# *East West Link Project*

## Discount Rate Paper

*East West Link Project– Discount Rate Paper*

**October 2013**

**pwc**

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# Disclaimer

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# Recommendations

1. That the risk free rate on which all the following rates are based, is the 1 month average TCV 10-year Bond Rate, which is 4.65% at October 2013

2. That the PSC Discount Rate is 4.65%

3. That the PPP Discount Rate is 7.27% for the PPP service fee

4. That the PPP Discount Rate is 6.53% for the State contribution

5. That the systematic risk premium is 2.62% for the PPP service fee

6. That the systematic risk premium for the State contribution is 1.88%

7. That the PPP Discount Rate is re-considered in the light of Short-Listed Respondents' actual position in respect of systematic risk transferred

8. That the PPP Discount Rate is re-considered in the light of Short-Listed Respondents' proposals in relation to indexation

# Introduction

## Overview

The purpose of this paper is to establish an appropriate PSC and PPP Discount Rate for use when evaluating proposals in comparison with the Public Sector Comparator (PSC) for the East West Link Project (the Project).

Infrastructure Australia's National PPP Guidelines (the IA Guidelines) establish the methodology to be used in determining discount rates for PPP projects. The Department of Treasury and Finance (DTF) has subsequently developed revised guidance material which has been made available to PwC and which has been used to determine the appropriate discount rate for the Project (the Revised Guidelines).

## Updated Guidance

DTF commissioned a review of the discount rate methodology which resulted in an amendment to the IA Guidelines. The amendments have not yet been reflected in the official Revised Guidelines but the update has been shared with PwC (by DTF) and reflected in this paper.

The primary change was the requirement to develop the Asset beta from 1st principles and then undertake a 'sanity check' against the revised Asset betas in the revised Table 2. The revised Table 2 is shown below:

| Category | Description and risk characteristics | Examples of project category | Asset beta range | Risk Premium range |
|---|---|---|---|---|
| *Availability-based social infrastructure projects* | *Key Systematic Risks borne by the PPP relate to inflation risks, market downturn risks and demand risk where it has a material impact e.g. variable demand impacting upon FM and replacement lifecycle costs* | • *Affordable & student housing*<br>• *Retirement & nursing homes*<br>• *Healthcare*<br>• *Education*<br>• *Prison facilities*<br>• *Renewable energy*<br>• *Technology*<br>• *Utilities*<br>• *Telecomms*<br>• *Roads*<br>• *Public Transport* | *0.3 - 0.8* | *1.8 – 4.8* |

The Revised Guidelines recommend that unless there are unique features to the project that the asset beta and risk premium will fall within this range.

## IA Guidelines

Under the IA Guidelines, there are the following four distinct discount rates to be calculated at various stages of a project's lifecycle:

1.   the **Risk Free Rate,** which is the average rate over the most recent 3 months of the 10-year Treasury Corporation of Victoria Bond Interest Rate;

2.   the **PSC Discount Rate**, being the discount rate used to calculate the Public Sector Comparator (PSC) and is typically the Risk Free Rate;

3.   the **Project Rate**, which is the discount rate including all systematic risk in the project both transferred and retained by government (which is a combination of the Risk Free Rate and a premium for all systematic risk); and

4.   the **PPP Discount Rate**, being the discount rate used to evaluate private sector bids at the RFP Evaluation stage (which is the risk free rate plus that portion of systematic risk transferred to the private sector bidder).

The discount rate should be updated in certain circumstances during the life of a project. The relevant discount rate should be updated over the tender period as a consequence of changes in the risk free rate.

Furthermore, the PPP Discount Rate used to evaluate private sector bids often varies between different bidders based on the amount of systematic risk that is ultimately transferred between the public and private sector. Where a single bidder submits a number of variant proposals, it may also be necessary to determine different PPP Discount Rates for each of these proposals.

This paper provides a discussion and recommendation on the calculation of discount rates to be used for the Project. It also provides, as background, an overview of the methodology used.

# Discount rate methodology

## Underlying methodology

The methodology for calculation of the various discount rates provided in the Revised Guidelines is as follows (excerpt from guidance):

1. *Projects with no Systematic Risk in the cash flows, ie, equivalent to the PSC, should be discounted at the PSC Discount Rate, typically the Risk Free Rate*

2. *For projects with Systematic Risk in the cash flows:*

    – *The CAPM is then used to assess the level of Systematic Risk associated with the project*

    – *An assessment is made of the level of Systematic Risk transferred to the Private Sector under the PPP project*

    – *The modified form of CAPM is used to quantify the adjustment required to the Risk Free Rate to compensate for Systematic Risk transferred*

    – *PPP cash flows should be discounted at the PPP Discount Rate.*

*This approach requires a project specific Discount Rate to be developed for each project. The appropriate PPP Discount Rate is a function of the scope of the project, the Systematic Risk it faces and the level of risk transfer required under the project documentation (subject to the private sector's acceptance of those risks). Therefore it is conceivable that:*

3. *The PPP Discount Rate for each bidder will be different, depending on the relative level of risk transfer in its submission (some bidders may accept the government's Systematic Risk transfer proposals in full while others may not)*

4. *More than one PPP Discount Rate may be required for a single bidder. For example, if a bidder submits two proposals, one using a CPI indexed bond with a fully indexed Service Fee and one with Nominal Debt and a partially indexed Service Fee, the level of CPI risk (which is a Systematic Risk) transferred under the two proposals will be different and a different PPP Discount Rate should be applied to each bid.*

*The use of CAPM requires data to quantify the Project Rate. The CAPM data is provided on a similar basis to guidance material that this Guidance supersedes.*

The methodology requires the use of a modified version of the Capital Asset Pricing Model (CAPM) to determine the amount of Systematic Risk in the project. In simple terms, an adjustment is made to the risk free rate to reflect the extent to which Systematic Risk is transferred for that bid.

