

Transport for London's Review of

PricewaterhouseCoopers' Analysis of

“London Underground:
Bond Financing Versus the PPP”
Dated 6 December 1999

23 November 2001

In 6 December of 1999 PricewaterhouseCoopers (“PwC”) published a summarised form of analysis between the proposed Public Private Partnership (“PPP”) and a hypothesised Public Sector Comparator (“PSC”) (Attachment 1.). The intent of the analysis was to show “how the efficiency savings achieved under the PPP are expected to outweigh any higher financing costs from private sector investment.” The analysis concludes that over 15 years the public sector alternative would end up costing £4.5 billion more than the same work performed by the private sector.

Since then, the PwC analysis has served as the foundation of the statement that the private sector will provide £13 billion (actually £12.5 billion) of investment in the Underground and has since been cited as a “clear steer” on the financial merits of PPP by the Deputy Prime Minister.

In reviewing the PwC note, the authors have formed the firm view that there are two major areas of concern with the PwC analysis:

1. It employs a valuation methodology that does not appear to conform to standard project evaluation techniques, nor to the methodology PwC and the London Underground are now using for value for money calculations on live bids. The presentation of this as a valid basis for the calculations is therefore misleading.
2. Its statement that a PPP would produce £4.5 billion in savings cannot be justified under a standard value for money calculation (much less is it supported from the backing schedules of the 1999 note); the claim vanishes when viewed against the first 7.5 year period, the only fixed-cost period within the PPP contract.

Based on our review TfL has reached the following specific conclusions:

As of 23 October, value for money analyses performed by LUL and PwC on the live bids for the Underground’s infracos have failed to show clear savings over the publicly funded and managed alternative. At best, and only after taking advantage of questionable assumptions, the “best” PPP bids are in the same range as the PSC. LUL has not come forward with any statement to indicate that they expect to see reductions in the current bids; in fact recent disclosures suggest that ongoing negotiations with preferred bidders are resulting in increasing risk being retained by LUL which should further erode any supposed margin between the bids and the PSC. It is overwhelmingly clear that the £4.5 billion in savings offered to Parliament are nothing more than a chimera; these originally projected savings which formed the basis for going ahead with PPP have proven to be entirely illusory.

- The authors have learned that the first 7.5 years of the PPP contracts are the only period for which the prices offered by bidders are fixed. Once this period in the 1999 PwC report

is restated to provide for an annual financing program and terms equivalent to the PPP VFM analysis, *the grant required by the public sector alternative averages £9 million per year less than the private PPP alternative.*

Table 1.

Comparison of Subsidy Differential across the First 7.5 Years

Implied Subsidy (£'s millions)	Public Sector London Underground	Public/Private Partnership	Difference
Year			
1	£24.7	£37.3	£12.6
Total investment and financing costs, restated into 7.5 year cash flows	60.7	79.2	18.5
2	94.7	115.6	20.8
3	124.0	143.8	19.8
4	151.2	161.9	10.8
5	181.1	181.7	0.6
6	216.1	208.2	-7.9
7	119.7	112.2	-7.5
7.5			
Total	£972.2	£1,039.9	£67.7
Annual Average	£129.6	£138.7	£9.0

- Recent revelations by one of the preferred bidding consortia regarding subsidies for the PPP indicate that the levels of required government grant – funded by the taxpayers – are likely to be at least four to seven times higher than levels suggested to Parliament in 1999.
- Accepting the 1999 PwC analysis as shown indicates that the private-sector funding of £12.5 billion of investment over the first 15 years of the PPP will be met by £12.1 billion of fares from passengers and government grants, or 96% of the total spending. When the full weight of financing costs to the PPP are taken into account¹, total public funding would have to rise to £12.3 billion, or 98% of the funding for the period.
- It appears that the analysis employed by PwC in 1999 did not use the same value for money methodology that LUL will apply as part of any decision to go forward with the PPP. Specifically, the analysis ignores the time value of money to the Treasury and it has the effect of reversing the benefits of lower-cost public-sector borrowing
- Employing present value analysis on the investment and resulting financing costs, as now apparently intended by LUL in its value for money analysis, the infrastructure spending gap narrows to £633 million, less than one seventh of the £4.5 billion gap cited by the PwC analysis (see table 2, below). Within this narrower range, even with anticipated savings (which have not appeared within actual bids and are based entirely on questionable adjustments), the case presented in the PwC note for the PPP is much more susceptible to small changes in assumptions in efficiencies, even to the discount rates employed on the resulting cash flows.

