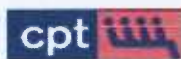


## Support to UKTram Activity 8 Work Group “Commercial Structure”



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## **Executive Summary**

On the 28th April 2004 the National Audit Office (NAO) published its report; 'Improving Public transport in England through Light Rail'. This report examined the Department for Transport's role and work in funding the construction of light rail systems to improve public transport in England. The NAO examined whether systems were delivering sustainable benefits at the expected costs and the barriers to further development of light rail and how these might be overcome.

As part of the consideration of the barriers to the further development of light rail in the UK, the NAO commented that the cost of light rail schemes is the most significant factor discouraging their further development. In order to mitigate this barrier to further development, the NAO commented that the following issues needed to be addressed.

1. Lack of standardisation in systems design drives up costs;
2. Costs are also inflated by applying heavy rail standards to light rail;
3. The diversion of utilities is expensive; and
4. There are barriers to the development and adoption of new and cheaper technologies.

This report therefore is part of those activities. The report examined recent procurement routes in the tramway industry and why it has not created a value for money market responses and the UK experience of scheme developments has highlighted the challenges of systems integration. The report also identified common themes across the tram industry and assessing the relative merits of different approaches to procurement and systems integration risk.

The report further identified lessons on when structuring contractual relationships to avoid previous perceived problems, and a lack of appreciation of the law of unintended perverse consequences.

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## **2. Activity Team Members:**

### **Activity Team Leader - David Humphrey - Transdev**

Robert Lewin - Investec  
Nick Joyce - DfT  
Ian Kendall  
John Harris - Innisfree  
Howard Smith - TfL  
Geoff Inskip - Centro  
Peter Clark  
Keiran Preston - WYPTE  
Chris Deas - NET  
Stuart Rushton  
Dan Phillips  
Alastair Shields  
Will Mc Williams - Grant Thornton  
Chris Chatfield - Centro

## **3. Consultant(s) engaged on this activity:**

None - all work completed on a contributions-in-kind basis.

## **4. (1) Description of Problem/Background to Work stream**

Procurement methods for recent UK tram projects have not resulted in value for money or affordable bidders' responses from bidders. Particular concerns have included:

- A variety of factors that lead to inflated project development costs;
- Concern over appropriate treatment of the systems integration and completion risks; and
- Market acceptance of the farebox revenue risk. And more general allocation of wider risks (statutory undertakers, planning, interfaces)

Recognising these issues, procurement teams have adopted different procurement models to seek to mitigate risk before assigning it to those most able to address it and reduce project costs.

The purpose of the study was to review and analyse different procurement methods with the objective of identifying fundamental (as opposed to project specific) commercial drivers for an optimum procurement strategy. It was accepted that due to the differences between projects (both commercial and physical) a 'one size fits all' approach would not be appropriate to procurement methods, but identifying best practice would allow the planners of projects to take into account past lessons in tailoring their approach to procurement.



## 5. Elements of Study

A one-day workshop to review and discuss current and proposed procurement models was arranged, bringing together public sector promoters, private sector contractors, operators and investors.

The workshop considered four representative **sample projects** and covered the principal **building blocks** of the procurement strategy.

### Sample Projects

The promoters of four projects were invited to review the procurement model adopted, including reasons for choice of model and key lessons learned. To ensure that all topics are covered, each model concentrated on certain specified, relevant building blocks. The four projects and models were:

- (i) early operator involvement : Edinburgh
- (ii) early developer involvement : Nottingham
- (iii) separation of operation from infrastructure provision : DLR or Centro
- (iv) public procurement : Merseytram

### Building Blocks

Key building blocks considered at the workshop were:

- (i) influence of TWA Public Inquiry process on project costs;
- (ii) land acquisition timing and responsibility;
- (iii) design risk allocation and, if appropriate, timing and method of passing to contractors/suppliers;
- (iv) combination or separation of contractor/operator/supplier activities and timing of introduction;
- (v) completion risk, including allocation and management of systems integration risk;
- (vi) public sector third party interfaces (highways authorities, planning authorities), including treatment of betterment aspirations;
- (vii) other third party interfaces (Network Rail, utilities, etc);
- (viii) case for private finance : grant versus availability payments; use of net farebox revenues to raise finance in the public or private sectors; and
- (ix) project extensions.