The legal and commercial arrangements in most PPP projects lead to the transfer of systematic risk from the public to the private sector. As a result, the discount rate is used to reflect the systematic risk transferred to the private sector. This will normally result in the PPP Discount Rate being higher than that used for the PSC.

It is also important to note that the discount rate seeks to reflect the level of ***systematic risk*** transfer to the Project Company as compared with the level of systematic risk under the PSC. In adopting this approach, it is assumed that **all** other project risks are reflected in the underlying project cashflows (and reflected in the Project risk register) and that no systematic risks are reflected in the cashflows for the PSC.

In simple terms, the PSC should be developed to include no systematic risk, whereas private sector bids, by their nature, include systematic risk and it is built into the pricing of each bid (and as noted above is normally implicit in the legal and commercial structure of the project). If the PSC and private sector bids were evaluated using the same discount rate, eg, the risk free rate, then the additional risk reflected in the private sector bid would be undervalued. The systematic risk premium is used to recognise the value of this transferred systematic risk.

# Discount rate for the PSC

Under the Guidelines, the Risk Free Rate is used as the PSC Discount Rate, with the Risk Free Rate defined as a jurisdiction specific long term bond rate. The 1 month average TCV 10-Year Bond Rate is 4.65% (as at 10 October 2013, as advised by DTF).

The RFP to be issued to Short-Listed Respondents will specify a date (Base Rate Date) at which Short-Listed Respondents are to quote their reference interest rates (the State bears the risk of movements in base rates up to financial close, in accordance with IA Guidance).

# Calculation of PPP discount rate

The Revised Guidelines provide a five step process for calculating the PPP Discount Rate to be used when assessing each bid. The five step process can be diagrammatically represented as:
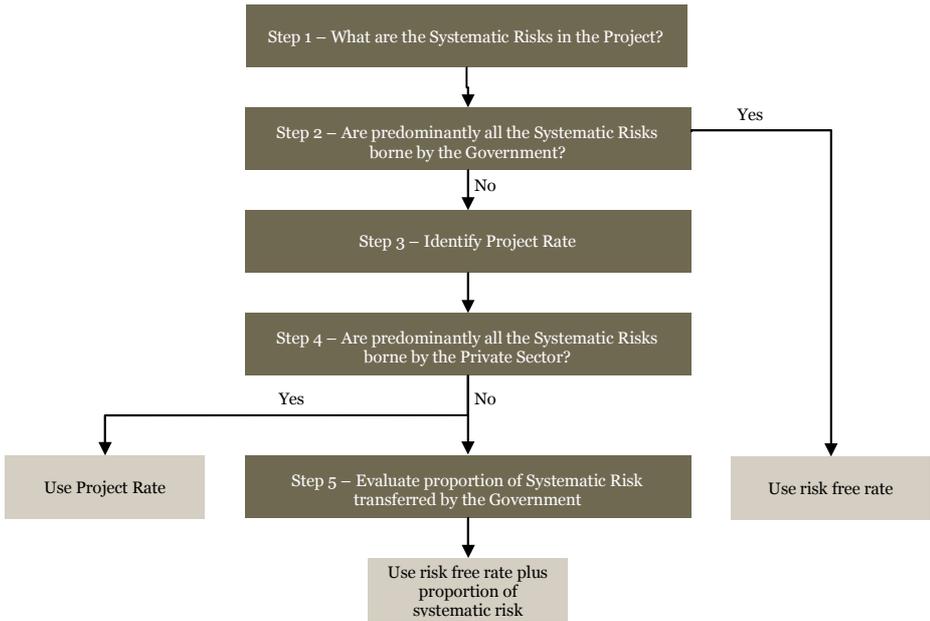


The following sections work through each step to determine a PPP Discount Rate, based on the risk allocation proposed in the draft RFP suite of documents.

## Step 1: What are the Systematic Risks in the Project?

Risks associated with the project (to the extent they are systematic), are outlined in Table 1 below together with comments on the relative impact and proposed allocation of these risks between the State and private sector (to assist in the assessment of who bears these risks as per Steps 2 and 4 of the Revised Guidelines).