¹ For reasons that are unclear, repayments of principal do not appear in the PwC analysis, as indicated by the heading “Interest costs, net of repayment” in table 5 of the 1999 report. Given assumptions in the note, these amounts may be estimated at approximately £240 million real over the 15 year period of the report.

Table 2.

Comparison of Funding Differential, 15 Years

(£'s billions)

	Public Sector London Underground	Public/Private Partnership	Difference	%
6 December 1999 PricewaterhouseCoopers analysis	£19.0	£14.5	£4.5	31.0%
Investment and financing costs, restated into value for money format	£9.1	£8.4	£0.633	7.5%

The percentage level of savings appears, in present value terms, to be one fourth of the percentage cost differential calculated in the PwC note and cited by Ministers in support of the PPP.

- When the value for money analysis is repeated for 7.5 years, (see table 3 below), the only fixed period of the bids for the public sector alternative, the comparison shows a difference of £40 million. Again, this narrow difference is based on questionable adjustments and not on a comparison of actual costs projected in the PPP and public sector alternatives. To date, this comparison favours the public sector alternative in all cases. Even based on LUL’s current value for money methodology, there is no significant margin in costs in the public and private alternatives for investment.

Table 3.

Comparison of Funding Differential across the First 7.5 Years

(£'s billions)

	Public Sector London Underground	Public/Private Partnership	Difference	%
6 December 1999 PricewaterhouseCoopers Analysis	£19.0	£14.5	£4.5	31.0%
Total investment and financing costs, restated into 7.5 year cash flows and fixed amounts	£5.3	£5.3	£0.040	0.8%

Background

The PwC note has been cited by Ministers as an indicative comparison of PPP and public approaches; but no savings have appeared in the live bids

PwC’s work was presented as a seminal piece in support of the PPP and was submitted to the Library of the House of Commons by the Deputy Prime Minister. The Deputy Prime Minister stated before the House of Commons:

“The PricewaterhouseCoopers document informs the debate and gives a clear steer that the PPP is the right choice. It would save £4.5 billion, which could be spent on education, health, and other priority needs.²”

Keith Hill, the Minister for London, echoed the relevance of the study:

“I remind the House of the conclusions of the most recently commissioned independent report on the PPP. Despite frequent claims to the contrary, the report found that the PPP would not double the cost of borrowing, but would lead to improvements in efficiency in the order of 20 to 30 per cent, generating massive efficiencies in the tube investment programme over 15 years³.”

Since then, TfL with its consultants Deloitte & Touche have reviewed the two deep line procurements within the PPP and that of the Sub-Surface Lines⁴. TfL believes that once the problematic assumptions cited by Deloitte & Touche are corrected, like the dismissal of the value of lower costs public funding (openly addressed in the PwC 1999 note), all three procurements will fail to prove value for money.

One could, for the sake of argument, put aside any questions regarding the £2.5 billion of adjustments, which have pushed up the cost of the public sector comparator being used for the procurement. But even in this case the actual bids show no significant difference in cost to the public sector alternative. It is therefore now clear that the potential savings of £4.5 billion presented to Parliament, based on numbers still apparently used in defence of the PPP, appear to have been calculated and relied upon without any valid basis.