## **6. Expected Benefits from Study:**

The identification and collation of best practice for UK tram projects for circulation amongst UKTram constituent bodies so as to avoid unnecessary project costs; reduce the risk element included by bidders in their prices; promote faster procurement; and stimulate stronger competition for more clearly defined projects with more helpful/transparent approach to risk and more standardised approach to contract structures/form of contract. (Complementary to DfT Light rail guidance paper)

## **7. Actual Output of Study (including current status with each Phase)**

### **Key issues addressed**

#### **7.1 Design risk**

- This topic considers the allocation of design risk and, if appropriate, the timing, method and cost effectiveness of passing this risk from the promoter (public sector) to private concessionaires or contractors/suppliers.
- As for “traditional” DBFO projects such as hospitals or schools, the public sector issues an output/performance specification and ultimate design responsibility rests with the private sector - usually a consortium - awarded the concession.
- With tram schemes however, the level of design carried out by the public sector ahead of, or in parallel to, scheme procurement needs to be greater for a variety of reasons, including:
  - To satisfy the requirements of statutory processes e.g. TWO;
  - To aid consultation on the scheme’s likely impact with both the wider public and other public and private organisations.
  - To ensure compliance with statute – e.g. Traffic Management Act
  - To ensure that cost estimates are robust, particularly when funding is likely to be ‘capped’ on the basis of pre-tender estimates submitted.
- Despite such upfront design reducing bidders’ own design costs and also possibly risk premia, the complexity of tram scheme development dictates that bidders are required to incur substantial design costs during the procurement process, negatively affecting market appetite for tram schemes in comparison to simpler assets.
- Several scheme promoters have recognised this and procured a greater level of scheme design in-house before procurement has started. This approach also strengthens the robustness of the scheme’s cost estimate but at the expense of higher Promoter sunk costs.

- Taken to its extreme, it is possible for promoters to procure substantially all design aspects in-house and novate the solution to an SPV to construct, albeit having allowed bidders the opportunity to engage with the promoter's design team throughout the procurement phase and possibly "take Ownership" of the preliminary designs prepared. Creating a greater degree of certainty over the final physical form of the tram system will allow bidders to price the works with a greater level of confidence, reducing the potential for cost contingencies being included.
- (This presumes a PFI with an SPV. The extreme is the promoter takes the design risk and procures a traditional construction contract under a BoQ surely –most major schemes can allow for contractors to submit variant bids where they can offer savings)
- The level of bidder engagement and influence of competitive pressure between bidders may however affect the degree to which individual bidders are prepared to put forward innovative design and construction practices.
- Ultimate design responsibility under this approach is retained by the private sector as before, although issues which this approach raises are:
  - the impact this would have on the degree of cost or time saving the scheme's contractor is able to bring at such a late stage;
  - the willingness of an SPV to accept the promoter's design as if it were his own and;
  - the ultimate legal recourse an SPV has to the designer if the design were found to be deficient.

## **8 Single concession or separation of activities**

- To date, most tramways have been procured under a single concession contract entered into with multi-disciplinary consortia; typically comprising civil contractors, E&M and rolling stock suppliers, operators and investors. The principal reasons for this approach are:
  - Single point responsibility and minimal risk interfaces for the public sector promoter
  - Opportunity / incentive for concessionaire to consider whole-life costing of all inputs
  - Full funder due diligence on all aspects (assuming a private finance model)
  - Bidders resolve contractor/operator interface

However, more recently, promoters have identified significant disadvantages including;

- Single contracts require the disparate parties in the consortium to take responsibility for risks with which they may be unfamiliar, in particular the contractor - operator interface is particularly difficult to resolve. This results in bidders including large contingencies within their prices for taking the risks. In addition some bidders have withdrawn from the market due to an unwillingness to take some of the unfamiliar risks.
- The Consortia tend to be dominated by civil contractors and suppliers, whose main interest is likely to be short term (i.e. construction only). The influence of the operator on the concession may be very limited.