**Table 1 Systematic risk impact score and weighting**

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| **Demand risk** | | | | |
| That element of demand risk that is related to the level of general economic activity affecting the demand for the Project (but not that element of demand risk related to performance of services by the Project Company). <br><br> Under the IA Guidelines, where the private sector bears the risk of increased or decreased costs associated with changes in demand, such as increased life-cycle maintenance costs where demand increases (but receives no corresponding adjustment in the fee it receives from the government) then demand risk for this project lies with the private sector. | 1 | 50% | 50% | **Weighting / Impact score** <br><br> The State is retaining the entitlement to toll revenues and all associated demand/revenue risk (i.e. this risk is not part of the PPP), the revenue component of demand risk is not what is being considered here. <br><br> However, variations in the level of demand for the road (both in terms of vehicle volumes and the mix of volume between cars, LCVs and HCVs, in particular) will influence the level of operating, maintenance and lifecycle costs which need to be incurred to achieve the required performance standards. Examples include: <br><br> • Higher traffic volumes and/or a greater than expected proportion of HCVs may affect tunnel O&M costs required to maintain air quality <br><br> • Higher traffic volumes and/or a greater than expected proportion of HCVs may affect the timing and amount of periodic pavement resurfacing costs <br><br> • Higher traffic volumes may influence the frequency and severity of incidents and hence incident response costs, etc. <br><br> Given the relatively small proportion of costs associated with the ongoing operation and maintenance of the road (in comparison to the upfront capital spend) the risk of material increases in these costs due to increased demand is not considered to be a significant risk to investor returns. <br><br> The relative importance of this risk is therefore considered lower than either inflation or downturn in the broader market and it has been weighted as a 1. |

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[1] The 'impact' relates to the relative importance of the systematic risk component to overall systematic risk

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| | | | | **Allocation** |
| | | | | Under the IA Guidelines, where the private sector bears the risk of increased or decreased costs associated with changes in demand, such as increased life-cycle maintenance costs where demand increases (but receives no corresponding adjustment in the fee it receives from the State) then demand risk for the project lies with the private sector. |
| | | | | Allocation between the private and public sector will be a function of any mechanism under the Project Agreement to periodically adjust O&M costs for traffic volumes being outside a defined range (for instance, of the type included in Peninsula Link in relation to HCV volumes). |
| | | | | While this issue will be resolved post RFP release as part of the finalisation/calibration of the payment mechanism, it is likely that some form of demand based bench-marking of operating and maintenance costs will be adopted. |
| | | | | On this basis it is currently estimated that at least 50% of the risk is transferred to the private sector. This position will be reviewed (and updated as appropriate) as part of the payment mechanism RFP addendum. |

**Inflation – higher or lower than expected inflation**

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| Risk of unexpected inflation (which could be represented by unusually high or low CPI or other index). That is, the risk that the real value of payments made during the term of the arrangements is eroded (or increased) by inflation with a diminution (or increase) in returns.<br><br>The Revised Guidelines contain the following guidance in respect to the allocation of inflation risk:<br><br>• if the PPP payment is fixed the risk is borne by the operator.<br><br>• if the PPP payment varies with general inflation or specific | 3 | 10% | 90% | **Weighting / Impact score**<br><br>All costs for the Project are likely to be subject to inflationary pressure during the Project term, these include:<br><br>• construction costs;<br><br>• wages and salaries costs;<br><br>• life-cycle maintenance and other road O&M costs.<br><br>The largest element of risk is in relation to the construction costs. On a project of this scale relatively small changes in construction cost can have a significant impact on project returns; this is exacerbated by the estimated 5 year construction period.<br><br>Economic conditions have removed some inflationary pressure from the economy; in particular the level of activity in the mining sector has abated significantly and the inflationary pressure that previous activity triggered in the building sector has reduced considerably, although the economy remains vulnerable to inflationary pressure resulting from the potential for a devalued dollar and subsequent increase in exports alongside currently lower interest rates increasing homeowner |

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| indices to reflect likely costs of the operator then pricing risk is likely to be shared. | | | | wealth and spending. Furthermore, the number of other 'mega' projects in the Victorian economy, both in progress and mooted, is limited, with Melbourne Metro not currently expected to commence construction until later this decade. |

The long term inflationary pressure on maintenance costs, which make up the majority of ongoing expenditure, is likely to be a relatively significant consideration due to the number of transport and civil engineering projects that are envisaged (both in Victoria, for instance as part of the Victorian Transport Plan, and in other States given the rate of population growth and other pressures on existing infrastructure) to be implemented during its life, and the impacts this may have on future costs.

Based on the above, inflation is considered to be a more important element of systematic risk than demand. Thus, in order to achieve appropriate relativity this risk has been weighted as a 3.

**Allocation**

The Revised Guidelines contain the following guidance in respect to the allocation of inflation risk:

- if the PPP payment is fixed the risk is borne by the operator.
- if the PPP payment varies with general inflation or specific indices to reflect likely costs of the operator, then the risk is likely to be shared.

However, the main component of inflationary risk is in relation to the construction period (c.86% of total real costs) and this element of the cost will be fixed at financial close and either financed via the construction loan facility or the State Contribution. Regardless of the financing of this cost, it will be fixed at financial close with Project Co bearing the majority of the risk.

While the operational spend component varies with CPI, some risk is still transferred to the private sector; notably that element that relates to the differential between general indexation and indexation in underlying costs (which will include elements that vary with labour and building indexes).

It is therefore estimated that 90% of inflation risk is transferred. Ultimately this element of the analysis will be updated to reflect the extent to which the QSPs under each Proposal are subject to indexation.

If Short-Listed Respondents bid back specific indices for the operating component, rather than CPI, the allocation of risk will need to be reconsidered.