Subsidy levels are now four to seven times the levels indicated to Parliament

Beyond presenting a preview of the anticipated results of the procurement that is currently unfolding, the PwC report aimed to provide an insight into the levels of Government subsidy necessary to support the PPP. The implicit level of subsidy is explained in paragraph 4 of the PwC report as being the difference between the funding requirement and internally generated cash flow:

² Hansard, 8 December 1999, Column 846

³ Hansard, 8 December 1999, Column 929

⁴ See “Transport for London, London Underground Public Private Partnership, Emerging Findings, 17 July 2001”; Deloitte & Touche Corporate Finance. Available on TfL website www.transportforlondon.gov.uk.

Table 4 [of the PwC report – attachment 1] shows the difference between the projected level of internally generated funds and the plans for spending on the infrastructure.... It shows a large funding requirement of £5.5 billion in the first 15 years. Under the present arrangements this difference would need to be met by grant from the Government.

This paragraph refers to the levels of grant required by a public enterprise with no financing—the same year-to-year grant financing regime that exists today. This “funding requirement”, whether produced by principal and interest payments of bond financing, ISC payments, or left as current-year cash payments, is the anticipated level of government grant in each scenario.

Recent statements by Tubelines, one of the bidding consortia, indicate that the level of subsidy required will be approximately £620 million⁵ per year for the first seven years of the contract. Other reports place this figure as high as £1.0 billion per year. These figures range from four-and-a-half to seven times the average nominal subsidy levels implied by the investment levels presented to Parliament in 1999, and represented above in table 3.

Statements about £13 billion of private funding are unsupported and are inconsistent with the incontrovertible facts that 1) the public sector could provide a financing benefit for any amounts it or a private sector manager raises, and 2) the PPP requires no commitment of the bidders to make any level levels of investment.

At the time of the report and at numerous points since, the Government has stated that the private sector will “unlock” £13 billion in funding for the Underground. This has often been misinterpreted by commentators to mean that the private sector is going to bring cash to the table, which would not have any burden on the taxpayer or which would otherwise be unavailable for investment. Of course this is entirely wrong. The best case for PPP is that it may “unlock” private finance for the Underground all of which will be repaid with handsome returns by the public sector. What TfL contends is that Government bond funding can provide the same or more funding for rebuilding the Tube at lower costs to the tax-payer than would higher cost PPP schemes.

The real test of any plan is how large the public obligation will be for fares and tax-supported grants, without regard to whether these funds are channelled through public or private investment vehicles. The PwC analysis shows a PPP scenario in which public funds will pay £12.3 billion⁶ in real terms against a projected £12.5 billion of investment costs over the first 15 years of the contract.

What does not appear in the note and backing tables is that from year 16 through 30 the fares and grants from Government will pay a substantially greater amount than the subsequent infrastructure investment, making total public payments for infrastructure substantially greater than the total investment costs. This excess of payments over infrastructure costs will

⁵ August 02 2001 “Tube improvements will struggle to run on time”, Ben Webster, The Times, referring to a statement by Ian Coucher, Chief Executive of Tubelines.

⁶ PwC analysis. Sum of “Operating Cashflow”, £10,090 table 7; “Interest and dividends cost net of repayment”, £1,970 table 8; and estimate of principal repayments over the 15-year period, £240m.

be the long-term and compounded payment of returns on debt (which will occur under both public and private structures) and equity, raised and borrowed on the promise of full repayment by the travelling and tax-paying public.

Technical Review of the PwC Analysis

The note presented to Parliament does not conform to the value for money analysis that will be employed to determine the approval of PPP; when conventionally accepted value for money techniques are applied, the investment figures in the 1999 PwC note show no significant difference between public and private alternatives over the only contractually defined, fixed-priced period of the contract.

The presentation and basis of calculation within the 1999 PwC report does not represent the time value, or “present value” of the private and public alternatives. Present value is the common financial calculation used to measure the economic weighting between financial alternatives.