- Self selecting consortia may result in a mixture of companies which are both good and bad from the procurer's prospective.

Accordingly greater focus is now being given on the separation of activities, akin to the model first developed for the DLR. Various models may be considered, including;

- Separate procurement of the main contract packages, followed by a "shotgun wedding" of the parties to create a single entity.
- Separation of the delivery of the infrastructure from operation, and possibly also the rolling stock, with the infrastructure provider either being paid directly against milestones or an availability payment structure.
- Short or long term operating contracts, with the operator bearing all or only a part of the revenue risk.

The main advantages of the separation of activities are considered to be;

- Allows the public sector to select separately the "best" (ie most suitable or economically advantageous) infrastructure provider and the "best" operator
- Potentially allows earlier operator involvement (enabling the future operator to contribute to the design of the system, to improve operability, alignment design, system simplicity, commercial success, and value engineering from an operational perspective).
- Through decoupling provision of the infrastructure from the revenue risk, creates a financing model based largely on system performance and availability, more similar to mainstream PPP projects (although this decoupling was achieved in Nottingham and subsequent PFIs, in which infrastructure provision was not linked to revenue risk at all).
- Design parameters set for an actual vehicle and the rest of the E&M package (especially the DKE) are fixed before the infrastructure provision is priced. However even with a specific vehicle in prospect, it is always advisable to design infrastructure for a range or "envelope" of possible vehicle parameters to avoid future vehicle procurement restrictions.
- Removing interface risks for the private sector should reduce cost
- Network expansion should be easier (no need for early termination of the Infrastructure provider, more easily allowing phased development).
- Should be able to achieve cheaper and longer term finance for the provision of the infrastructure

Main challenges with the separation of activities approach are;

- Creates a significant contractor/operator interface which the public sector may need to backstop (see below)
- Balance sheet treatment of the structure for the promoter



- Where it is anticipated that projects will produce a significant operating surplus against which funding could be raised, such funding could be raised by either the operators or the promoters depending on the contractual structure governing their relationship. Where the amount of funding is significant, operators may have only limited ability to provide the necessary equity (and may need revenue risk support to raise bank debt), probably requiring promoters to raise the funding themselves through use of their prudential borrowing powers.
- Willingness of local authorities to take this risk needs to be determined
- It decouples operation and maintenance which in at least two tramways where it has been tried has proved that the residual risk to the public sector is in fact significant and also that whole life care of the assets (an assumed side effect) has been illusory. The benefits of a vertically integrated tramway are neither well understood nor acknowledged
- The completion risk is still just as large for the infrastructure provider to the extent that private finance is involved

## 9 Completion risk

- This topic considers the significance of this risk and the ability of the public and private parties to best manage the risk in a cost effective manner under different procurement models.
- Completion risk is the risk that the “as constructed” tram system fails to be successfully commissioned as it cannot deliver the promoters’ stated requirements. This risk can arise from a variety of sources, although typically would result from deficiencies in the design, construction, and integration management or commissioning of the system. It is less prevalent in “closed” LRT systems than in urban tramway systems. With tramways there are far closer interfaces with all manner of third parties, who can either have an effect upon tramway operation (road traffic, pedestrians, junction management, etc.), or be affected by tramway operation (access to properties, noise and vibration in properties in the street, etc.).
- The primary mitigating measures are: robust project management and careful system integration engineering design.
- To date, the public sector has limited its exposure to meeting any rectification costs associated with a failure to physically complete and successfully commission the tram system by passing the risk to the private sector, typically under either a D&B or a DBFO contracting structure. Additionally, certain LRT schemes by their segregated or closed nature have fewer conflicting or complex design parameters and less propensity to affect or be affected by others as intimately as tramways have.
- Under a DBFO approach however, where private construction finance has to be repaid by farebox revenue and/or availability payments which are only available following successful completion, this risk is heightened. Furthermore, whilst all members of an SPV contribute at various levels to the successful commissioning of a tram system, each will have a different risk appetite that ultimately influences the premium each charges for sharing this risk as would the risk-sharing structure of any SPV consortium