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| **Downturn in broader market** | | | | |
| Risk of downturn caused by factors in the broader market, resulting in a reduction in the quality of the Project Company's service provision, or an increase in the Project Company's costs due to its own financial distress/ insolvency or that of its major contractors/ subcontractors.  This risk also captures the impact of market downturn risk on customer insolvency | 3 | 25% | 75% | **Weighting / Impact score**<br><br>There is a risk that events may occur in the broader market economy, which increase the potential risk of insolvency and adversely impact suppliers or customers of the private sector operator.  This could manifest itself through a reduction in the level of services, or increased costs as a result of procuring a replacement supplier.<br><br>This risk most likely needs to be considered for two distinct phases of project delivery:<br><br>• The D&C phase – where the need to use specialist contractors for significant components of the project (particularly tunnelling and tunnel fit-out) will likely result in this risk being higher during this phase.<br><br>• The O&M phase – where the more general nature of services means that sub-contractors will be drawn from a broader market base, resulting in a comparatively lower risk profile.<br><br>The EOI assessment will consider the financial standing of contractors and it is expected that the parties selected will have significant financial strength.<br><br>Given there are a large number of competing suppliers for sub contracting services, the most likely scenario in the event of any private sector contractor insolvency is the private sector operator will need to procure an alternate supplier (rather than being forced into insolvency itself). Such an event is likely to have a moderate impact on the private sector operator and ultimately result in lower levels of financial return.<br><br>Perhaps of higher relevance is the risk of a severe local or global down-turn in economic activity. Australia is highly exposed to the Chinese economy and a reduction in Chinese GDP is likely to have a further adverse impact on Australia, continued uncertainty in the Chinese economy is a threat to the health of the Australian economy.  The period since the GFC began in 2008 has been characterised by significant risk in the global economy – in particular the risk of sovereign bankruptcy risk.  More recently the economic conditions in Greece led to significant global instability and concerns remain about other large economies in Europe, in particular Spain and Italy. The frequency and scale of 'economic shocks' is relatively high. A default in a major economy would have significant global ramifications leading to systematic risk.   For example, a sovereign default is likely to be accompanied by a credit squeeze which could have an impact on company performance (such as the ability to refinance debt and credit lines). |

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| | | | | Finally, this risk includes the impact on financing costs. That is the risk that financiers' returns are eroded by movements in underlying interest rates, the availability of capital and the terms and conditions on which capital is made available. This is a significant area of risk; a down-turn in economic activity is often accompanied by a credit squeeze and this can affect the ability of companies to refinance debt and/or refinance debt cost effectively. Consequently, market returns can be severely affected by a down-turn as a result of the impact on the ability to effectively re-finance existing capital and raise new capital to continue to invest in projects. |
| | | | | On balance, this risk is considered to be more important to systematic risk than demand risk and similar to inflation risk. In order to achieve the appropriate relativity, it has been weighted as a 3. |
| | | | | The impact of this risk is assed as Medium (3 out of 5). |
| | | | | **Allocation** |
| | | | | If there are no provisions in the Project Agreement that allow the private sector operator to pass through cost increases (a cost plus type arrangement) as a result of insolvency of a sub contractor or lowering of equity returns due to these increased costs, then the risk will be considered to be effectively transferred to the private sector. |
| | | | | The Ararat Prison PPP project is an example of a project in which the majority of the risk associated with contractor failure was borne by the investors in the project (as well as a number of sub-contractors). |
| | | | | It is currently contemplated that debt will have a term of between 5-7 years and that the market will take underlying interest rate risk for this period and all refinancing risk throughout the contract term. As a result of the State bearing underlying interest rate risk after the point of the first refinancing the overall assessment of market down-turn risk transferred to the private sector is 75%. |

**Residual Value**

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| Risk that at the end of the contract the project (or its underlying assets) will be worth more or less than expected at the end of the project term, and upon which the financial structure of the project is based. | 0.0 | N/A | N/A | **Weighting / Impact score** |
| | | | | On expiry of the Project Agreement, the road transfers back to the State for nil consideration. The Project requirements are likely to clearly define the hand back conditions for the road asset and the related residual design life for the infrastructure. |
| | | | | Other than in relation to asset condition (which is a project specific rather than a systematic risk and is therefore addressed via cash flow forecasts rather than the discount rate), due to the nature of the asset there is no other meaningful residual value at the end of the Project term. That is, the Project |

| Description | Impact score[1] | State share | Private share | Risk impact weighting and allocation comments |
|---|---|---|---|---|
| The risk has relatively higher importance where the project (or assets) is expected to have significant future value and/or remaining useful life at the end of the PPP term. | | | | asset is an integrated part of the road network with no alternative use (making it highly unlikely that following expiry any residual value could be realized through either sale of the asset or re-letting of a PPP style concession unlike assets of some social infrastructure projects where assets would potentially have alternate use and hence residual value). Additionally, any value in the toll revenue stream is not considered given it is not part of the transaction. |
| | | | | In this context there is not considered to be any residual value systematic risk for either the private sector or the State. Therefore the risk has been weighted as 'Nil'. |
| | | | | **Allocation** |
| | | | | No element of systematic risk has been allocated to residual value therefore no allocation between the State and private sector has been proposed. |

# Step 2: Are predominantly all the Systematic Risks borne by the Government?

As reflected above, there are a number of Systematic Risks evident in the Project that will be allocated between the parties. As a result of this risk sharing, it is not appropriate to use the risk free rate for the PPP discount rate.

# Step 3: Identify Project Rate

The Project Rate reflects the premium over the risk-free rate for bearing all (100%) of the systematic risk associated with the project. The rate is calculated using an asset beta and market risk premium for similar projects (the asset beta and market risk premium are provided in the guidance material).

## Asset beta - Discussion

The Revised Guidelines specify when a project has two or more distinctly different sub-components either a separate discount rate should be developed for each sub-component or an appropriately blended rate should be developed.

