infrastructure Partnerships Austrailia 2010)

By these measures a little bit of negotiation goes a long way toward constraining construction cost. Some of the most recent studies get at this point from another angle when the front end planning efforts required for successful construction phase work is complete. This work is complementary to the notion that up front time spent is worthy of the expenditure including the time required to effectively negotiate robust terms and conditions, specific agreements and details that only the project under examination can hold as valuable to the parties (Gibson and Bosfield 2012).

Another view toward the use of negotiation stems from the process at the inception. Whether the project is brought forward as a publically initiated endeavor or unsolicited, part of the process taken on by the Private side is formation of a team. This process involves a selection. Self-selection that is, of the best qualified combination of participants to satisfy the demands of the particular project. This vetting of team members is done outside of the Public purview and is usually very effective toward achieving the goal of winning the pursuit. This normally culminates with a pre-qualification review by the Public side. A substantial degree of due diligence is done prior to this Public review that involves a number of factors including the capacity of the design Engineering and Construction firms to provide the human resources, financial capacity and basic technical expertise required.

All of this discussion that most often lead to internal of external negotiation result in a better understanding of the parameters of the project including the risk embodied by the scope or work.

Risk

A central part of the procurement process in the PPP environment is a nuanced approach to risk allocation. This presents another opportunity to communicate and negotiate. During the tender phase the Public Owner often affords the proposing Private proposers an opportunity to influence the distribution of risk. This has been found to ameliorate the risks via the most cost-effective allocation of risk to the party best able to manage that set of risks (Palmer 2000).

Risk assessments, risk registers, and the entire subject of risk as a component of cost and price is a slow growth measure usually not addressed adequately in the vast majority of Public construction projects as a formal endeavor. DBB casts the risks very rigidly via the uses of the words “must” and “shall”. Very large constructors involved in PPP campaigns will to varying degrees apply risk assessment procedures. These can be supplemented with Monte Carlo simulations and human thought centered assessments. The Fluor Corporation has used these techniques extensively for years and as risk manifests itself on the Private side it is balanced in a return mode via profit. This fact among other key reasons why Fluor pursues the PPP projects is documented very selectively at Private Institutional Investor conferences (Public Works Financing 2012).

It is through that process that risks are thought of in a new light (Gibson and Bosfield 2012). That includes consideration of asserting an option to return risks that are inappropriately allocated to the party least capable of dealing with them.

This reallocation is not specifically codified in terms of contractual language yet does occur as a result of the vetting and due diligence that results from the participation of outside consultants, financiers and risk professionals that are drawn into the various stages of procurement.

In a United States Congressional Budget Study released January 2012 the point is made that “a Public Private Partnership can reduce the risk borne by the government on a project by shifting a substantial portion of that risk from the government to the Private entity” (CBO 2012). Unfortunately the report stops short of introducing our elected officials to the concepts of risk identification, risk sharing and the consequent explanation of why this is key to the success of PPP contracts.

From the Public perspective shifting risk to the Private side is an alluring endeavor. Multitudes of court cases framed principally by the Spearin doctrine frustrate that premise (United States v. Spearin 1918). The DBB method embraces the notion of risk transfer to the detriment of the Public purse. The rationale of risk allocation is interpreted by the agents to the DBB process via the contractual framework and the “musts” in particular the “shalls” completely negate any opportunity to negotiate – as that possibility is absent. And it is within negotiation that risk is best dealt with. Most risks have a value that can be approximated, but that effort takes time. Done properly the risk allocation is recognized early on during the initial procurement decision whether to pursue a

DBB or PPP. This should occur during the Value for Money (VfM) processes and VfM has proven to be a very effective means of determining whether the use of DBB, DB or PPP bring the most value to the Public (Arup/Parsons Brinkerhoff 2010).

Figure 16 details the components of VfM graphically.

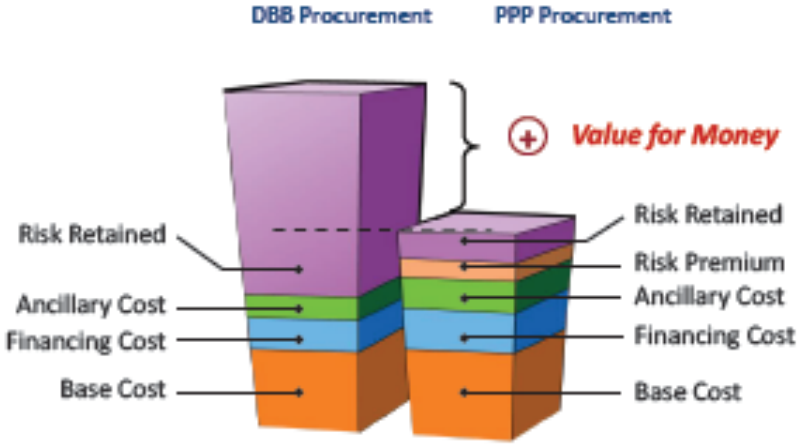

Figure 16 Risk Consideration in VfM DBB v PPP (Carollo, et al. 2012)

When examining the results of early PPP's that did not use VfM many of the pitfalls that a VfM process would have identified could have been avoided (Canada 2010).

When using a VfM the component of risk is a central factor in the differentiation process (Hodge and Greve 2009). A Public Sector Comparator (PSC) e.g. a DBB compared against a PPP within a VfM. An accurate assessment of risks as they have bearing on the Public sector then is a key driver in not only the selection of a PPP but just as importantly to begin the process of identifying risks that would

then become a topic for negotiation as the PPP evolves and the Public entity engages the Private proposer. There is a significant amount of effort put into an assessment of risk although the degree of the significance can vary depending on the size, complexity, number of stakeholders, and the level of sophistication of the contributors to the process.

In the typical flow of a PPP the Concessionaires are asked to make comments at some point about their level of interest, their views on basic issues including the timing of the project, the availability of men, materials, machinery and many other aspects. These discussions are held early on in the process affording all parties, specifically the Private side, to assess the risks that the project may hold. Having this opportunity potentially results in a discussion focused on those risks and how they may be best mitigated and by whom.

As the Private side assess its risk profile using various means, the costs of the risk are better understood and via negotiation and simple application of reserves of money set aside should the risk trigger at the appropriate level of acceptance of risk, the negative consequences of ignoring risks is alleviated.

Time

Time spent planning is time well spent. Critics of PPP contend that too much time is expended when compared to DBB. The Congressional Budget Office issued a report early in 2012 that suggests that PPP take longer than DBB from inception to start of construction. Though difficult to quantify this is an endeavor that is well documented to the contrary. When time is examined in the larger frame of reference that encompasses the entire process, considers the value at the conclusion of the design, build, finance and put into use aspects PPP's do not cause delay. Studies are revealing that the time it takes to bring a PPP to fruition can be lengthy. But that there are substantial positive outcomes given that the time is spent focusing on the right aspects of the project. The Australians have been viewing the entirety of the process and break the lifecycle of the front end work into three stages (Infrastructure Partnerships Austrailia 2010). Causes of the length of time it may take to get a PPP advanced are offered including "PPP projects are subjected to additional scrutiny and interaction with governments and instrumentalities". Instrumentalities herein are interpreted to mean the degree of scrutiny that is undertaken during due diligence.