- For example, a civils contractor would wish to earn a substantial portion of its total return through construction-period payments, and limit its liability to construction defects only. By contrast, the tram operator earns its return over the long-term and would wish to limit its risk exposure to the “as constructed” system’s not being able to provide the required service.
- And whilst the use of construction milestone payments by a scheme’s promoter reduces the cost of borrowing by SPVs under a DBFO approach and incentivises the delivery of services rather than assets, linking the final milestone payment to the SPV demonstrating a period of successful running exacerbates the financial risk the SPV faces in this critical post-commissioning phase. This is because the SPV would already be at risk from losing farebox revenue and/or incurring performance deductions against an availability payment if it failed to deliver the output specification. Under a D&B approach, the contractor would similarly be at risk of not receiving full payment and/or suffering performance deductions if the system fails to provide the service required. A contractual balance therefore has to be struck which incentivises the SPV to meet the project objectives of the promoter without burdening either party with disproportionate or unacceptable/unaffordable risk.
- Certain tram promoters have sufficient in-house experience in designing appropriate commissioning tests at both the sub-system and system levels that provide a clear and unambiguous commissioning process that gives bidders confidence but also ultimately ensures that promoters’ objectives are met.
- Certain promoters have recognised the added costs a DBFO approach brings to securing successful commissioning in UK schemes to date, and the residual risk they ultimately retain as scheme promoters, and proposed alternative contracting structures. Under such approaches, the constituent suppliers remain liable for their own works and agree to work in a collaborative manner, specifically with regards to ensuring the system is commissioned successfully. Additionally, each supplier is entitled to representation on a panel that can attribute responsibility for any commissioning defects and hence rectification costs amongst the panel members. This requires an intelligent client base as well as a strong incentive on suppliers to align their individual commercial aspirations with the wider project objectives held by the promoter; neither of which may be present in reality.
- Ultimately however, the ability of the public sector to retain all or some completion risk is dictated by the balance between the amount of contingency that can be removed from suppliers’ costs and the potential cost exposure it may face if completion risk were to materialise. The public sector could have an active role in ensuring that the tests are properly controlled and managed (for which it would need the corpus of competence), but must not as a result be exposed to the risk. The number of suppliers and hence interface risk that has to be successfully managed to deliver an operational LRT system is the key driver for both the public and private sectors alike.
- It was suggested by some that the public sector must not be exposed to completion risk at all: the public sector could have an active role in ensuring that the tests are properly controlled and managed (for which it would need the corpus of competence), but must not as a result be exposed to the risk. Clearer test parameters and pass/fail criteria should result in reduced risk premia.

- For a tramway, the most critical completion issue is run time, which is significantly affected by highway and other third party interfaces, over which no one party has control. All parties have to accept, and allow for, the fact that completion tests will be taking place in the real world.

## **10 Third party interfaces – public sector**

- This topic considers how the costs of tram schemes are influenced by third party public sector requirements during both the development and operational phases.
- Fixed asset public transport schemes such as tram by their nature have a significant impact on the publicly-owned built environment they serve. Additionally, tram schemes have a wider socio-economic and regenerative impact on the communities they serve, again giving rise to interfaces between the scheme's promoters and elected officials.
- Whilst promoters have a duty to take into account the requirements of the public sector parties its scheme affects, reaching agreement on the scope and/or quality of the physical measures included within tram projects has proved problematic in the past. In particular, the degree to which any third party public sector requirements could be argued to constitute betterment, as opposed to a (usually) cheaper like for like replacement, of affected public assets/services, can give rise to affordability issues for the tram scheme.
- To mitigate such cost pressures, tram promoters need to have a clear understanding of the *de minimis* physical characteristics required from the tram system which would leave the third party public asset in a no better than, no worse than physical condition than if the tramway had not been built. If the asset owner (the local authority in this context) wishes to enhance its asset to beyond this *de minimis* state, the owner should bear the incremental cost of such betterment. The use of jointly prepared and agreed documentation, such as an urban design guide for example, can also help to clarify what will be expected of a concessionaire/SPV.
- In reality such discussions are complicated further as the tram design is worked up in more detail and if the asset owner's requirements (technical, planning) change.
- Particular public-public interfaces which have significant impacts on tram scheme costs and operational risks are those between the scheme promoter, the statutory highway authority/ies and the planning authority/ies.
- A particular obstacle encountered on previous schemes has been the dogmatic adherence to the principle that one administration cannot "fetter" a subsequent administration – as if the building of a tramway is not in and of itself a "fettering".