The Project has two distinct phases: the D&C phase in which 85% of Project costs are incurred and an O&M phase, in which 15% of costs are incurred and a blended rate has been developed which includes a blended asset beta reflecting the systematic risks of each phase and their relative weighting in the overall project.

To develop an appropriate asset beta PwC has considered the asset betas of Australian and international construction companies, facilities management companies and regulated utilities. The betas have been used to develop an appropriately blended asset beta for the construction and operational phases of the Project.

However, while it is valid to use these betas as a proxy for the systematic risks faced by the project, an adjustment is required to reflect that the total systematic risk in a construction company will include systematic risks driven by three factors:

- Systematic risks related to the delivery of construction projects - these should be included in the project beta

- Systematic risks related to aspects of the construction industry not relevant to the Project - such as mining projects, which should be excluded from the beta for the project

- Systematic risks not related to individual projects - such as the future number of construction projects available and bidding for these projects, which should be excluded from the beta for the project

A more detailed explanation of the above is provided in Appendix 2.

The construction betas developed in the analysis may therefore overstate the beta for the Project. It is estimated that 30-50% of systematic risk relates to systematic risk not related to construction period risks for the Project; consequently an adjustment is made. While this adjustment is subjective, the resultant asset betas have been cross-referenced to asset betas for regulated utilities as a sense check. This is discussed further below.

## EWL Business Case asset beta

The discount rate used in the EWL Business Case (dated March 2013) considered the entire East West Link project. This therefore included systematic risk related to both the toll revenue and the cost side of the Project.

The PPP discount rate is considering only cost related systematic risk on the basis that revenue risk is not transferred to Project Co. As a consequence the review of asset betas for the purposes of assessing the PPP discount rate is focused on an analysis that identifies betas which exclude revenue risk (to the extent possible).

## Asset beta - Calculation

### Construction Beta

The D&C component of the Project has similar characteristics of a large infrastructure construction company. We have observed betas for listed construction companies and primarily relied on betas of companies in Australia (Lend Lease, Cardno) with very little exposure to the mining industry, and European 'pure play' construction companies (see Appendix A). These asset betas ranged from 0.84 to 1.14 with an average and median of 1.02 and 1.01 respectively. Based on this a beta of 1.0 has been adopted.

As noted above, construction companies are exposed to risks which do not relate to the systematic risks of the Project and as a result the construction beta has been adjusted and is considered as a range:

- High Point: Assuming that 70% of the asset beta relates to construction activity – adjusted beta 0.70

- Low Point: Assuming that 50% of the asset beta relates to construction activity – adjusted beta 0.50

While it is difficult to put a precise quantification on the high and low points in the range the analysis of betas in Appendix A shows that regulated utilities have an average asset beta of 0.3. These companies will have lower asset betas than a construction company as a result of factors including:

- Their portfolios are a mix of construction period and operating period projects (i.e, represent a portfolio of construction risks);

- Nevertheless, they do not compete for construction constructs; and

- Their returns are regulated and they are shielded by periodic adjustments to pricing which insulates them from some systematic risk.

As a result their average asset beta of 0.3 is considered to be significantly under that of a company exposed to the risks of construction projects alone. Hence, 0.5 is considered to be the lowest point for the asset beta.

### O&M Beta

The O&M component of the Projects has many similar characteristics with a regulated infrastructure asset (e.g. water or gas pipeline) where the asset is akin to an availability based project (i.e. no revenue / demand / throughput risk and limited construction risk as the network assets have largely already been built).

These regulated infrastructure assets are subject to systematic risks in line with the Project during its operational phase including inflation risks, downturn in the broader market (e.g. insolvency of key off-taker customer or subcontractor), and demand risks associated with potential higher O&M costs resulting

from higher throughput in the network (e.g. greater wear and tear on pipelines for increased volume transported).

Betas for Australian and global regulated water and gas infrastructure assets ranged between 0.20 and 0.37 with a median and average of 0.30.

While it could be argued that these companies also face systematic risks not directly correlated with the Project systematic risks and hence some reduction in the proportion of asset beta should be applied, it is noted that regulated utilities are able to recover from the impacts of systematic risks through their pricing regimes and pass the pricing impacts onto customers: this mechanism effectively insulates these companies from the full impact of systematic risk.

## *O&M / PPP availability beta cross check*

Furthermore, a strong proxy for the systematic risks borne by a PPP project are the systematic risks borne by specialist PPP companies; and in this regard listed infrastructure funds are considered to be the best proxy. These organisations only undertake projects which operate as PPPs and face the same types of risk as the underlying projects. The benefit of using a PPP fund as a proxy is that its beta does not require adjustment or blending in the same way as a construction company would require adjustment, on the basis that on average PPP projects have similar commercial structures and risks.

An analysis of betas for PPP investment companies shows an average beta of 0.29. The majority of assets in these funds are operational, as opposed to construction period, and hence represent a reasonable proxy for the beta for the operating phase.

On balance the beta for O&M phase is considered to be in the region of 0.30.