When the public and private investment plans are considered in this way, the posited difference in construction costs between the public and private alternatives narrows to £633 million, less than one seventh of the £4.5 billion headline figure in the PwC analysis. Once the difference between public and private costs falls to such a narrow range, the balance between public and private plans becomes particularly susceptible to assumptions regarding efficiencies and discount rates on future cashflows. Net present values that are so close should have indicated cause to pause, rather than the “clear steer” argued before Parliament. This concern is driven home by the fact that the nominal cash outlays over the first 7.5 years – the only firm pricing period of the contracts – are lower for the public sector alternative than that posited for the private sector alternative.

PwC analysis presents an erroneous dynamic regarding public borrowing

Contrary to the thrust of the PwC commentary in the 1999 note, the lower financing cost of public funding provides a savings against any posited levels of “bricks and mortar” infrastructure spending.

While the calculations of this effect on multi-year financing plans may require a spreadsheet, all businesses and most consumers recognise its broad effect in their largest purchases. For example, a lower rate mortgage mitigates the cost of buying a more “expensive” house. Contrary to the view put forward in the 1999 note, the house-hunter knows that borrowing low costs funds money is better than spending his or her own funds, and certainly better than taking out a more expensive mortgage. It literally produces more house *value* for repayment *money*. This effect *increases* the more borrowing is involved.

The 1999 PwC analysis, however, argues that public borrowing, while at a lower cost, actually widens the spending differential on investment:

“Because of the higher efficiency savings achievable under a PPP, the Private sector should need to raise less finance than under a public bond issue. The incremental cost of the finance under a PPP can be estimated as the difference between the cost of servicing a public sector bond – about £3.5 billion...and the private sector servicing cost of about £2.0 billion.⁷”

Summary of PwC Analysis and Methodology of Conversion to Value for Money Format

As its basis for comparison, the PwC analysis uses “real” cash flows, which state all future payments in 1999 pounds. This is done to remove the impact of inflation, but is one step removed from full economic weighting. PwC’s calculations do not employ present value analysis, the model that LUL will use (as the NAO requires⁸) for any value for money decision.

The 1999 PwC note also does not include the calculations behind its financing costs, and as such these costs do not appear to be reconcilable between the summary page of the note and its backing tables⁹. As mentioned above, a specific shortcoming of the analysis is that it appears that principal payments of both public and private financing are not included in the backing schedules of the note. While they are mentioned in the cover summary as the par value of the real amounts that would have to be raised for both public and private alternatives, there is no schedule representing their cash payments when they come due. Their burden cannot be evaluated nor confirmed within the 15-year window offered for analysis in the note.

It is a simple matter, however, to reconstruct both public and private financing plans—including a proper weighting of all financing cash flows—from the information contained in the note. As with any infrastructure project, the key ingredients are the amounts to be raised, the timing of such amounts, and the interest rates anticipated for such amounts. All components have been listed, and permit the creation of a present value or “value for money” analysis.

PwC begins its analysis with a baseline infrastructure and maintenance plan for the public sector of £16.5 billion over 15 years. Against these costs, it posits a level of efficiencies from stable funding. The analysis then factors hypothetical further benefits of 1) lower-cost public borrowing and, alternatively, 2) private sector cost reductions through the control of investment.

Stable funding regimes helps both public and private programs by reducing their costs by £1.0 billion. The private plan is hypothesised to have further savings of £3 billion, or approximately 19% from cost controls and other efficiencies in its investments.

⁷ PwC analysis, page 6, paragraph 13.

⁸ The Financial Analysis for the London Underground Public Private Partnerships, 15 December 2000, p. 7.

⁹ For example, it is not clear from the 1999 note why the “Interest and Dividends cost net of repayment” rises from £100 to £140 between years 2 and 3 of the Private Sector financing plan, only to fall back to £110 in year 4.

The report implies, at least in the opening sentence of its summary, that the lower cost of public borrowing should provide some compensation against an assumed inefficiency in delivery of the assets. One would therefore expect that this £3.0 billion gap in asset spending would *decrease* as a result of cheaper financing. PwC’s analysis, however, shows the difference between public and private cases increasing by £1.5 billion, specifically attributable to the lower cost public debt.