## **11. Third party interfaces – private sector**

- This issue principally covers project interfaces with Network Rail and the statutory utilities.
- With respect to Network Rail, it was felt vital that the promoters negotiate directly with Network Rail and that this is not left up to private sector bidders. The key issue for

promoters is how to incentivise Network Rail to expend sufficient resources in examining tram proposals (which may still be a preliminary design phase in any case) such that the promoters can provide a greater degree of confidence to bidders that the potential Network Rail costs they are being asked to incur are robust. Good quality strongly expressed expertise will be required to control Network Rail's innate propensity to (a) get someone else to pay for their own betterment, and (b) impose unnecessary technical/engineering/operational conditions and therefore costs on the tramway.

- It was noted that the diversion or protection of utilities is perceived to be a major risk in a number of projects (in terms of both cost to undertake and timing of completion of works resulting in delays in sites being available and requirements to compensate consortia). In practice utilities have not always been a major problem, but their associated costs still have a major impact.
- It is agreed that the scale of utilities diversions required in the UK is an impediment. UKTram Activity Group 1 is exploring how diversions can be minimised. However, operational performance regimes will need to acknowledge the trade-off between the amount of utility plant diverted, and residual risks to operation of utility plant left in situ. Compensation will therefore not always be available to operators in the event that future works on utilities result in disruption on the network and loss of revenue.

## **12. Revenue risk sharing**

- This topic considers the impact of revenue risk allocation on the cost of tram schemes and the various contractual mechanisms by which the cost impact can be reduced.
- Irrespective of procurement method adopted, recent experience of revenue risk in the UK tram sector has been generally (but not universally) poor, with the majority of schemes reporting revenue building up at a slower rate and over a longer time period than originally forecast.
- For schemes delivered through the Private Finance Initiative under a DBFO concession model, where an SPV is reliant on farebox income to fund long-term debt service commitments, funders have included significant risk premia within their costs to offset this ramp-up risk.
- Release of PFI Credits under the PFI by central government for the procurement of LRT schemes is contingent on the tram scheme being accounted for as "off balance sheet" within the promoter's balance sheet. As the allocation of revenue risk is a key determinant of balance sheet treatment, promoters are clearly incentivised to pass this risk to the private sector.
- To reduce the affordability pressure such premia create, certain promoters proposed a banded revenue risk support mechanism similar to TOC franchise agreements in the heavy rail sector risk sharing mechanism. This provides a level of downside protection to senior debt providers whilst ensuring that the public sector shares in any revenue upside. Assuming that such mechanisms maintain the "off balance sheet" treatment sought by promoters, these mechanisms give rise to long-term contingent liabilities (or gains) for the promoters. These have to be weighed against the upfront scheme cost reductions offered by the SPV.



- Other promoters, unencumbered by the balance sheet constraint, have elected to retain all or a substantial part of revenue risk, often in conjunction with the separation of infrastructure provision and operations. There has also been some consideration by certain promoters of utilising the powers granted under the Prudential Code to raise debt against future farebox income.
- Retention of some element of revenue risk by the promoter can generate benefits to a tram scheme:
  - It acts as an incentive on the Promoting authority to adopt robust highway interfaces
  - It is a disincentive against compromising alignment and design whilst seeking TWA powers and during consultation generally
  - It has the potential to enhance senior management level and political “buy-in” to the tramway.
  - Conversely, transfer of some element of revenue risk to the operator acts as an incentive to boost income by reliable operation, marketing and ticketing incentives etc.