## *Weighting the Betas*

The relative weightings of these two separate phases in the systematic risks of the overall project have been made based on the relative value of the construction and O&M costs in the PSC:

| Blended Project asset beta components | D&C phase | | O&M phase | |
|---|---|---|---|---|
| Adopted asset beta | 1.00 | | 0.30 | |
| High/Low beta | 0.70 | 0.50 | N/A | N/A |
| Weighting (proportion of PSC costs) [2] | 86% | | 14% | |
| Weighted asset betas | 0.60 | 0.43 | 0.04 | |

This results in an asset beta range as follows:

| | | |
|---|---|---|
| Blended Project asset beta – High/Low | 0.64 | 0.47 |
| Average beta | 0.56 | |

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[2] Based on a total real PSC of $6.1bn and a construction cost of $5.3bn and O&M costs of $0.8bn

## Project rate assessment

The estimation of the project rate is calculated in accordance with Step 3 of the Revised Guidelines is summarised in Table 2.

**Table 2 Project rate assessment**

| Project rate component | |
| --- | --- |
| Risk free rate ($R_f$) [3] | 4.65% |
| Asset beta ($\beta$) | 0.56 |
| Market risk premium ($R_m - R_f$)[4] | 6.0% |
| Project rate ($R_f + \beta (R_m - R_f)$) | 8.01% |
| Risk premium (Project rate - $R_f$) | 3.36% |

# Step 4: Are predominantly all the Systematic Risks borne by the Private Sector?

Table 1 indicates that there are a number of Systematic Risks evident in the Project that are allocated or shared between the parties. As such, it could not be concluded that "predominantly all" risk lies with the private sector.

# Step 5: Evaluate proportion of Systematic risk transferred by the Government

To enable calculation of the Systematic Risk Premium, the proportion of Systematic Risk borne by the parties must be identified.

The Revised Guidelines recommend a two stage process is utilised as follows:

- Assess the relative importance (weighting) of each of the Systematic Risks

- Assess how the risk is allocated between the parties.

Table 3 summarises the Systematic Risk assessment, reflecting the analysis in Table 2.

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[3] To be updated at the Base Rate Date.

[4] As per Revised Guidelines and based on generally accepted market practice.

**Table 3 Summary of systematic risk allocation**

| Systematic Risk Type | Weighting (Scale 1 – 5) (Relative importance) | Estimated Portion of Systematic Risk Premium %[5] | Allocation to Private Sector (based on Step 1 analysis) | Systematic Risk Premium transferred to Private Sector % |
|---|---|---|---|---|
| Demand | 1.0 | 0.48 | 50% | 0.24 |
| Inflation | 3.0 | 1.44 | 90% | 1.30 |
| Downturn in broader market | 3.0 | 1.44 | 75% | 1.08 |
| Residual value | 0.0 | 0.0 | 0% | 0.0 |
| **Total** | **7.0** | **3.36** | **N/A** | **2.62** |

The recommended PPP systematic risk premium is 2.62%. The rate for discounting the PPP service fee is therefore 7.27% (4.65% + 2.62%)

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[5] The calculation of the Estimated Portion of Systematic Risk Premium = each Systematic Risk Weighting in Column 1 divided by the total Systematic Risk Weightings in Column 1 multiplied by the Systematic Risk Premium (Asset beta of the Project (0.xx) multiplied by the Market Risk Premium (xx%)).

# Impact of State Contribution

## Introduction

The State intends to make a State Contribution to the Project as follows:

- The lesser of $2 billion (nominal) or 50% of the total funding requirement (to be contributed once an amount of private finance equivalent to 80% of the private debt and 100% of equity has been contributed)

- An additional $1 billion (nominal) on the $2^{nd}$ anniversary of completion.

The intent of the State Contribution is reduce the cost of finance by reducing the amount of the Project which is privately financed, but without reducing the fundamental PPP risk transfer principles.

However, the PPP discount rate needs to be reconsidered to assess the extent of any additional risks retained by the State as a result of the State Contribution, vis a vis, the privately financed element of the Project (notwithstanding the general intent is to preserve risk transfer).

Other Victorian projects have amended the discount rate applied to State contributions.

## Proposed approach

The State Contribution has been developed in such a way so as to preserve the fundamental risk transfer principles; in particular to provide the State with the same level of construction risk transfer as if the payments were made through the PPP service fee (and not a State Contribution). However, there are important differences in the amount of systematic risk transferred and we consider the components of systematic risk in turn to identify these:

### Demand Risk

There is not considered to be any change in demand risk, however, this risk is not relevant to the construction phase related activities (to which State Contributions are intrinsically linked) and so the allocation to the private sector has been reduced to zero.

### Inflation Risk

The element of inflation risk related to construction costs is not changed, in particular, if actual construction costs are higher because of higher construction inflation this risk is borne by Project Co, not the State.

### Market Downturn

If a contractor went into administration as a result of a down-turn and Project Co incurred more costs as a result of the event (for example, finding a suitable replacement contractor), this risk would be borne by Project Co, not the State.

However, that element of risk related to the real returns of project investors is affected. Whereas for the service fee underlying interest rates are fixed by Project Co to the first refinancing date; under the State Contribution, the State bears the risk of increases in interest rates and an erosion of returns (or higher costs), for that part of the cost the State is financing (i.e. in that the State needs to finance its State Contribution through revenues or borrowing). In particular, if sufficient finance or competitive finance is not available to the State in the future, at any debt roll over date, the State is bearing the risks associated

with refinancing that debt (where it has made a State Contribution). This compares to Project co bearing that same (refinancing) risk where the debt is raised and refinanced by the private sector.

A practical example of this can be seen on the *Partnerships Victoria* in Schools (PViS) project. In this project the debt was highly geared and was raised at a time when costs were significantly lower. The project delivery company has been unable to refinance this project economically as a result of the higher costs of debt and reduced gearing requirements in the post GFC environment. Because the State does not hold any of this debt it is insulated from this risk on the PViS project.