The stated increase was explained as follows: “Because of the lower financing requirement, financing costs are also lower under the PPP, giving a total net difference of £4.5 billion.”

Part of the difficulty of reconciling this outcome against standard fixed-income theory may be that the authors of the 1999 note failed to account for the fact that, even when expressed in real terms, the principal payments of any amounts raised would have to be reduced by some deflator. For example, while interest on the bonds would appear every year as their “real” weight (which the PwC note appears to show), the specific principal component of a £100 million bullet bond maturing in ten years would appear as £74.4 million on a spreadsheet of financing cash flows at today’s prices¹⁰. Yet the PwC note appears to omit the principal amounts in the backing schedule. Instead it carries the principal components of debt on the cover page of the note at their full, undeflated value at time of issuance, and the adds to this the real cost of interest and dividends. The methodology may therefore be double counting some portion of financing costs, causing an inappropriate amplifying effect on the differential between public and private alternatives.

This note attempts to resolve this problematic outcome in the PwC analysis by employing present value analysis of the total cash flows that can be derived from the investment plans and financing rates included in the note. It is the authors’ understanding that present value analysis is the approach that LUL and PwC will use for any value of money calculation related to the actual PPP contracts. On this basis, we investigated how the “real” figures in the 6 December note could be restated in a present value format, so that the effect of lower borrowing rates on the public sector alternative could be measured in a way consistent with the analysis of the bids.

¹⁰ Assuming a 3% real deflator to maintain cash flows in current prices.

Restating the investment plans into value for money calculations

The PwC analysis can be restated by inflating the real operating and investment cash flows by 3% per year so that they become nominal. A nominal discount rate for these costs was approximated at 9%, by adding the 6% real rate of the note to an assumed 3% inflator¹¹. Attachment 2 shows these calculations for 15 and 7.5 year scenarios. To not bias against the private alternative by forcing a higher near-term burden of amortization, all financing cash flows for each annual financing are expressed as 30-year, level-payment functions from their respective dates of issuance. This assumes that the long-term amortization of private sector capital costs would remain commensurate with the useful lives of the financed assets, and would be assumed by any private or public successor infrastructure provider.

Both the operating cash flows (representing internal funds) and financing cash flows (representing TfL subsidy requirements under each scenario) were then discounted back to year one prices by applying the market financing rates, which are stated in the PwC note. In this way the public and private alternatives could be measured by their present value or the properly weighted economic burden to the public sector.

First, we can compare the present value of the total infrastructure costs for the two 15-year plans. The public-sector investment costs are £9.8 billion, the private-sector £8.0 billion. The differential is £1.8 billion present value, as opposed to the £3.0 billion real differential as presented to Parliament¹².

Consistent with this author’s earlier contention that lower borrowing rates reduce costs for any level of borrowing, the lower public financing costs shrinks this £1.8 billion present value gap between public and private alternatives. When the full payments (including principal, which appears not to be included in the backing PwC schedules) of the public and private financing are projected for 30-year terms¹³ and then discounted back at 9.0% the lower cost of the public borrowing reduces the overall gap to £632 million.

The total present value of the Public sector alternative within PwC’s analysis is now £9.1 billion over the first 15 years, and the private sector model is £8.4 billion. The differential means that with the proportionate levels of efficiency posited for the private model, its advantage is just less than 1/7 of the differential that appears in the real-cash-flow calculations, and only one-fourth of the proportionate difference in plan costs as presented to Parliament.

This analysis was repeated for the first 7.5-year period of the proposed PPP contract, which covers the only term of the contract for which the bidders are committed to either fixed prices or the clear obligation to raise finance.

¹¹ This is a simplifying assumption, instead of working with the compounded figures of 3% and 6%, which result in a rate of 9.18%.

¹² Cover page of PwC note, “Investment requirement after efficiencies”, public sector £15.5 billion and private £12.5 billion.

¹³ For ease of analysis, we assumed that level annual financing would match to 30-year asset lives. Any repayments beyond the end of the PPP contract were assumed by the public sector or successor entity at year 30.