### **13. Case for private finance**

- The workshop did not consider in any detail the wider benefits of PPP, which has been promoted by government as a preferred delivery model for a wide range of public infrastructure works.
- Given the current perceived lack of value for money of raising commercial funding against the farebox, the key benefit of availability payments as a source of income for the concessionaire are recognised. A significant level of availability payments helps to dilute revenue risk.
- The assumed benefits of requiring suppliers to have risk equity in the project are largely illusory: the investment and supply functions almost always reside in discrete corporate divisions, and are often consciously prevented from influencing one another.
- PPP/PFI contracts often incorporate renewals obligations (involving further capital expenditure) over the life of the contract. There is an argument for the public sector to retain such commitments (under a different contractual structure) since the public sector is the ultimate repository of renewals risks in any case. Whether this is forthcoming, will ultimately depend on the contractor's propensity to invent rather than hand back the keys.

### **14. Project extensions**

- The cost of procuring extensions to an existing LRT system procured through a long-term DBFO contracting strategy can be significantly affected by the prohibitive cost of breaking the long term debt the SPV raised to finance construction.
- An alternative method is to procure the infrastructure under a long term DBFM contract, with operations being let on shorter term contracts. Long-term debt finance would be raised

through availability payments to the Infrastructure Company ("Infraco"), whilst a short-term operations contract can be let to an Operating Company ("Opco").

- Such an approach would allow Promoters to procure an extension on a DBFM basis and simply extend the operating contract to cover the extended network. However, the risks inherent in de-coupling operations and maintenance would be multiplied, and all the interfaces between old and new infrastructure and old and new rolling stock will give rise to contractual and practical complexities.
- This alternative requires Promoters to take the interface risks, and Promoters therefore need to be both informed and competent.
- A further alternative is to appoint the existing concessionaire company as "early contractor" for extensions. Provided that sufficient competition for supply and services of the extension can be demonstrated, it should be possible to add the concession for the extension/s to the existing concession contract. This may need further consideration under EU procurement and competition law.

## **15. Lessons learned**

- There is need for clarity regarding funding rules, in particular regarding escalation on grant amounts/PFI credits. This is particularly the case in tram projects due to their long lead times.
- The distinctive and conflicting objectives of commercial operation, economic regeneration, social inclusion and any other political objectives set for the tramway should be explicit and clear.
- The roles of different parties (in particular the DfT) in the procurement process needs to be clarified; closer collaboration between promoters and central government will shorten lead times.
- There needs to be a source of knowledge (centre of excellence) on which promoters can draw and ensures that experience from previous projects can be applied in future.
- There was a view that this centre of excellence would best sit within the DfT but it was stressed that this should not represent the DfT taking over the procurement process from the promoters.
- The disparate nature of the supply industries needs to be taken into account. Splitting out suppliers (civils and vehicle, and possibly E&M) is correct; how they get forced together may take different forms.
- Sharing risks, especially that of revenue, has clear benefits.
- Forcing a "full" PFI, in strict accordance with current rules, will lead to appointing, by definition, the most vulnerable consortium

## **APPENDICES**

### ***Appendix 1 - Glossary of Terms***

DBFO: Design, Build Finance and Operate

TWO: Transport and Works Order

SPV: Special Purpose Vehicle (i.e. a company formed specifically for one purpose only).

DLR: Docklands Light Railway

E&M: Electrical and Mechanical set of sub-systems within a tramway

DKE: Developed Kinematic Envelope (the vertical, horizontal, linear and lateral space required to accommodate a moving tram throughout the alignment).

LRT: Light Rail Transit – here used to describe DLR and Metro type systems which are more like heavy rail in their characteristics than tramways, to in order to distinguish them from line-of-sight in street tramways.

D&B: Design and Build

TOC: Train Operating Company

TWA: Transport and Works Act

PFI: Private Finance Initiative

PPP: Public Private Partnership