More generally it is likely that in certain scenarios the market downturn risks borne by the State are higher where there is a State Contribution. For example, if the Project defaults and the State has invested some (or all) of its State Contribution, while the Project Agreement and the timing of the State Contribution, is designed to protect the State from the loss of value in its State Contribution it faces a small residual risk of a loss, not faced where the Project is fully privately financed. For example, if the project is terminated and has zero value, to any alternative investor or the State, the amount invested by the State may be at risk. Furthermore, a more tangible impact of the risks faced by the State having contributed capital is that the State will have invested in the project and may be more likely to engage with investors in the event of default to remedy the default. This could lead the State to taking some sponsor, as opposed to client, risk.

The issues at Ararat prison represent the first issues of that scale for a Victorian (and Australian) PPP project. There have been in excess of 50 Australian PPPs so Ararat represents a 'default' rate of 2%. If the State had made a State Contribution into that project it may have incurred a loss, depending on how each party was responsible for costs of rectification. Although in the E-W Project equity and private debt are expected to take the first loss position.

The systematic risk transferred has been reduced from 75% to 40% for market disruption reflecting the reduction in finance risk transferred and the higher risk of the State bearing a loss with a financial default.

# Revised discount rate for State Contribution

As a result the systematic risk premium is reduced according to the following revised calculation:

**Table 4 Summary of systematic risk allocation**

| Systematic Risk Type | Weighting (Scale 1 – 5) (Relative importance) | Estimated Portion of Systematic Risk Premium %[6] | Allocation to Private Sector (based on Step 1 analysis) | Systematic Risk Premium transferred to Private Sector % |
|---|---|---|---|---|
| Demand | 1.0 | 0.48 | 0% | 0.0 |
| Inflation | 3.0 | 1.44 | 90% | 1.30 |
| Downturn in broader market | 3.0 | 1.44 | **40%**[7] | 0.58 |
| Residual value | 0.0 | 0.0 | 0% | 0 |
| **Total** | **7.0** | **3.36** | **N/A** | **1.88** |

The rate for discounting the State Contribution is therefore 6.53% (4.65%+1.88%).

# Considering the impact of the different components of the State Contribution

The State Contribution is staged and the later payments made by the State will transfer more systematic risk than the earlier payments. In considering the above a balanced view was taken across the various components of the State Contribution and the full State Contribution structure has been considered in making the adjustments.

# Benchmarking the rate

The most comparable project to the Project is Peninsula Link, in that it is an availability payment PPP. The equivalent systematic risk premium for Peninsula Link was 2.49%, compared to 2.62%, above.

The E-W Link rate is considered prudent and reasonable in the light of the relative size of the construction spend and concentration of construction risk on this project, against which a higher discount rate could be considered appropriate. Furthermore, the tunnelling component includes significant spend on tunnel boring equipment which is exposed to exchange rate movements.

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[6] The calculation of the Estimated Portion of Systematic Risk Premium = each Systematic Risk Weighting in Column 1 divided by the total Systematic Risk Weightings in Column 1 multiplied by the Systematic Risk Premium (Asset beta of the Project (0.xx) multiplied by the Market Risk Premium (xx%)).

[7] Previously 75%

# Other considerations

## Updating the PPP Discount Rate

This PPP Discount Rate may need to be updated when the final bids are received, depending on the following:

- Risk transfer – if less or more systematic risk is accepted the State will need to consider whether an adjustment is required

- Differences in the treatment of inflation – Given that the operational component of the service fee is relatively small, adjustments for different inflation proposals (from different Short-Listed Respondents) in the service fee are expected to have a relatively minor impact on the treatment of inflation. However, some adjustment may be required.

# Appendix A: Comparable company beta analysis

| Beta analysis<br>Infrastructure construction companies | Country | Market Cap<br>(AUDm) | Asset beta |
|---|---|---|---|
| **Australia** | | | |
| Lend Lease Group | Australia | 4,992 | 1.14 |
| Cardno Limited | Australia | 920 | 0.99 |
| Leighton Holdings Limited | Australia | 5,477 | 1.46 |
| UGL Limited | Australia | 1,184 | 1.08 |
| Monadelphous Group Limited | Australia | 1,739 | 1.40 |
| Downer EDI Limited | Australia | 1,812 | 1.16 |
| Clough Limited | Australia | 1,104 | 1.33 |
| NRW Holdings Limited | Australia | 318 | 2.13 |
| MacMahon Holdings Ltd. | Australia | 207 | 1.58 |
| Sedgman Limited | Australia | 148 | 1.95 |
| Forge Group Limited | Australia | 434 | 1.99 |
| AJ Lucas Group Limited | Australia | 424 | 0.81 |
| Watpac Ltd. | Australia | 96 | 1.26 |
| **Australia average** | | 1,450 | **1.41** |
| **Australia median** | | 920 | **1.33** |
| **Australia average (Lend Lease, Cardno)** | | | **1.07** |
| **Europe** | | | |
| Skanska AB (publ) | Sweden | 8,642 | 1.01 |
| Colas SA | France | 5,306 | 0.84 |
| Hochtief AG | Germany | 6,069 | 1.10 |
| VINCI S.A. | France | 33,640 | 0.65 |
| ACS - Actividades de Construcción y Servicios, S.A. | Spain | 9,897 | 0.41 |
| Ferrovial, S.A. | Spain | 14,087 | 0.32 |
| Bouygues SA | France | 11,162 | 0.74 |
| **Europe average** | | 12,686 | **0.72** |
| **Europe average (construction only)[1]** | | 6,672 | **0.98** |
| **Europe average (construction/operation)[1]** | | 17,197 | **0.53** |