The due diligence that occurs is largely if not completely out of sight of the Public side of the PPP process. The results of that due diligence are often utilized during the subsequent and consequent negotiation. And it is the application of legal, financial, insurance and technical review that reveal much of the more difficult to cast risks and assure that the risks are ultimately allocated in a way that best

serves the Public. The authors experience in dealing with teams that comprise the four outside consultants to the process is that this vetting process requires sufficient time for the key aspects to be considered by all parties in a way that the topics are segregated and ultimately are handed to the team best suited to analyze and report back the findings. The goal is to satisfy the RFP in a timely manner and return those unresolved issues that cannot reasonably be dealt with on the Private side to the Public entity. This effort is generally coordinated on the Private side by the Concessionaire. The unwritten best practices call for a rather frank set of negotiations to occur between the parties. These are usually outside experts that weigh in on what has been formed as solutions, postures, and proposed contractual language that sets the risk allocations. As these issues come into focus on the Private side the technical aspects are normally digested and disposed of via specification or plans centric visible solutions. On occasion the solutions are found within a means and methods approach by the DB component. Still others must be dealt with via legal language to satisfy a clear approach to avoid contractually ambiguous terms. The financial issues usually revolve around the balance of risk return – revenue cash flow considerations and rarely hinge on technical matters. Technical matters and legal matters must be resolved such that ultimately the only aspects of the risks inherent in the work that cannot be mitigated with more money, time or other resource based solutions must come from a risk sharing pool commonly referred to as insurance. It then becomes the insurer's role to fully understand those parts of the work where risk may manifest itself to the detriment of the Private or Public party to the agreement. These

discussions held out of sight of the Public view are central to the success of PPPs in terms of total cost and total time to deliver. A look toward the conclusions and recommendations of the most recent studies are trending toward a recognition that the time it takes to deal with the issues upfront opposed to during the construction phase are quite clear across the globe (Growth Solutions Group 2004). One of the key aspects for example that many reports detail is the need for environmental issues including embracing the governmental agencies that administer environmental issues to be dealt with early on by the Public side. These issues can at times totally confound the progress of a project and the Private providers of service are usually ill equipped to deal with the third party stakeholders that have a say in the outcomes of projects. These issues usually boil down to a very few choice words in the contractual settings.

The outcome of the Presidio Parkway is coming into view and will be examined in this study as a case study. The lack of understanding likely stems from a lack of experience or worse likely due to an inaccurate view of the PPP as something novel. Their use is not novel at all and many studies and reports point this out in terms of the historical ways PPP have been used as toll roads and other "Private" endeavors granted under charters and the like for the benefit of the infrastructure using Public.

Case Study- Presidio Parkway

Figure 17 Aerial Rendering of Presidio Parkway DBB-PPP Project shows a visualization of the completed project.

Figure 17 Aerial Rendering of Presidio Parkway DBB-PPP Project (Arup/Parsons Brinkerhoff 2010)

Background

The Presidio Parkway began its life with a different name in a different era. The project was constructed between 1933 and 1936 in conjunction with the Golden Gate Bridge. The roads and bridges that comprise the southern approach to the Golden Gate Bridge were formerly known as Doyle Drive. The photo in Figure 18 is reflective of the times and vehicles the roadway was constructed to accommodate.

Figure 18 Presidio Parkway then known as Doyle Drive late 1930's (Arup/Parsons Brinkerhoff 2010)

The project was named after Frank P Doyle who was a roadway advocate by virtue of his Directorship of the California State Automobile Association, a civic leader and the first private citizen to cross the Golden Gate Bridge. The road was originally designed for a total of six ten foot wide lanes, three in each direction. At that time the roads and bridge were administered by the Golden Gate Bridge and Highway District. In 1945 the road was taken over by the California Division of Highways now known as Caltrans. The project was originally designed to accommodate the Presidio Military Base which neither resulted in aesthetics not being a priority nor was making it easy to enter the Base. The road effectively severed the connection as direct access between the Base and the San Francisco Bay. The project was under scrutiny by the San Francisco Board of Supervisors by 1991 and a task force was established to examine design options that were

subsequently approved by the new operator of the Presidio, the National Park Service. The Park Service assumed control of the Presidio when it was decommissioned as a military base. There were a number of features of the project as envisioned that focused on the historic values, noise and pollution impacts, as well as traffic circulation. The project was further studied by the San Francisco County Transportation Authority (TA) in 1996 and suggestions included multi-modal uses of the facility. A five year long environmental impact assessment began in 2000 and a Final Environmental Impact Statement/Report was certified in 2008.

As the gateway to the Golden Gate Bridge the Presidio Parkway is part of a vital transportation link because it serves 120,000 vehicles per day carrying some 140,000 plus daily commuters. Figure 19 details the setting of the roadway.

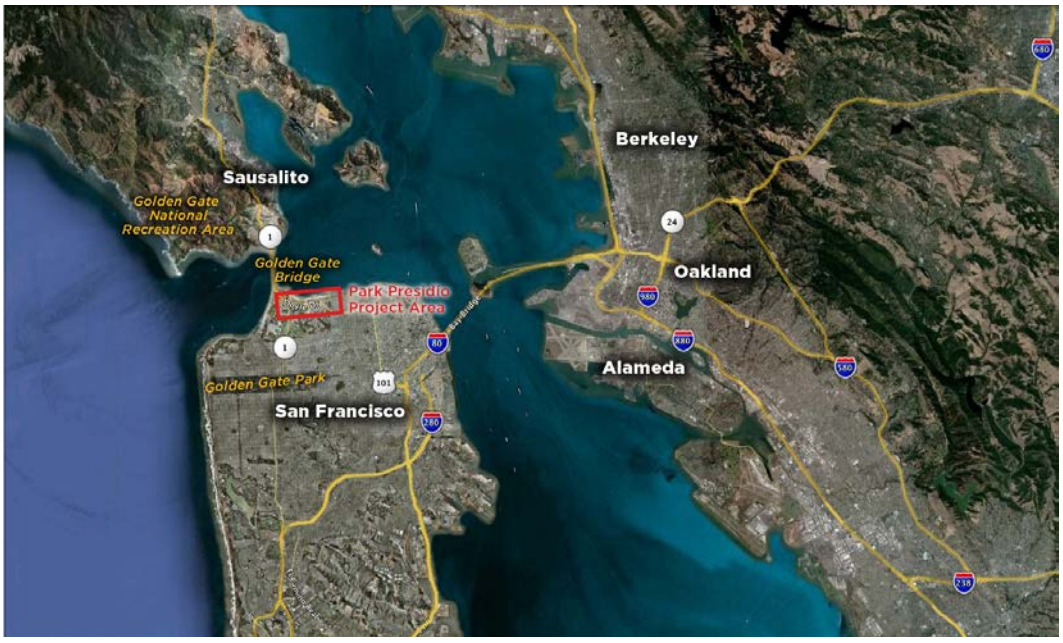

Figure 19 Presidio Parkway Location Map (Arup/Parsons Brinkerhoff 2010)

Significant employers such as Lucasfilm and Letterman Digital Arts as well as many other North Bay area businesses are served by the roadway. The project is structurally deficient and 80% of the structures cannot be retrofit and must be replaced. The roadway has a poor traffic safety record due to the 10 foot lane widths, no median barrier and an absence of shoulders. The project is situated adjacent to what is now the largest urban national park that attracts approximately 5 million domestic and international visitors while the Golden Gate itself attracts 3 million visitors per year.

The project was extensively discussed and viewed by the public stakeholders over two hundred plus community meetings. The project was enhanced via the inputs of a Landscape Architect by incorporating cut and cover tunnels as opposed to bridges on a portion of the roadway. The design enhancement affords a context sensitive setting with a continuous connection between the Presidio Park and the San Francisco Bay waterfront and more attractive sightlines. The project was placed in a priority category as well due to the bridge structures vulnerability to failure during a large earthquake and was started under a multi-governmental entity headed by Caltrans and the SFTA and procured via traditional DBB procurement methods. The project was programmed to be split into eight contracts:

Contract 1: Advanced environmental mitigation (wetland, biological, tree removal). Including mitigation prior to construction activities. With

environmental mitigation during construction accounted for in the individual contract budgets'.

Contract 2: Utility relocation prior to construction activity, including private utility relocation for items owned by the Presidio.

Contract 3: Ruckman Road, Southern Presidio Parkway Interchange, South Bound High Viaduct.

Contract 4: South Bound battery tunnel, at-grade detour, retaining wall number six, permanent southbound roadway sections, long weekend closures, partial demo of low viaduct structures and the traffic shift effecting an at-grade detour to public traffic.

Contract 5: Girard Under Crossing, main post tunnels, new low viaduct, including fill over tunnels, electrical and mechanical substations, demo existing low viaduct, maintain and remove at-grade detour, and opening permanent roadway to public traffic

Contract 6: North bound battery tunnels and related roadwork, including fills over tunnels, and conformance to existing twin high viaduct.

Contract 7: North bound viaduct, northern park presidio interchange, North Bound roadway to Merchant road

Contract 8: highway planting.

As the project moved into the first of several contracts the project came under scrutiny at the highest levels of California state government during an extraordinary session of the California Senate that resulted in PPP enabling legislation signed by the Governor in February of 2009. This legislation created a

program to pilot transportation PPP's in California until 2017. At that point the Presidio Parkway project was renamed from Doyle Drive and the project was split in half whereby the second half or contracts 5 through 8 were studied as a PPP and compared to 5 through 8 being carried forward as a DBB.

Figure 20 provides a summary of the construction phases after the project was split into two phases.

	Phase 1	Phase 2
Environmental Approval	Record of Decision (ROD) approved in December 2008 for the entire project	
Activities	• Environmental mitigation • Utility relocation • Southbound High Viaduct • Southbound Battery Tunnel • Traffic detour	• Northbound tunnels • Northbound High Viaduct • Low Viaduct • Landscaping
Timeframe	June 2009 – August 2011	August 2011 – December 2014
FHWA Initial Cost Estimate	$379 Million	$550 Million
Construction	Traditional Design-Bid-Build	Public-Private Partnership (DBFOM)?
O&M	Caltrans or P3?	

Figure 20 Presidio Parkway Phase 1 & 2 Profiles (Arup 2012)

Arnold Schwarzenegger was a solid supporter of using PPP to complete the project. And he went so far as to fire California State officials on the California Transportation Commission when they voiced opposition to the plan.

Figure 21 shows the projects Sponsors.

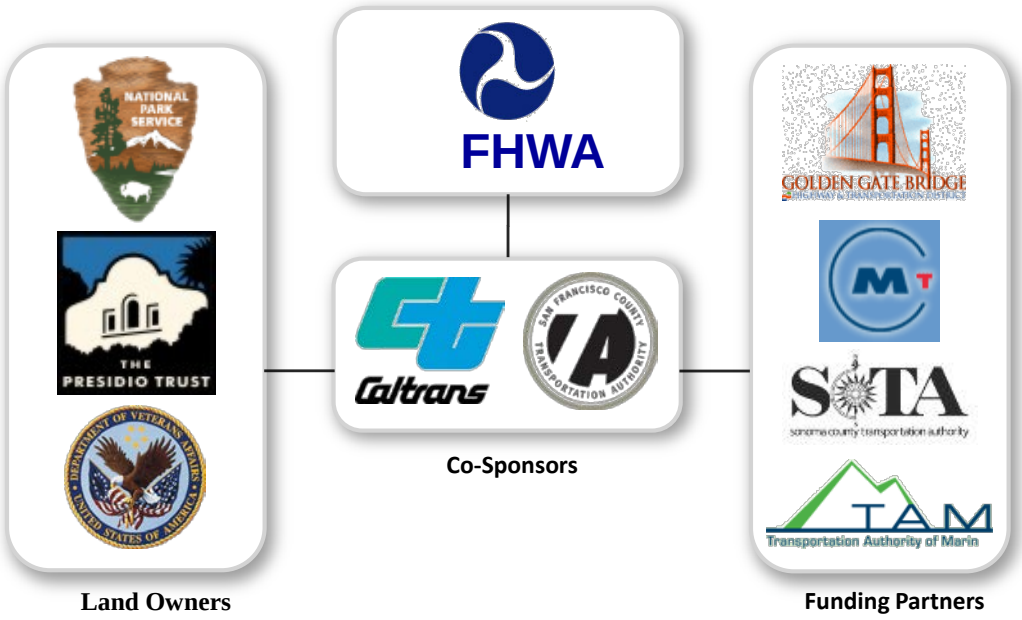

Figure 21 Presidio Parkway Sponsors (Arup/Parsons Brinkerhoff 2010)

In that context under the direction of the Co-Sponsors Caltrans and The San Francisco County Transportation Authority, the Engineering Joint Venture between Arup and Parsons Brinkerhoff that had been principally doing the design engineering, was requested to perform a VfM investigation. There were a number of issues that prompted the study. Among them is the decade worth of negotiations it took to line up the project funding, but worries about mega-projects in the Bay area going seriously over budget were foremost in decision maker's minds. Due to the beginnings of the 2008 to 2012 recession, there were lingering funding uncertainties. The economy was headed downward and along with declining sales tax and gas tax receipts and earmarks that may not come through the concern was around whether there would be sufficient cash when the construction started. The final concern was that there was historic evidence that

the State underfunds maintenance and that there was a lack of consideration for a maintenance plan on the completed facility.

VfM

The Value for Money methodology included a Risk adjusted construction cost, benchmarked risk premiums extracted from Caltrans project data. Bent Flyvbjerg as well as Florida on I-595 near Ft Lauderdale, FL An investigation into understanding the optimism bias that plagues early estimates and a look at transaction costs in terms of financing factors including senior debt (banks), the discount rate, taxation and an net present value (NPV) view were all included.

When conducting a VfM a public sector comparator is matched against a presumed set of figures for a PPP. In this case Caltrans had conducted a standard highway department estimate of cost. These standard estimates are derived from historical bidding result data previously received from DBB projects and utilizing unit price style data. In order to right size the estimate a number of adjustments were made that allowed the differences in delivery method to be ascertained and the ability of a DBB project to overrun was considered. When examining the record at Caltrans the historic data was analyzed and yielded a graph that is indicative of the main problematic issue with the large complex project. The fact that historically, the worst overruns of construction containment occur on projects over $300 million and the range of that size of projects' overrun was revealed. A consideration of Optimism Bias as defined by Flyvbjerg was ascertained and that led to an understanding of the risks that were embodied in the two types of delivery methods under study DBB v PPP. Estimates were created that captured the difference and that calculated difference was included on each side of the

comparison. Without consideration of the risks that the Owners hold the picture looks like Figure 22.

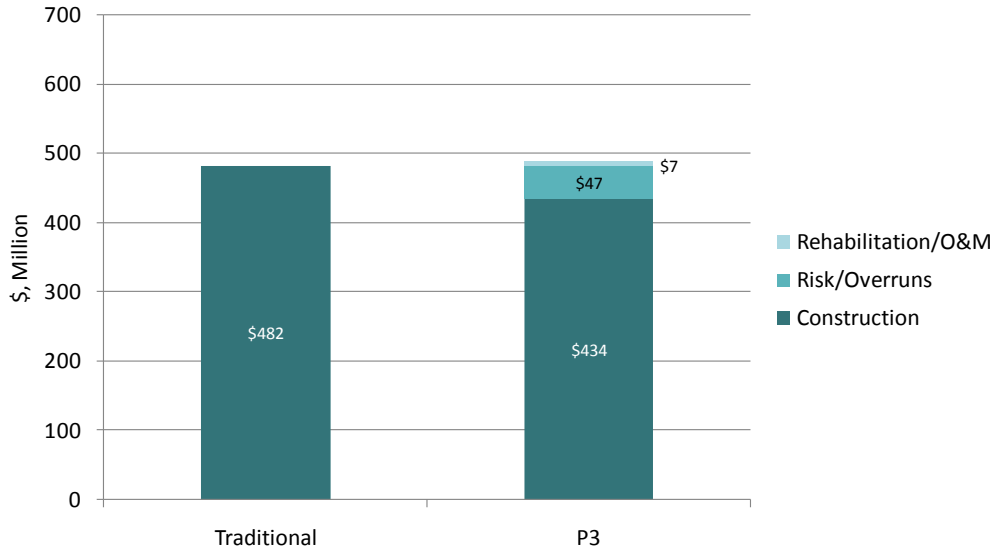

Figure 22 Presidio Parkway DBB v PPP without Risk Considered (Arup/Parsons Brinkerhoff 2010)

With the risks included, the picture looks different as portrayed in Figure 23.

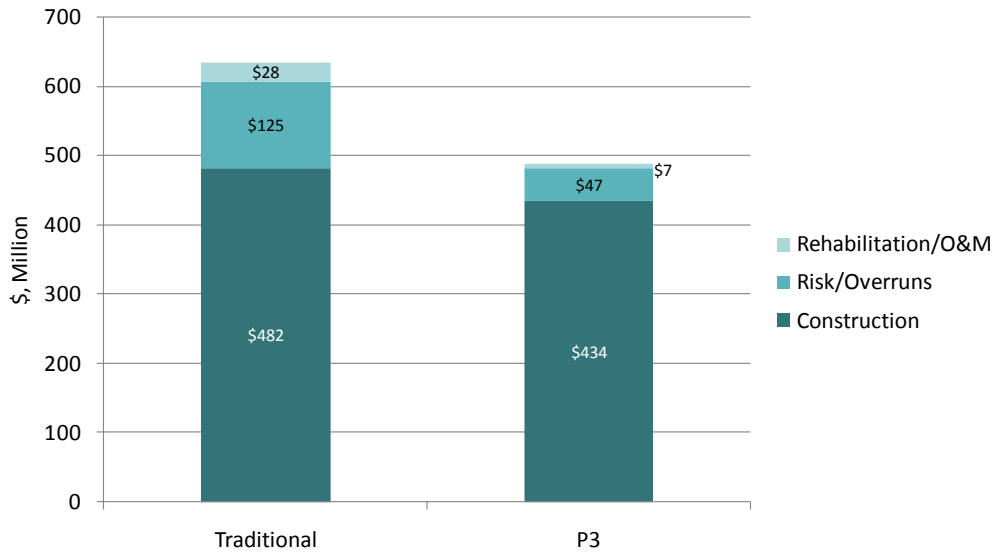

Figure 23 Presidio Parkway DBB v PPP with Risk Considered (Arup/Parsons Brinkerhoff 2010)

The two figures referenced above include a number of considerations that are differentiators and were monetized to reflect those differences. The net calculated savings to the project cost including considerations of overrun costs, operation and maintenance was $147 million when using a PPP. The PPP cost was calculated to be $488 million compared to $635 for the DBB method. These amounts were inclusive of not only the lower risk adjustment but oversight costs that were valued $93 million less using the PPP than the DBB. Additionally due to a more efficient preventative maintenance asset management program during operations related to maintenance and rehabilitation costs with an NPV savings -$6 million but is offset by a lack of economies of scale and higher operating costs NPV of +$6 million. Finally the NPV impact of spreading the financing over the 30 year operations phase of the concession at a lower (after tax) cost of capital than the discount rate -$54 million. In total then the differential in the risk-adjusted construction cost in the traditional DBB delivery model and the PPP delivery model (NPV $93 million) is the largest contributor to the difference between the total NPV of the traditional and P3 delivery options, followed by reduced finance costs (NPV $54 million).

When looking at a Comparison of Phase 2 PPP Construction Costs versus Project's Conventional Phase 1 Costs the VfM determined that Phase 2 has nearly twice the amount of physical works yet will deliver that for about the same cost. These figures were then put into a cash flow model that compares the two

delivery methods and considering nominal cash flows. The key takeaway was that the DBB has an overall lower cost in nominal dollars, but construction is paid for up front. Figure 24 details the profile of nominal cash-flows projected to 33 year term of the concession and assumes no financing of construction payment at $458 million construction completion cost and $128 million in Operation & Maintenance expenditures,

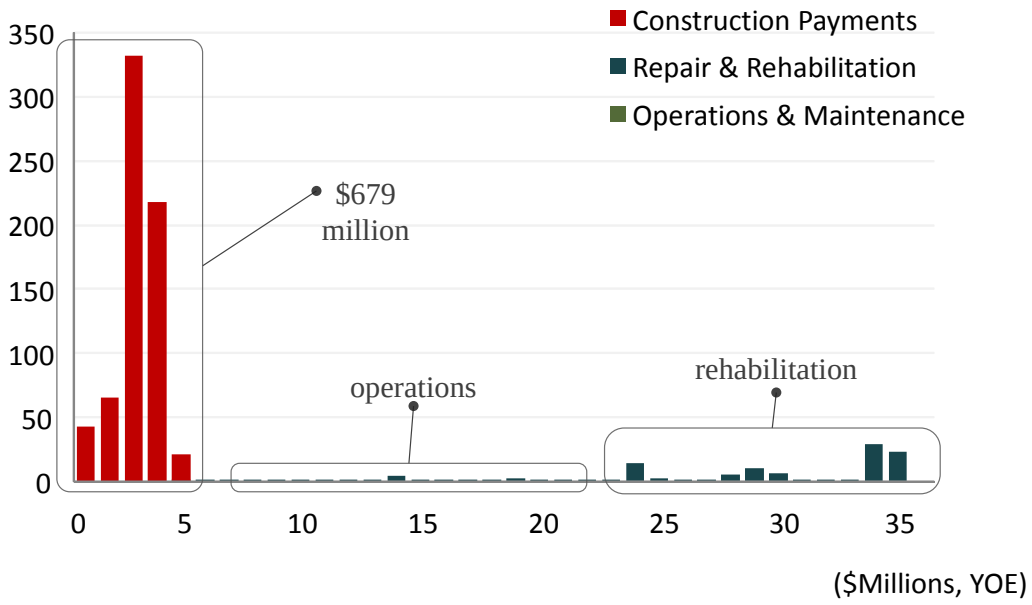

Figure 24 Presidio Parkway SPV Payback Cashflow (Arup/Parsons Brinkerhoff 2010)

When examining the PPP in terms of nominal cash flows the majority of payments, through availability payments, defer costs to the public sector until a later date. The milestone payment is only made at substantial completion certification. A profile of nominal cash-flows projected to the 33 year term of the concession yields that during construction for oversight, transaction and retained

risk costs the project suffers $72 million. When a milestone Payment of $150M at the end of construction is factored in and availability payments starting at $35M in 2013 and reaching $40M by 2043, are considered a different perspective begins to take shape. Adding in the Operations & Maintenance component of the availability payments that is assumed to escalate with inflation, whereas the capital component is assumed to be "flat", the sum total equals $1.378 billion. This is detailed in .

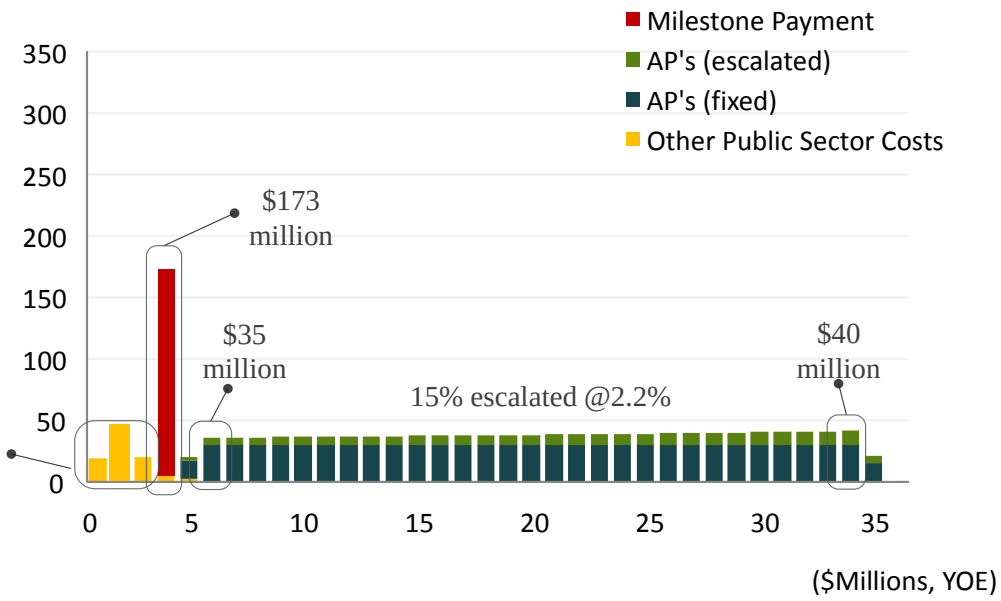

Figure 25 Presidio Parkway SPV Availability Payment (Arup/Parsons Brinkerhoff 2010)

These sum project total costs divided by the lane miles to be constructed were compared to a statewide cost of $240 thousand per lane mile per year. A closer look for comparative purposes is viewed in Figure 26.

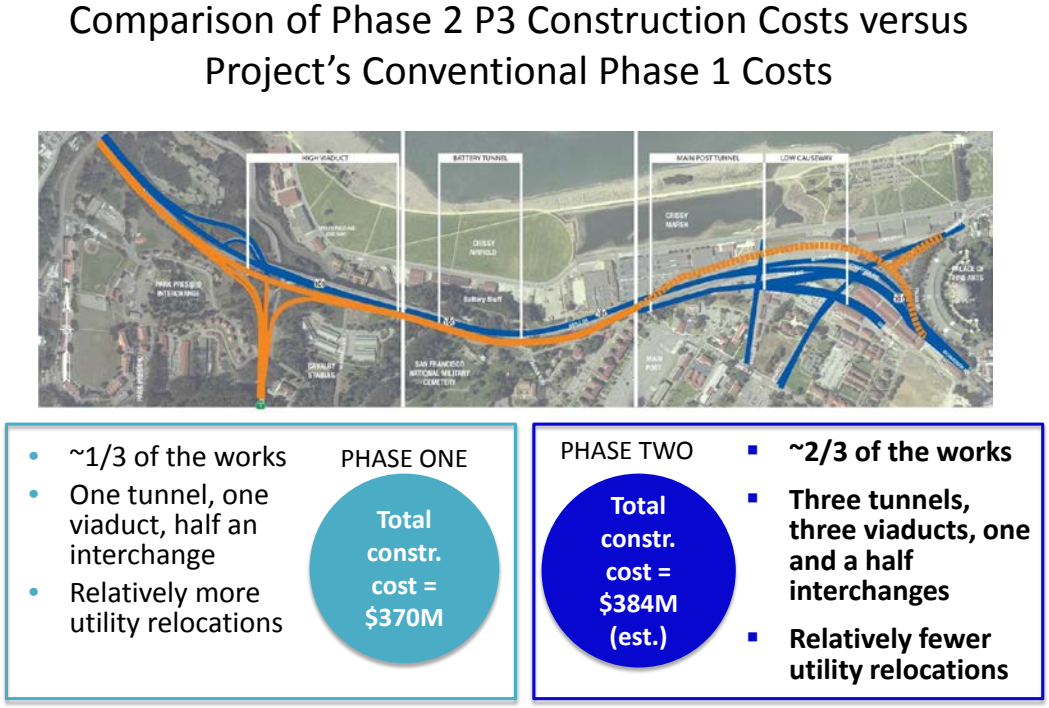

Figure 26 Comparison of Phase 2 PPP Construction Costs v Phase 1 DBB Construction Costs (Arup 2012)

Upon conclusion of the VfM study the report was sent to Public Infrastructure Advisory Commission who reviewed the study approved it and sent it on inclusive of a recommendation to affect the PPP to the California Transportation Commission. The Executive Director of the SFCTA stated "Our analysis shows that a P3 application is not only feasible, but presents a great opportunity to achieve best value for money, deliver the project on schedule, and lower life cycle costs [more] than any of the alternatives"

The DBB procurement milestones were slated as delineated in Figure 27.

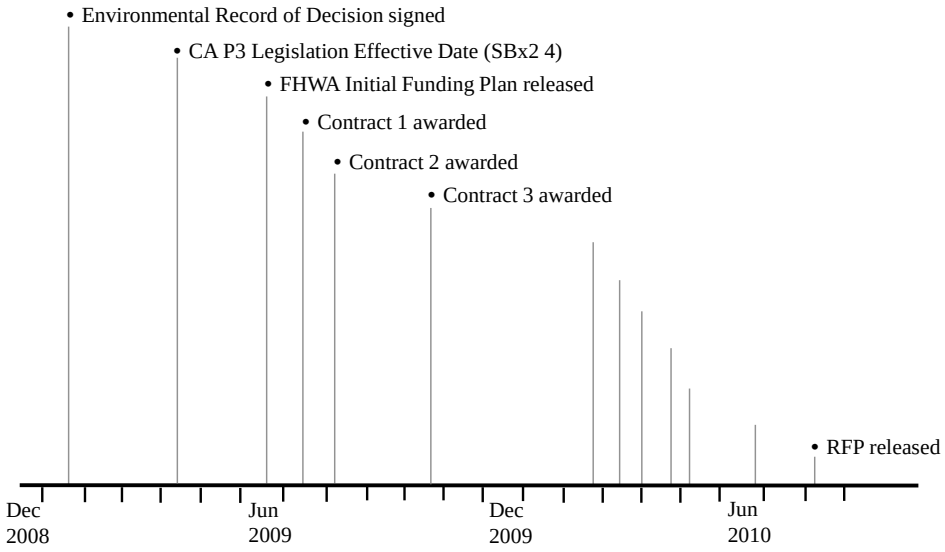

Figure 27 Pre-PPP Procurement Milestones (Arup 2012)

As the project was recast for a PPP delivery the milestones were altered as shown in Figure 28.

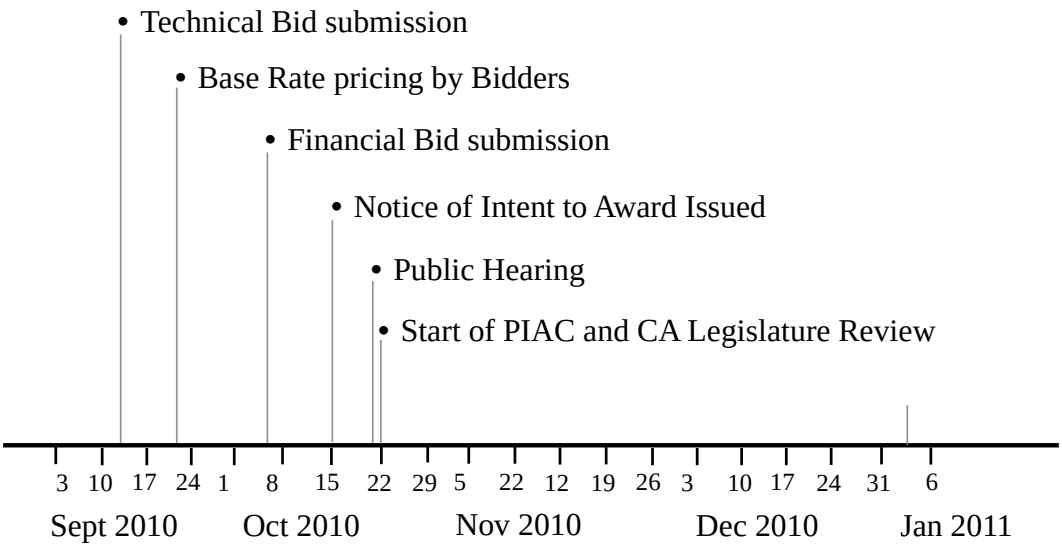

Figure 28 Phase 2 Procurement Milestones (Arup 2012)

The procurement had numerous objectives. Chief among them was:

1. To attain schedule and cost certainty through a robust and proven risk-sharing P3 contract.
2. Use public funds more efficiently by eliminating cash-flow risks by support of construction in a timely manner.
3. minimize lifecycle cost by ensuring that Operations & Maintenance costs is fully funded and that a dedicated Operations & Maintenance staff is in place for 30 years
4. Create a competitive process that maintains competitive tension. All of these goals were intended to optimize overall project value from a public perspective. The procurement documentation consisted of a Request for Proposals (RFP) consisting of Instructions to Proposers (ITP), a Public-Private Partnership Agreement (PPP Agreement), a Technical Requirements and an Evaluation Manual that was also used to assist in the scoring of the Technical and Financial Proposals. An Evaluation Team was established that was comprised of a Project Selection Committee ("PSC") as shown in Figure 29.

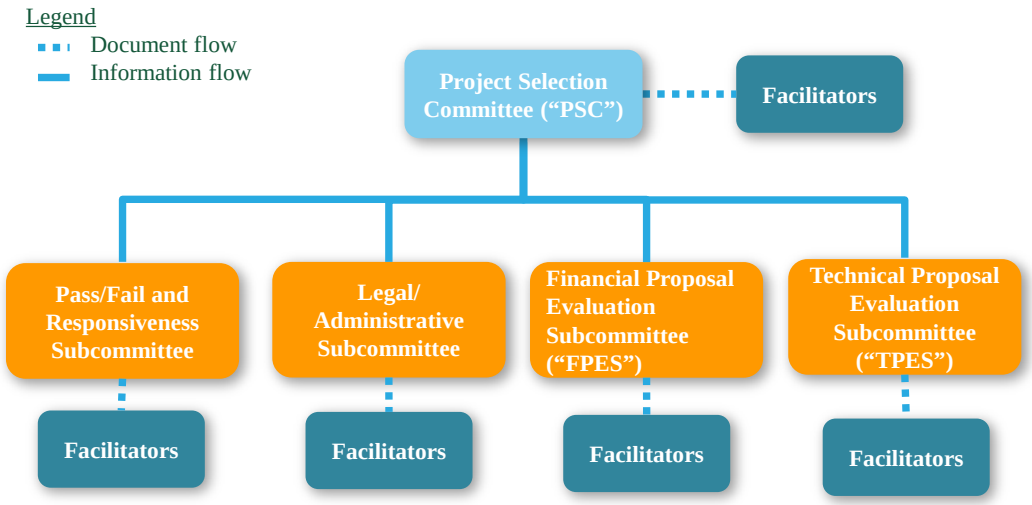

Figure 29 Public side Evaluation Team Structure (Arup 2012)

Their role was to evaluate proposals in accordance with the criteria and procedures established by the RFP and Evaluation Manual and to develop and approve clarification questions for Proposers as well as to score proposals based on their evaluation and input from Financial Proposal Evaluation Subcommittee (FPES) and the Technical Proposal Evaluation Subcommittee (TPES). The team was also obligated to review individual proposals and assist the Project Selection Committee during the evaluation process. That process included a completed Qualitative Rating Form as a consensus for each Proposal and subsequent submittal to the PSC as a recommendation. Additionally the role included development of clarification questions for recommendation to the PSC. There was a role for Facilitators that could assist the PSC and FPES by offering comments on the technical, financial, and legal aspects of each Proposal. Facilitators were restricted and not allowed to provide qualitative ratings or

scoring recommendations. The RFP resulted in three shortlisted proposers. They were:

- Golden Gate Access Group
- Golden Link Concessionaire (GLC)
- Royal Presidio SF Partners

The preferred proposer was GLC; their organization is detailed in Figure 30.

The Maximum Availability Payment (MAP) came in almost 20% below the CTC set affordability limit. Construction costs were $254 million and the Proposal included a financing solution utilizes Private Activity Bonds of $150 million, TIFIA loans of $150 million and equity of $45 million. The proposer had a typical set up used in North America as portrayed in Figure 30. This chart details the makeup of the SPV and the Design/Build joint venture split.

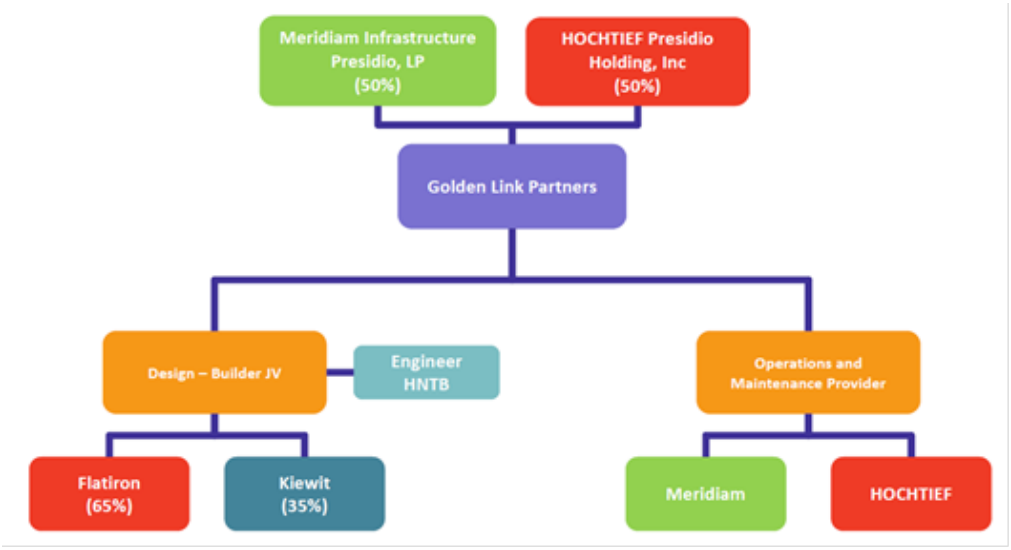

Figure 30 Presidio Parkway SPV Organization detailing Participants (Arup 2012)

The Phase 2 start was delayed by two primary factors, litigation and the delay in completion of phase 1. The lawsuit was brought forward by the Public Engineers in California Government (PECG) with a challenge to the merit of the project proceeding under the Senate Bill that enabled the legislation. The issue was whether a PPP could draw it's repayment from availability payments instead of tolls – in other words the contention that PECG put to the Courts to test is that the project must be "self-funding" as with a tolling regime. The lawsuit failed at the District Court level and the appeals were rejected at both the Appeals Court level and at the California Supreme Court. PECG has mistakenly asserted that PPP's are anti-union and anti-public engineer. That is not the case. And it is also not the case that every project can be turned into a PPP. Less than 10% of all projects are suitable for PPP. This last fact is highly speculative in nature. A project fits the PPP VfM test as a result of its primary characteristic of large price tag (unusual size) and degree of complexity. The degree of impact from the litigation is portrayed in Figure 31.

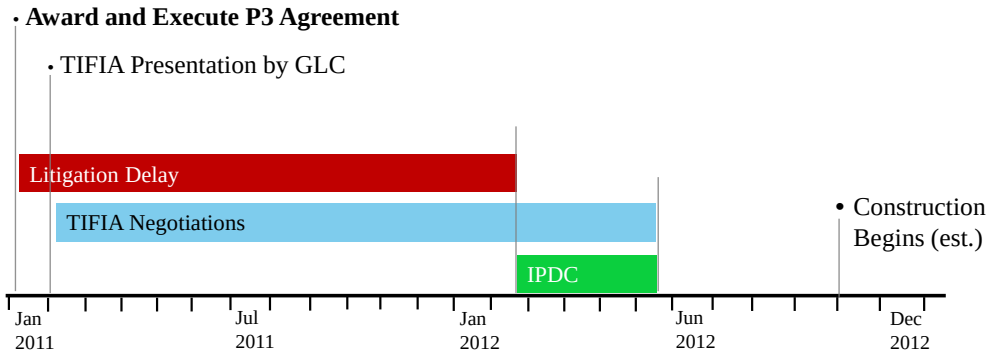

Figure 31 Post PPP Procurement Milestones (Arup 2012)

The project then took the more normal course of progress by the securing of finance from a combination of Government backed loans from TIFIA and Private finance via a transparent method of securing finance from Private markets. A view toward the complete financing picture is found in Figure 32.

Source[1]	Controlling Agency	State Use ($YOE)	Authority Use ($YOE)	Total Amount ($YOE)
Programmed RIP (San Francisco)[2]	Authority, CTC	$54,000,000	$ -	$54,000,000
Future RIP (San Francisco)[2]	Authority, CTC	$13,000,000	$ -	$13,000,000
SLPP	Authority, CTC	$19,360,000	$ -	$19,360,000
MTC STP/CMAQ Advance	MTC	$34,000,000	$ -	$34,000,000
Prop K	Authority	$21,180,000	$14,780,000	$35,960,000
GGBHTD	GGBHTD	$75,000,000	$ -	$75,000,000
Programmed RIP (Marin)	TAM, CTC	$4,000,000	$ -	$4,000,000
Programmed RIP (Sonoma County)	SCTA, CTC	$1,000,000	$ -	$1,000,000
TOTAL AMOUNT		**$221,540,000**	**$14,780,000**	**$236,320,000**

Figure 32 Project Funding Procured by Sponsors (Arup 2012)

The project was delayed further by the ongoing delays in completing phase 1. One fascinating feature of the delays were that out of a list of 10 key risks virtually every one of them was triggered and the outcomes in terms of delays and costs manifested themselves. These delays and costs that were identified could have been mitigated more effectively with less cost and without the delays had they not been essentially ignored by the team principally responsible for managing the phase 1 contracts.

The most significant outcome to date of the transition from a DBB to a PPP is shown in Figure 33.

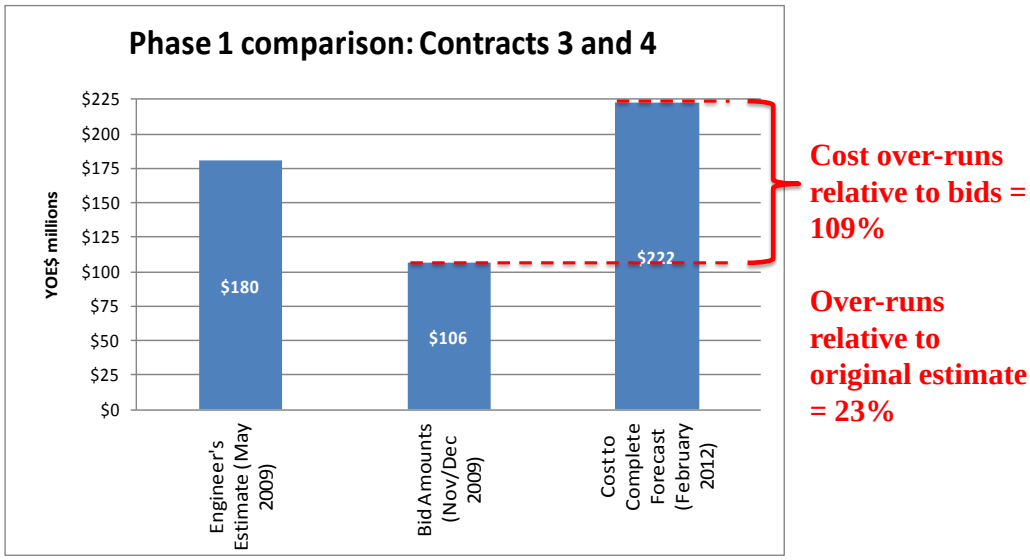

Figure 33 Phase 1 Overrun 1st Quarter 2012 (Arup 2012)

This is evidence of the accuracy of the VfM predictions. The bid received for Phase 2 previously and that have been delayed for a considerable length of time have been adjusted slightly via the mechanism afforded by the small window of negotiation. If the PPP proves as effective as the past results would indicate the PPP outcome result will be far superior to the DBB

CHAPTER 5 Study results

The Presidio Parkway as a case study demonstrates several key aspects of why PPP works. The VfM done properly will reveal the key risks of the project, the soundness of the ability to pay for the project and provide a clear path forward to achieving the ultimate goals of the project. This VfM is the result of Private professional unbiased practitioners of the Legal, Technical, and Financial aspects of the project. The people are quite aside from the Public side and bring a different perspective. The constraints that are built in to the everyday practice of engineering and construction of highways require some alteration when the project reaches a tipping point of size and complexity that warrants additional scrutiny and proof testing. The ***why*** of it working boils down to applying the knowledge and expertise of persons that have not only "done it before" but have a mindset of being able to recognize that there are times that the rules require modification to suit the circumstances, having the ability to recognize when a change in standard procedure is complimentary to the goals of the project and to the benefit of the Public. In most every PPP there is a set of professionals that have the requisite knowledge and skill set to embrace the degree of complexity that a project presents. By maneuvering through the constraints in a way that points out where the constraints are indeed not constraining the project progress in a positive way but in fact hinder what needs to occur the professionals can work with the Public side to craft palatable solutions to problems that would otherwise vex a project or worse completely frustrate a project that brings vast benefits to

the Public in general. The focus then is on the Private side's contribution to the process of the PPP. It is all encompassing. From where the money to fund comes from to how it gets spent in the near term of design engineering and construction further to the life cycle of the completed works. The mindset of the Public side of the equation has become shortsighted due to the political realities of the election cycles and the implications of those cycles. The impacts of constructing the built environment are huge – but just as important are the upkeep of those built environments. This effort of upkeep commonly called Operations and Maintenance are not programmed into the mix of costs in most cases. PPP brings in a longer term perspective of caretaking of the built environment. In that examination of the longer term impacts the legal, technical and financial focus generates numerous scenarios of good things and bad things that may happen over the projects lifecycle. From strictly an investment point of view – the shrewd mentality that a banker may apply countered with what is within the legal bounds and technically feasible results in a range of possibilities that a large complex project may require to be a long term success. And it is the very small opening of the negotiating door that is in essence more communication about the total set of project aspects that lets the best ideas, approaches, means of construction, agreement details and means of funding that serve the longer life cycle considerations of a project. The Presidio Parkway is unusual in addition to being a large complex project the fact that it began as a conventional DBB that has evolved into a PPP will provide an ongoing test case that will allow some

conclusive comparisons to the two methods. Examination by a number of constituents to the process will provide a poignant benchmark for future study.

CHAPTER 6 Issues for further study

California has created, through legislation, the ability for PPP's to come to fruition. There is much to be learned from this endeavor. It is clear that the success that has been demonstrated by the global experience of PPP to effectively constrain construction costs is real. The ways in which the PPP is made to happen can and does vary. There are several lessons learned from the experience of the Presidio Parkway PPP, other PPP's completed and PPP's done in places outside the US. These lessons should be compiled and turned into a body of knowledge that can be widely disseminated and better understood such that the PPP method of delivery may be used where appropriate. This collection of knowledge should be held at the Federal level. The FHWA has demonstrated an ability to bring knowledge skimmed from the states experience. This can be seen when funding considerations are undertaken by the FHWA and the most current practices are utilized on large DB projects. In those projects the latest risk assessment techniques have been employed to make projections of a projects potential swing in cost. Canada has established Partnerships BC in the province of British Columbia to house the collected best practices of performing PPP's. There are moves underway to internalize some of the global and stateside experiences of the PPP method of delivery. It is a laborious and time consuming process to change the status quo. And that change requires recognition that the PPP method has a limited application. It is not a panacea. It is a step change of improvement to project deliverance. The Transportation Research Board that draws its support

from the National Academy of Sciences has begun to fund studies that will bring the VfM process to the forefront of the front end planning process when considering the appropriate means of delivery for projects. One of the key deliverables from the aforementioned Partnerships BC compendium of knowledge is a process flow that considers the specifics of a project under consideration for deliverance method.

A key question that is the subject of scrutiny in the literature as delineated above is: Does the method of delivery really matter? Or is the cost of funding the more important consideration? This can be examined by looking at the variability of the cost of construction and the variability of finance in a steady state view. When comparing the degree of variability of the Presidio Parkway strictly from the risk perspective between the DBB and the PPP a difference of $125 million was in play. This was the amount that could have been shifted one way to the Public side or the other to the Private side. Experience proves that attempts to achieve this on large complex projects via the DBB do not universally work. Accepting that fact, is difficult on the part of the Public entities that have felt the sting of these overruns. Both from the personal managerial point of view and the Public's interest projects are not being served as well as possible when viewed at the outcome stage. From the more simplistic financial view of what the DBB versus PPP opportunities yield in terms of funding, the picture is similarly clear, but is dependent upon the markets variability as well. Since the markets are constantly

in flux – then so should the decision making involved. This can be seen by comparing the variability of financing profiles at different rates in Figure 34.

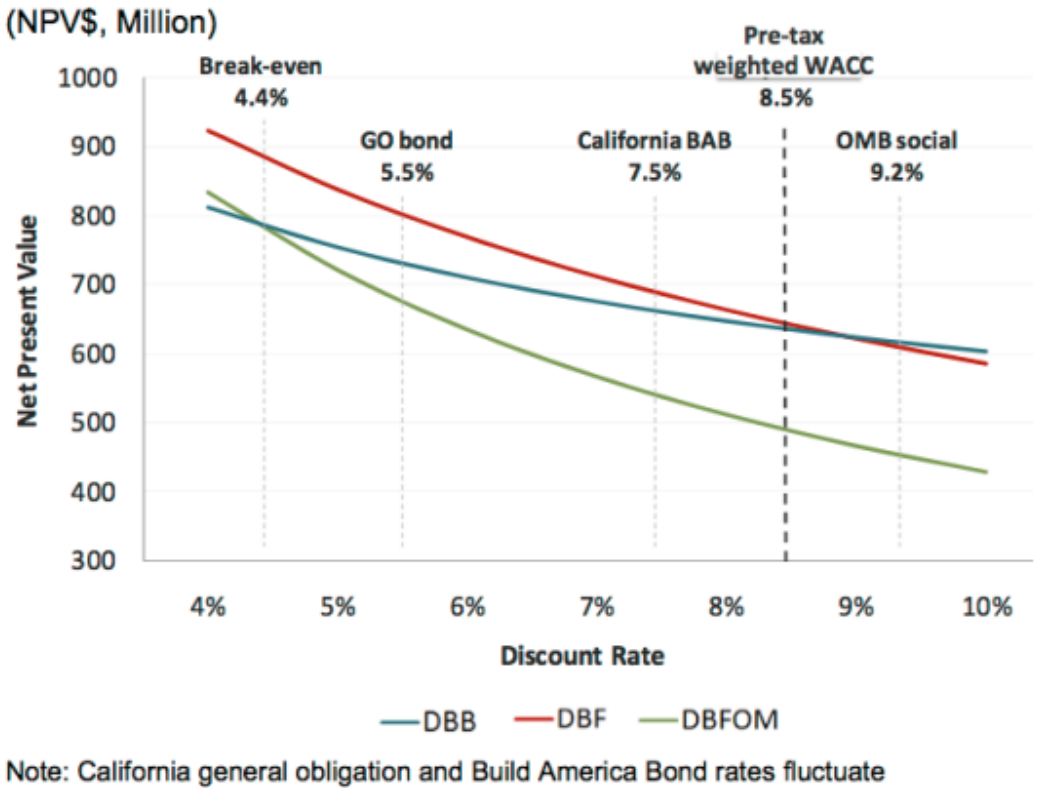

Figure 34 Breakeven points of Delivery Types v Discount Rate (Arup 2012)

These are the sorts of considerations that require specialized knowledge and that most states do not necessarily hold nor should they be required to hold that expertise at all times. And for that reason a national repository of information should be held at the federal level that is available to all fifty states and any subsidiary form of government that can inform and provide guidance when the need arises.

The focus of this study has been the ***why*** PPP's can bring a superior cost containment to the constructive process in the built environment. And the focal point has been highways. Can the method be employed across a wider spectrum of the built environment? The answer is yes and it is already underway both in California and other locations. In Canada there is a considerable set of projects underway in the field of health care and in the US we have seen the first PPP in California in the judicial field with the Long Beach courthouse PPP. Airports have not seen much activity in the way of PPP's here in the US but have seen activity around the globe. The FAA has in essence put into place a PPP for the weather information and ground support of aviators in the US. How this effort working and what is are the similarities to more capital intensive endeavors? The largest question in terms of impact that has not been answered is: How much capital may be freed up by using PPP's more extensively than we are now in the US? That one question was speculated upon above. And to further speculate in an effort to gauge the impact, a recent report stated that the need for infrastructure in the US is on the order of $2 trillion. So applying the 10% of projects fits and 10% is saved or freed up for other uses due to efficiency. That points to a $20 billion net savings. This is another area worth investigation. Is there a space for PPP's in US health care, or is our system so different from the Canadian (for example) that it does not make sense here? Can PPP's assist in lowering the cost of healthcare? These issues get into areas that include the questions: How large is the market for PPP? What areas of the Public built environment should be considering PPP? What role does government carry out in the PPP process? Is the

PPP support system adequate to fulfill its promise should it be more widely utilized? How much does VfM cost? At what point does a VfM need to stop? How much time does it take to perform a VfM? Can the VfM be conducted concurrently with the advance of a project? Are VfM's done better by principally Public or Private Parties? Do PPP's take longer than DBB's? What are the transaction costs? These are all questions that are worthy of continued and advanced study. Of course the projects that are still in progress like Presidio Parkway US 36 near Denver, CO and others in the pipeline warrant further examination. These projects are ripe for study in similar form to that completed by Chasey, *et.al.* for the highways PPP in the US. And certainly a continuation of that study as projects complete the PPP cycle through the construction phase need to be done. It is only by examining what works and what does not that the most accurate assessments may be made and that the best outcomes dependent upon the method of construction deliverance will yield the best results for the public.

There is one other project delivery method worthy of mention in the context of considering best value approaches - Construction Management / General Contracting (CM/GC). This method affords even a higher level of negotiation, risk assessment and input to the design process due to the early involvement of the Constructor during the design, cost and schedule development stages of the work (FHWA 21012). Early results are promising and the input to this study is only to emphasize that more communication via negotiation, risk allocation and time spent early in the procurement are all well spent efforts of energy.

An interesting aside from the FHWA Office of Innovation cited above, the entity poised to gain the most significant set of benefits from PPPs is our Governments (we the people) yet these entities are the most pessimistic when casting the results of their studies. This is best represented by the recent CBO report – which is relying upon outdated data to form conclusions and worse inform our congressional representatives on the topic. The CBO is not alone in this misrepresentation of the facts and outcomes from PPPs'. The Office of Inspector General has not done an adequate job of assessing the pros and cons (Office of the Inspector General 2011) and is rather myopic in its view of the experience already generated in the larger sphere of PPP uses. Most recently California has committed the same mistake in the Legislative Analyst Office report. This excerpt from the report assumes apparently that the DBB method provides equal certainty of cost – when it has proven time and time again that it does not.

"Our analysis indicates that utilizing a different set of assumptions (such as a discount rate of 5 percent and excluding the assumed tax adjustment) would result in the cost of the Presidio Parkway project being less—by as much as $140 million in net present value terms—in the long run under a traditional procurement approach than the chosen P3 approach."

In a recent report published by Stanford University the conclusion regarding the VfM is quite different from the LAO's input. The more complimentary report from Stanford likely stems from a better understanding of the inputs, impact and outcomes (Carollo 2012).

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BIOGRAPHICAL SKETCH

William E. Maddex brings 35 years of construction experience to the burgeoning field of Public Private Partnerships. Mr. Maddex is employed by Arup, a renowned professional engineering services consultancy based in the United Kingdom with global reach. Since joining Arup 5 years ago, he has risen to the position of Associate Principal and Leader of Cost Engineering Services in the Americas. Based in San Francisco, Bill has traveled extensively in the US, Canada, Central and South America to provide essential input on over 25 PPP's worth more than $30 billion. After earning his Bachelor of Science in Engineering degree from the Del E Webb School of Construction Management at Arizona State University; Bill went to work for a number of notable heavy civil and industrial construction firms on a variety of projects throughout North America. These projects include airports, tunnels, highways, bridges, earthfill and concrete dams, coal fired, natural gas and hydro spun electric powerplants, coal, copper, gold and other types of mining projects, water and wastewater treatment plants, environmentally driven industrial cleanups and retrofits and a host of other project types too numerous to list. Currently Bill provides valuable advice on major projects from New York's $5 billion Tappan Zee Bridge to San Francisco's $1 billion approach to the Golden Gate, the Presidio Parkway (formerly known as Doyle Drive). Other major California projects, start just outside Bill's office window with his involvement at the Trans-Bay Transportation Center in downtown San Francisco and from there encompass the breadth of the Golden State via his participation in making the California High Speed Rail from Sacramento to San Diego a reality. Bill holds a Certified Estimating Professional credential from AACEI. He regularly guest lectures at the University of California at Berkeley and San Jose State University. Bill has previously contributed to the widely recognized Recommended Practice on "Contingency Determination using Range Estimating" and co-authored the first study focused on the efficacy of construction costs when using the PPP method of project deliverance. Bill has long been interested in alternative project delivery methods and possesses a considerable wealth of experience about Public Private Partnerships; a method that he believes holds much promise for the United States as we work through these difficult economic times and beyond.