(1) VINCI, ACS and Ferrovial are involved in construction as well as the operation of infrastructure concessions and Bouygues has a large telecommunications business. They are therefore not 'pure play' construction companies which explains their lower betas relative to Skaska, Colas and Hochtief.

| Beta analysis<br>Gas pipeline and water companies | Country | Market Cap<br>(AUDm) | Asset beta |
|---|---|---|---|
| **Gas distribution** | | | |
| APA Group | Australia | 5,006 | 0.37 |
| DUET Group | Australia | 2,532 | 0.20 |
| Envestra Limited | Australia | 2,048 | 0.26 |
| Vector Limited | New Zealand | 2,354 | 0.27 |
| National Grid plc | United Kingdom | 46,699 | 0.24 |
| Northwest Natural Gas Company | United States | 1,257 | 0.30 |
| Atmos Energy Corporation | United States | 4,270 | 0.36 |
| Snam S.p.A. | Italy | 17,488 | 0.29 |
| **Water distribution and services** | | | |
| Artesian Resources Corp. | United States | 215 | 0.34 |
| Middlesex Water Co. | United States | 367 | 0.39 |
| Aqua America Inc. | United States | 4,871 | 0.30 |
| Pennon Group Plc | United Kingdom | 4,187 | 0.33 |
| United Utilities Group PLC | United Kingdom | 8,167 | 0.24 |
| **Average** | | 7,651 | **0.30** |
| **Median** | | 4,187 | **0.30** |

| Beta analysis<br>PPP infrastructure funds | Country | Market Cap<br>(AUDm) | Asset beta |
|---|---|---|---|
| Bilfinger Berger Global Infrastructure SICAV S.A. | Belgium | 587 | 0.29 |
| HICL Infrastructure Company Limited | UK | 2,651 | 0.20 |
| John Laing Infrastructure Fund Ltd. | UK | 1,115 | 0.39 |
| **Average** | | 1,451 | **0.29** |
| **Median** | | 1,115 | **0.29** |

*Source: CapitalIQ*

# Appendix B: Construction beta discussion

## Overview of construction company asset betas

When considering using the betas of listed construction companies as a proxy for the systematic risk of a single infrastructure construction project, it is important to consider the following points:

- The major systematic risks faced by construction companies relates to the impact of a downturn (or uptick) in the overall economy and how this will impact future demand for construction services, and in turn, the future profitability of the company. The value (and therefore share price) of construction companies will reflect both the ability to deliver current construction projects in a profitable manner, but much more importantly the ability to win future construction contracts in both the short and very long term (i.e. the future success of the business). This is a function of both the number of construction contracts available in the market and the ability of the company to compete for these.

  Given the high correlation between general economic activity and construction activity, this would explain the relatively high observed betas for construction companies (typically north of 1.00). This is an important consideration given that the systematic risk of a single infrastructure project should relate only to the delivery of that individual construction project (e.g. inflation pressure on costs, insolvency of sub-contractors) rather than the risks associated with the ability to win future construction contracts. Therefore using an unadjusted construction company beta as a proxy will significantly overstate the systematic risk of a single infrastructure construction project.

- In an Australian context, a large proportion of construction companies have significant exposure to the mining sector either directly through the provision of engineering, mining services and mine construction projects, or indirectly through the construction of major mining support infrastructure (e.g. rail, port). For example, approximately 37% of Leighton Holdings portfolio is for mining contract services and 40% for economic infrastructure which includes a large proportion of mining support infrastructure. Therefore well over half of Leighton's portfolio is either directly or indirectly linked to the mining sector.

  As the Australian economy and share market is highly correlated to commodity prices and activity within the Australian mining sector (more so than any other industry), Australian construction companies with significant mining exposure are likely to be also very highly correlated to the market and display betas higher than their international counterparts. Additionally, given the volatility in commodity prices and share market in Australia over the last 5 years, this will have had further impact on observed betas for construction companies.

## Recommended Approach

In consideration of these two important points, in estimating the systematic risk of a single infrastructure project using construction companies as a proxy, the following steps should be undertaken:

- As a starting point, a greater emphasis should be placed on observed betas of Australian construction companies with no major exposure (direct or indirect) to the mining industry (e.g. Lend Lease).

  Given almost all major Australian construction companies are subject to volatility in the mining sector, it is recommended that a strong emphasis should also be placed on regions outside of Australia whose construction industries are not so heavily reliant on a single and volatile sector. A number of European construction companies are primarily focused on general infrastructure construction and

are considered better proxies as a starting point. When considering these, appropriate betas averaging 1.00 can be observed (compared to almost 1.40 for a range of Australian construction companies exposed to the mining sector).

- The second step is to adjust the construction beta to 'strip out' the systematic risk that relates to factors other than just the delivery of a single infrastructure project (e.g. winning future contracts). Given it is not possible to observe in the market the systematic risk related to a single infrastructure construction project, these adjustments must be made using some form of a risk/value allocation methodology.

The approach used to make the above adjustments, as well as allocating risk between the State and private sector is shown diagrammatically as follows: