Turner & Townsend

Review of Commercial and Project Management

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THE CITY OF EDINBURGH COUNCIL

DRAFT

Preliminary Report
Edinburgh Tram Project

THE QUEEN'S AWARDS FOR ENTERPRISE 2009

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Contents

Rev	Originator	Approved	Date
0	Name	Name	Day/Month/year

1 Introduction

Turner & Townsend Project Management (TTPM) have been appointed by the City of Edinburgh Council to carry out an initial review of the Edinburgh Tram project, including a review of the project risks, the measures necessary to mitigate these risks as far as possible and the translation of these mitigation measures into a delivery structure for the Council.

The review was carried out over two weeks from 15th August through to the 26th of August, the submission date requested for the report. In preparing the report a number of meetings were held with representatives of the Council, Tie and BBS with information as available being provided to the TTPM review team.

The report sets out the evaluation of team members on the basis of the information made available to them from which risks to the Council have been identified and the possible mitigation measures highlighted. Finally these mitigation measures have been reflected in the proposed structure for the Council's Project Management team.

In proposing an enhanced Project Management structure we have also included the transition measures necessary to maintain momentum on the project, the roles and responsibilities of individuals within the structure and the nominees for each of the required roles.

The information provided within the 2 week period has been a snapshot of the developing post mediation relationship, prepared within an emerging contractual environment. As a result of this and the gaps in the information available we have set out further actions we believe necessary to be carried out to more fully understand and mitigate the risks to the Council.

2 Scope of Project Review

The scope of the review as set out in our proposal of 8th August 2011, was to review current information, establish the control requirements with CEC and conduct interviews with existing managers to establish the current management approach, reporting regime & associated data flows. Specific activities to include:

- Contracts: The contractual interfaces with BBS will be critical in identifying the risks to CEC that the project structure will then be designed to mitigate. The review includes the obligations of CEC under the contract in terms of Utility free access. In addition the effect of change within the contract and the substantial milestone payment administration requirements will require specific roles to be created to deal with the risks associated with these provisions. In carrying out the review TTPM would also seek to identify where possible improvements in the proposed contracted position prior to contract signing should Edinburgh wish to address these. In the absence of these improvements, we would look to set in place action plans to minimise CEC exposure to remaining contract risks.

- Programme and Implementation: It became clear from discussions with CEC officers prior to the review that while a 64 page programme had been prepared by BBS this does not reflect the impact of the emerging requirement for additional services diversions nor the potential impact of consolidating the effect of temporary traffic management. As BBS had a contracted position of a Utility free site, this had potentially serious consequences for CEC in cost and time. Part of our scope was to consider this risk in recommending the eventual structure to be adopted.

- Utilities: There are emerging utilities diversions that may potentially delay the start on site for BBS in on street areas. Due to the current contract provisions this is a substantial risk to CEC. From our experience in Sheffield, Nottingham and Croydon where we successfully managed the utilities diversion contracts we would seek to use the principles developed on these contracts to reduce the scope of the diversions and hence seek to mitigate much of the risk currently held by CEC. The development of a "work in proximity code" with utilities companies may reduce many of the diversion requirements.

- Organisation structure: TTPM to assess if provisions in the contract and additional risks highlighted in the review will require the structure to be revisited to mitigate these risks. In particular the emerging utilities diversion scope and the consequential risks associated with providing a utility free site may require the creation of a separate workstream whose only focus will be meeting contract commencement dates for the main works.

- Governance and project controls: TTPM will seek to establish the reporting requirements to meet CEC and Transport Scotland governance requirements. In addition the mitigation of risks associated with contract provisions and emerging scope will also require the project controls systems and reporting levels to be bespoke to the needs of the project. This review

should seek to make recommendations on the processes and systems necessary to meet these requirements.

- Commercial and cost issues: Albeit Faithful and Gould carried out an assessment of the cost to complete the main works and the available contingency, TTPM to carry out a high level review of this assessment, taking into account the emerging utility diversion scope and the risks identified as part of the contract review to confirm where the principal affordability risks lie and to mould the commercial management and contract administration team to mitigate the potential for cost overrun. TTPM do not intend revisiting the detailed exercise carried out by F&G.

- Risk: The TTPM risk review will seek to confirm whether the risk database is fit for integration with cost and programme, what current risk process and mitigation measures are being carried out and what additional work needs to be carried out to provide the level of assurance required by CEC.

3 Review Methodology

3.1 Meetings

The study commenced on Tuesday 16th August with an initial meeting with CEC officers. At this meeting the study plan was tabled and a suite of required meetings agreed. CEC sought to pave the way for these meetings with Transport Initiatives Edinburgh (*Tie*) and Bilfinger Berger Siemens (BBS). Many of these meetings were facilitated, the key meetings being set out below:

Evaluation area/Interviewer	**Interviewee**	**Organisation**
Utilities: Stephen	Frank McFadden	Tie
	Tom Hickman	Tie
	Graeme Lang	PB(SDS)
	Martin Foerder	BB
	Jim Donaldson	BB
	Jim Cowie	BB
	David Gough	BB
	Michael Blake	Tie
	Simon Nesbitt	BB
Contracts: Andrew Cox	Colin Smith	HG Consult
	Alan Coyle	CEC
Cost: Gary Easton	Dennis Murray	Tie
	Alan Coyle	CEC
Risk: Stephen Ross	Stephen Bell	Tie
Governance: Julian	Stephen Bell	Tie
	Seamus Healy	Tie IT
	Frank McFadden	Tie
	Hazel Kennedy	Tie
Programme: John	Jim Cowie	BB
	Jim Donaldson	BB
	Tom Hickman	Tie
	Frank McFadden	Tie
	Graeme Robertson	HG Consult
	Damien Sharpe	Tie

	Steve Westwood	BB
	Peter Widdows	BB
Project Assurance:	Stephen Bell	Tie
	Ralph Baqar	Tie
	Colin Kerr	Tie
Project Controls:	Tom Hickman	Tie
	Linda Melville	Tie
	Hamish Sheppard	Tie
	Mike Paterson	Tie
	Seamus Healy	Tie

Initial meetings were held with the key staff members set out above from which information for evaluation was provided and the need for any further meetings identified. Initial reports were prepared by the evaluation teams for joint review by the team to establish links, common themes and the mitigation measures required to be included in the project structure development.

4 Principal findings

4.1 Overview

In carrying out the project review necessary to confirm the structure necessary to deliver the project to completion, key areas of the project and the Tie service delivery have been reviewed. These structure related areas have included:

- Contract documents
- Programme
- Cost
- Risk
- Project Controls & Governance
- Project Asurance
- Utilities

The following sections set out the principal findings in each area of assessment based on the information available to the review team during the course of the review.

4.2 Contract Documents Review

4.2.1 Basis of Review

This element of our report has been prepared by reference to the following documents circulated on 15th August 2011:

- The Settlement Agreement,
- The revised Infraco Contract,
- MOV[5] in relation to tram integration and Tram Integration Drafting.

For each agreement we have reviewed key topic areas of Council obligations inherited from Tie, including Design, Programme, Commercial and Other. We have identified, where possible, the clauses, described the risk and suggested management actions/mitigations to manage, mitigate or reduce the risks.

At the end of this section we have identified further steps we believe necessary to complete the contractual element of this Project Review.

4.2.2 Settlement Agreement

Risk Area	Risks	Management actions /Mitigations
Council Obligations		
Other Cl. 5.12 Rights of action / claims under the Tram Agreements after Novation vested in CAF lie against CEC and not the Infraco.	CEC carries	Seek independent list from Tie records, from CAF and from Infraco, of the claims
Design		
None at this stage		
Programme		
None at this stage		
Commercial		
Other		
2.6 Step-in rights under collateral warranty have been waived	Not clear why step-in would be ceded but we are not aware of the full commercial background to the settlement.	Suggest that monitoring of situation in its reflection in the revised Infraco. It is important that default is closely managed and that CEC understand their rights so that they are enforced.

4.2.3 Revised Infraco Contract

Risk Area/Clause	Risks	Management actions /Mitigations
Council Obligations		
8.4 In the system integration clause, there is a requirement for the Infraco to liaise with the Operator and Tie in respect of system operation, System Acceptance Tests and operational defects.	▪ Tie/CEC instruction determines the extent of liaison and is supported by Review Procedure (unseen by TTPM). Consequently there is the potential that if undefined CEC finds itself in the middle of disagreements between the Operator and the Infraco about the design impact on operations. Post-revenue service start date CEC is potentially in the same situation in relation to any latent defects in the design. ▪ SDS Provider does not seem to have similar obligations to Operator but Operator will have an interest in Systems.	To mitigate this risk, we suggest that ▪ Review Procedure is reviewed for sufficiency ▪ A process for defect attribution/rectification is completed for revenue service ▪ Operator/SDS liaison is covered in Review Procedure if not already included.
Design		
7.3.14 Design obligation for a buildable and maintainable tram system is limited for Secondary Phase 1a. Limitation is to the extent that buildability and maintainability can be determined from construction drawings.	This is not usually information that's determined by reference to the drawings only and is a potentially costly exclusion.	Key buildability & maintainability requirements to be summarised on Issued for Construction drawings.

Risk Area/Clause	Risks	Management actions /Mitigations
9.8 There is an obligation on the Infraco to provide all components so that they are fit for purpose (as described in the Employer's Requirements). This clause excludes Trams and excludes Infraco from making Trams compliant.	Risk of gap between Trams design and supporting infrastructure and systems.	Currently being addressed in Tram Integration Agreement. Change will need to be managed closely so that any deviation from the Trams or Infrastructure design does not impact the risk profile in the Trams Integration Agreement.
10.3 Safety case compliance is CEC risk	With no influence on design and part-way through the project, regulatory approval is a challenge for CEC.	Early establishment of working relationships and regular meetings with ICP and others to ensure safety case compliance Implement as part of design review process, a regulatory element to take into account ICP comment.
Programme		
60.1 & 60.3 Infraco to complete in accordance with Programme and to issue updates to Tie for acceptance	Usage of acceptance vs approval suggests that Infraco controls programme. Need to consider situation where e.g. consents delays cause delay to the project	May be acceptable but in accepting, consider CEC input and whether timescales for CEC are sufficient.
17.21 Infraco has to rectify deficiencies preventing service start-up subject to Operator demonstrating not ready for service	Risk is that Operator and Infraco only liaise close to commissioning/handover and Operator cannot demonstrate deficiencies so work-around/sub-optimal solutions are put in place and/or delay start of revenue service	▪ We understand the interface agreement has been developed to deal with such issues. To be checked ▪ CEC to liaise with Operator so that issues are aired through the design process and Operator is kept informed to minimise trial operations/testing

Risk Area/Clause	Risks	Management actions /Mitigations
		& commissioning issues.
18.1 Tie warranty to Infraco that access to Permanent Land and Temporary Sites will be with all necessary Land Consents	CEC carries risks of all consents which usually falls to the Contractor in such projects	▪ Establish a clear register of land consents required and status ▪ Actively manage difficulty consents ▪ Include delay contingencies in commercial planning
Commercial		
10.18 Instruction to release Construction Drawings early constitutes a Change unless design is in breach of Infraco and SDS contract obligations	Risk = unnecessary change instructions	
62.2 Infraco LADs not deductible owing to failures of Tram Supplier in achieving Commissioning Certificate	Risk to CEC that it incurs delay costs of Infraco because the Tram supply programme and Infraco programme are misaligned.	Suggest this is reviewed as part of the Tram Integration drafting. Additionally suggest that both Infraco and Tram Supplier are present at regular review meetings in order that there is alignment between the two programmes as far as possible.
Other		

Risk Area/Clause	Risks	Management actions /Mitigations
Clause 10.3 requires Infraco to establish an extranet and upload deliverables as per Programme.	There is no requirement on the Infraco to notify that uploading has occurred/deliverables are completed. The risk is a reduction in approval/notice/correspondence timescales if CEC does not access the extranet.	CEC to put in place a document control process so that there is clear internal communication protocol to work around absence of notice from Infraco's. Cover in progress meetings to create "no surprises" culture.
There is no over-arching definition of the "Works" which would be anticipated in a contract of this type.	Those descriptions of Infraco's responsibilities for the works to construct the tram and subsequent maintenance are defined differently throughout the contract, resulting in potential ambiguity about Infraco's scope. While these are likely to be small events, there is potential for there to be many such events.	Recommend undertaking an analysis to identify gaps in scope for the various elements of the project and evaluate the potential impact of such gaps.

4.2.4 Tram Integration Drafting

Risk Area	Risks	Management actions /Mitigations
Council Obligations		
General	Transfer risks and liability arising under the MoV5 in respect of the First Tram during the Provisional Period	Manage its obligations during the Provisional Period efficiently to reduce CEC's claims and additional costs arising from the MoV such as • arrangement of the traffic management and any necessary consent for the First Tram,

Risk Area	Risks	Management actions /Mitigations
		• availability of depot to receive the First Tram, • earlier planning of the location of the First Tram to avoid further relocation, etc
1.6 CEC appoints Infraco as the client's representative under the Tram Agreements for all purposes relating to Tram Supplier Integration	This appears to be a reactive management approach by CEC.	To mitigate this risk, we suggest to proactively manage the system integration part of the programme, by introducing competent personnel from CEC to work closely with the Infraco and the Tram Supplier
1.10 Tie Change under Infraco Contract will not be implemented unless a corresponding Client Change is instructed and agreed under the Tram Agreements	There could be a potential Compensation Event from Infraco under the Infraco Contract if any delay in agreeing the Client Change under the Tram Agreements	
Design		
None at this stage		
Programme		
None at this stage		
Commercial		
None at this stage		

Risk Area	Risks	Management actions /Mitigations
Other		
None at this stage		

4.2.5 MOV 5

Risk Area	Risks	Management actions /Mitigations
Council Obligations		
General	Transfer risks and liability arising under the MoV in respect of the First Tram during the Provisional Period	Manage its obligations during the Provisional Period efficiently to reduce CEC's claims and additional costs arising from the MoV such as • arrangement of the traffic management and any necessary consent for the First Tram, • availability of depot to receive the First Tram, • earlier planning of the location of the First Tram to avoid further relocation, etc
Design		
None at this stage		
Programme		
None at this stage		
Commercial		
None at this stage		

Risk Area	Risks	Management actions /Mitigations
Other		
None at this stage		

Contract Documents Review On Street

4.2.6 Settlement Agreement

Risk Area	Risks	Management actions /Mitigations
Commercial		
Cl. 6 - On street works (i) potential provisional sums for items identified in Schedule G (ii) if subcontract prices are not agreed, Infraco may propose on the On Street Works Contract Price	CEC carries commercial risk of On-Street Works. We understand that this is likely to remain in place, subject to delays of 21 days which convert the target cost to a reimbursable contract.	▪ Minimise the number of provisional sums ▪ See also comments on Schedule X of Infraco Agreement
Schedule Part X Pricing Cl 6 Extensive pricing assumptions Cl 7 No set –off rights against Infraco for claimed amounts. Cl 8 Suspension Infraco cap on difference between disputed and certified amounts of £750k entitling Infraco to suspend. Cl 9 Termination	Pricing assumptions and and 21 day delay mechanic suggest that the contract is likely to become reimbursable. CEC is not going to be able to guarantee e.g. Scottish Water requirements do not cause delay. Risks of termination/suspension are high and to neither Infraco or CEC benefit.	▪ Detailed interface and dependency schedule between Infraco, SDS and Trams in relation to On-Street Works. ▪ Detailed Third Party interface and dependency schedule with project. ▪ Create a clear internal communication protocol for all disciplines re On Street Works ▪ Regular internal review so that change is managed in a controlled and commercial way. ▪ Plan to manage a

Risk Area	Risks	Management actions /Mitigations
CEC cap on costs of £3.5m entitling CEC to terminate		reimbursable contract and resource accordingly. ▪ Include cost verification, cost audit and general audit rights in the revised Infraco Agreeement or as a separate commercial process for On Street Works

4.2.7 On-Street Works Pricing – Schedule X

This element of the contract merits a specific commentary because of the commercial and completion risk it presents to CEC.

There are a number of areas of risk which will require a well-resourced commercial team working in tandem with project managers and appropriate record keeping to preserve as much of CEC's position as is possible in the light of an unfavourable arrangement:

- It is suggested that an assumption be made that the on-street works will be paid on a reimbursable basis because some of the Pricing Assumptions rely on third parties to the contract and some delay is inevitable.
- On this basis, Appendix C should be very closely reviewed in the light of known issues with this category of the project in order that there is a good level of commercial understanding of the pricing basis of the Infraco.
- It is strongly suggested that CEC retain some level of cost verification, audit and review rights for the reimbursable elements of the Works.
- Certification of payment either before or after the contract converting to reimbursable should be very carefully managed. CEC has waived its rights to correct valuations in subsequent certificates under the terms of Schedule X
- There are three areas where commercial/project control support is required:
  - change management, commercial review and valuation

- commercial management including certification and valuation of amounts due against milestones both before and after the Trigger Date changes the commercial model from lump sum or reimbursable

- claims management and valuation

4.2.8 Assessment

We have made the assumption that CEC is unlikely to be in a position to alter the risk profile that's favourable to the Infraco.

On that basis, the key mitigation to manage the commercial risks inherent in the draft revisions of contracts will be to implement and comply with processes for commercial management for the On-Street Works and to resource the project management/commercial team accordingly.

4.2.9 Next Steps

We have not seen the complete set of contract documents or a complete version of any of the contract documents provided to us to date and we have not therefore undertaken a complete review of the project requirements.

We recommend that as each contract document is issued in its final form, the documents are reviewed to capture the full scope of the Tie role and responsibilities in the various documents and ultimately the complete contract documents and therefore the project.

Such review will identify the various powers and duties of Tie together with the timescales and particular requirements for exercising such powers and duties and allow those that should be reserved to CEC as 'Client functions' to be distinguished from those that are to be devolved to TTPM as project managers.

This review is essential to the effective understanding of the respective contributions of CEC and TTPM in delivering the project and to allowing this to be done efficiently and economically.

In order to do this we would request sight of the following documents:

- List of MOVs and copies of those relevant to understanding CEC contract and project administration roles

- Updated key issues list

4.3 Programme

4.3.1 Planning generally and schedule revision 3A

Introduction

Through interviews with the Tie, HG Consult and BBS teams involved with the planning and programme controls processes in BBS and Tie it has been possible to evaluate the current state of the processes, and to consider the validity of the Schedule Revision 3A.

Planning Perspectives

BBS do not share CEC's planning perspective but instead have concentrated on their interpretation of the contract, business interests and matters that affect their own supply chain and related investment strategy. BBS appear aware of the CEC's risks and work to ensure that BBS are protected from them, and moreover that they are positioned to profit from them should they materialise.

Tie/CEC have found little satisfaction or confidence in the schedules provided by BBS, nor will they until common data structures and vocabulary are established and schedules are combined into one master programme to which all have coincident access. This should lead to a consistent basis for the evaluation of the project, or at least provide accurate information for negotiation, resolution and the determination of coherent action.

Assumptions

The assumptions accompanying the programme define the premise on which the investment plans have been created and will be taken forward. The validity of these assumptions is of paramount importance in the development of schedules, which are models that predict the future based on holding a multitude of interdependent activities coherent. If the assumptions are not valid, or lack the consensus of stakeholders, the predictions offered by the schedule cannot be delivered.

An interpretation of many of the assumptions related to the Schedule Revision 3A can be found below. An obvious characteristic of these assumptions is that they are defensive, i.e. they transfer risk for the success of the new schedule from BBS to Council, but there is no evidence that the Council accept the validity of these assumptions, and associated risks.

Assumptions related to Schedule Revision 3A

Summary of the assumptions within the narrative that accompanied Schedule Revision 3A.

1. The effective productive working week will consist of 40 hours.
2. Third Party approvals/licenses will be in place for On and Off Street Works to commence and proceed as planned.
3. Network Rail Possessions will be available for Off Street Works to commence and proceed as planned.
4. Network Rail will approve the constructions works in Section 2 and 5 to allow the works to proceed as planned.
5. CAF will comply with previously published time scales for Tram delivery, testing and commissioning
6. The schedule excludes TSA and TMA activities.
7. All Trams are delivered, tested and system acceptance tests are successfully completed to allow shadow running as planned.
8. The Depot will be completed and energised as shown on drawing ULE90130-06-DEP-00016 REV6, and included in MOV 4, Schedule Part 2.
9. Test track energised and functional from the Depot West entry/exit to the Airport as planned.
10. Four Trams will be delivered to site, assembled, tested and proved compliant with the Employers Requirements for Tram Commissioning Routine Tests to permit Driver training as planned.
11. One Tram will be delivered to site, assembled, tested and proved compliant with the Employers Requirements for Tram Type Tests to permit Driver training as planned.
12. The section from the Airport to York Place will pass, as planned, the tests required by the Employer's Requirements, including the System Acceptance Tests for shadow running.
13. Memorandum of Variation 4 (MoV4) will be agreed.
14. Defined portions of the Prioritised Works will commence on the 03May11.
15. The construction of the Depot and mini Test Track will commence on the 04April11.

16. CEC will issue instructions for the works on Princes Street to commence on the 05Sept11.
17. The whole of Princes Street shall be available for construction works from the 05Sep11.
18. Traffic management enabling works to facilitate the construction works in Princes Street will be undertaken in June and August 2011.
19. No allowance in the schedule for the consequences of any discovery of utilities in Princes Street that require to be removed diverted or protected.

Implicit in the assumptions declared is a lack of confidence that the Council and others will "clear the way" to allow BBS to proceed as planned. This has introduced bias to the schedules made manifest in activity durations that may seem excessive compared to the work that has to be done. It is improbable that the list of assumptions seeded in the narrative that accompanied Schedule 3A is a comprehensive list for a project of this complexity, and it should be presumed that many assumptions lie latent to emerge later, with the concomitant effects on the actual work. This is a further layer of risk to the Council.

No evidence was found of the processes that reveal the assumptions, or assures their validity, or ensures that stakeholders are consistently made aware of assumptions, i.e. a process that takes an assumption and moves it through a life cycle in which stakeholders consider the assumption and decide if they agree with it, or at least can live with it, or identify it as a risk and put in place mitigating actions, or regularly test the relevance of an assumption.

Schedule Quality

A primary focus for this review is the Schedule Revision 3A produced by BBS. This is a construction and system delivery model that has been carefully developed by BBS, and if it could stand alone it would be considered robust. The weakness is in the schedule's isolation; it is only valid if the work of others is precisely in concert with the needs of the 3A schedule. It is a brittle model, and when another organisation fails to deliver something on time, to the quality needed, or in the quantity required, the schedule will break, and it will be difficult to recover from the failure. In short the schedule is BBS's, it is not integrated and only reflects their deliverables based on their interpretation of the contract.

This highlights the fundamental structural deficiencies and failures of process that pervade the Edinburgh Tram schedules, which are peculiarly susceptible to risks of integration. The reality is that there are a number of elemental schedules with interdependent links, many that need to be connected to form a coherent model of the project. With the current planning regime and disparate versions and types of planning tools in play across the project community, which

includes the consortium's supply chain, the quality of a schedule compiled to show the route to an operational tram is at best weak.

Information

There is a wealth of information within the participating organisations. Sources of vital information are in construction operations, access planning, utility diversion, design, Tie, CEC, etc., this is in the form of primarily spreadsheets accompanied by reports, presentations and schedules. When information is captured it is frequently consigned as a record in these inadequately linked documents that are not amenable to searches, dependent upon individual's memory and action and, with the passage of time, unreliable.

From interviews it appears that the common presumption that document transfer equates to information transfer is prevalent, and even if information transfer has not taken place document transfer moves responsibility to someone else; part of a defence strategy. This has contributed to the emergence of a near total lack of trust between many people in BBS and Tie. What is needed is a solution that encourages and secures joint operations between BBS and representatives of the CEC, with success not measured by the recording the passage or location of a document, rather that the recipient correctly interprets the meaning, can derive conclusions and readily interact with others to make decisions and take actions.

Next Steps

Schedule revision 3A may be an acceptable foundation from which to build a more complete model of the remaining work for the Edinburgh Tram, but it is not an acceptable model on which to base contractual obligations.

The schedule is biased towards the needs of construction and systems delivery, and based on a few declared assumptions that largely place the responsibility for the integrity of schedule on City of Edinburgh Council, and its agencies.

It is necessary to revise and enhance the data structures that set the framework of the schedule, and make integral all the schedules that together describe the work needed to deliver the Edinburgh Tram into a master schedule.

New processes are required to address key deficiencies in areas such as assumptions and the assurance of assumptions, and to ensure that people collaborate. The current framework and processes do not work.

4.3.2 Planning, the way ahead

Master programme

As previously identified; there is a need to establish a master programme for the remaining work on the Edinburgh Tram to make the planning of work and reporting of progress more effective and efficient.

The Schedule Revision 3A can provide a starting point for such a programme, but on its own is deficient without the plans of the CEC's agents and other stakeholders. During the review representatives from BBS stated that accessible construction schedules were shared with Tie in the past, but differing perspectives and priorities led to conflict and the practice ended. During this review a willingness to share accessible schedules again was given. People need access to a model schedule that gives them a perspective of the whole project, and processes in which they can participate to negotiate and resolve problems.

Rather than replacement of the schedules currently in circulation the approach will be to reengineer the current schedules to establish a common data structure, integrate peoples' endeavours, provide the utility to track interfaces between contractors and the other contributors, and highlight issues that need to be considered by management teams.

"Building-block" systems

A systemic failing to be addressed urgently is the poor integration of the work of the many players participating in the project. Evidently those involved have faced, and will continue to face, a complex system of interdependencies that dictate progress. The current milestone régime has its purpose, but it is inadequate to the challenge of integrating multiple lines of discrete activities.

The business of delivering the remaining portion of the Tram must quickly address this challenge, with early, and repeated, tangible evidence the reengineered business systems have produced an effective and coherent progress towards the ultimate business objective. Creating the overall programme as an overarching system, within which there is a set of interconnected and successive "building-block" sub-systems, can do this. The successful completion of each sub-system will be a step towards the ultimate business objective, and there will be tangible and irrefutable evidence that the sub-system objective has been met, or not.

Processes

Robust processes that secure information, monitor and stimulate its evolution as the project moves forward have not been observed. This is not to say that they do not exist, simply that they are not obvious. It is evident from the state of the project that the current processes do not reveal the nature and magnitude of the causes of delay and disruption, and do not readily help to resolve matters.

Stakeholders need to be assured that their requirements are delivered; they understand the assumptions that affect them; and they are promptly made aware of issues that arise, and that resolution will not add to their risk.

Process that provide stakeholder assurance should be implemented for:-

- **Assumptions:** things that define the premise on which the plans are taken forward.
- **Requirements:** Things that define the needs of stakeholders, and when and where they are to be delivered.
- **Issues:** Things that have emerged and need discussed, negotiated and resolved, and actions delegated.
- **Risks:** Things that threaten the targets and objectives.
- **Links:** The interdependencies between things and activities, and which affect progress.
- **Changes:** modifications to the plans that are necessary to accommodate revised, new or emergent assumptions or requirements.

The current sequential procedures working on the basis of poor historical data, which can be weeks old, with related data held in isolated spreadsheets and reports inadequate for the task.

The new processes should provide a more complete data record; provide the information in real-time; allow people coincident access to the records; provide parallel processes instead of the current sequential structures; and provide easily comprehensible reports with data that is current, rather than the present historical emphasis.

Information systems

There should be information systems that serve, help and support the project. While the investment in information technology throughout the project is visible, the investment in effective information systems is less obvious.

The key information systems have already been identified in this paper, e.g., master schedule, assumptions, requirements, issues, etc.

A fast implementation, or reengineering, of information technology is needed, to support the deployment of the information systems that will enable the necessary changes. In the case of the planning the scheduling application Primavera is in use in Tie and BBS, this can be the basis of the system needed for planning. In regard to assured processes, e.g., assumptions, requirements, etc., a rapid phased deployment is required; therefore, the functionality and utility of applications served securely via the Internet should be adopted. It would be possible to quickly implement an application that is designed specifically for the management of transport investment projects in urban settings.

The information systems that manage cost currently can continue to operate; however, the processes that provide information to the system, and take information from it, should be

reviewed in an effort to improve the performance of the system, and the reports emanating from it.

People

The chance of success will be improved greatly if senior management on all sides engage . They must, willingly: promote the value of the planning methods envisioned; release team members to support the initiatives; engage in meetings and workshops that address critical planning issues.

The planning team must be permitted free and independent access to the organisations involved, such as the organisations will tolerate, to discover data and find information more generally, and to acquire such support as is deemed necessary for success.

One of the methods that will be employed is that of creating teams of people to tackle planning problems and opportunities. Though working together to a common cause, with the right leadership and methods, there is an opportunity to establish a collaborative culture, and start to redress the underlying mistrust that is prevalent.

The areas to be tackled will be those that are currently in crisis, and those that could be considered as "pinch points" i.e. points where many different organisations come together and practical planning solutions have to be distilled out of conflicting constraints and requirements.

Learning

There is a significant challenge to help people unlearn behaviour that is a consequence of the prejudices that have built up over the years that resulted in a culture of mistrust; however, many have expressed a desire for change, and to complete the project.

The learning needed to support the reengineered planning regime is in the area of collaboration, problem solving, decision-making, and creative thinking. To have the tools, and know how to use them, to avoid adversarial confrontations that absorb energy and time, with little benefit to the project.

Implementation

An implementation plan will be developed in consultation with senior staff; however, it is acknowledged a fast implementation is required.

There will be two parallel lines of development; one for the application of the processes and necessary technology, and the other for the engagement and development of people. .

Within a week from commencement the first initiatives will be deployed, and the objective for each week thereafter will be a further development. Each step aims to try and ensure that people find personal benefit in the changes, and there is a flow of tangible benefits for the Edinburgh Tram management teams.

In overall terms there will be an intensive three month period, followed by a further three months of adjustment, with ongoing support to develop the systems in the light of experience.

4.3.3 Next Steps

To address the weaknesses in planning it is necessary to deal with four interdependent areas, i.e. people, processes, information systems, and learning.

- People: it is people that decide on the action and make it happen, and it is people that create conflict, they need tools and motivation to collaborate, and learn to have respect for each other.
- Processes: the current processes are weak and demonstrably do not work, but they can be replaced by processes that give managers the visibility to see that what should be happening is happening, and people the information to get on with the job.
- Information system: the current systems are inadequate, but can be readily re-configured and reengineered to serve, help and support the people on the project, such as a master schedule.
- Learning: people need to be given the opportunity to learn how to collaborate with each other without conflict to solve planning problems, and make planning decisions.

4.4 Cost

4.4.1 Methodology

This review seeks to comment upon the Faithful & Gould (F&G) Post Settlement Agreement Budget Report and other supporting documents made available within the brief review. This report does not replicate what F&G have but seeks to identify comments which influence costs.

A briefing meeting was held with CEC and a further meeting held with Tie.

4.4.2 F&G Report

The costs summarised in the F&G report are as follows:

	Work Done	To Go	Sub-Total	Risk	Total	Risk %
Off street	214.7	145.4	360.1	1.1	361.2	0.3%
On street		45.8	45.8	5.6	51.4	12.2%
Utilities	0.0	2.8	2.8	5.0	7.8	180.5%
Tram Vehicles	48.0	14.4	62.4	1.4	63.8	2.2%
Project Management	248.5	30.6	279.1	1.8	280.8	0.6%
Risk				22.5	22.5	
	511.2	**238.9**	**750.1**	**37.3**	**787.4**	**5.0%**

Note: the risk amounts have been abstracted from the budget analysis, the F&G total from the P80 QRA is £784.7M. This is yet to be reconciled. The basis of the estimate and risks are attached below.

The F&G review relied on previously quantified items and project data and is not a first principles review of the design, the scope and a 'bottom' up estimate. The Off–street costs are based upon the agreed mediation figure.

The key observations for each element of the work include:

- Off-street – We have been informed that a pricing assumptions agreement has not been produced and that the costs are based upon a proposal at mediation to undertake the off street as a stand alone project. This needs to be verified. There is reference in Schedule X that possessions are assumed to be in place to meet the programme. It is understood that the contractor has accepted the utilities, ground contamination and ground risk. This also needs to be verified. Cost risk provision equates to 0.3% which appears low given the nature of the work next to the Edinburgh Glasgow rail line, however there is cost risk provision in the general cost risk section which relate to the Off street works.;

- On-street – sub contract tenders are being received and validated. Conservative assumptions have been included for capping layer depths (700mm vs 300mm shown on the drawings) however discussions are ongoing in relation to 'back to back' main contractor / sub-contractor pricing or remeasurement approaches. It is considered that a saving of £1m to £4m is possible subject to agreement. Schedule X Appendix B defines the pricing assumptions, there are a number of provisions which could trigger the cost plus arrangements, there is no evidence that the design information has been verified and there are a number of approvals to be obtained.

- Tram vehicles – the risk of 9 months of delay from September 2013 is included.

- Project Management – risk provision for delays is included

- Risk – the risk amounts are based upon the F&G risk workshop held 3rd August and the P80 figure is derived from the F&G QRA.

4.4.3 Meeting with Tie

A meeting was held with Tie, 18 August and 26 August 2011, to review the basis of the pricing. Tie's commentary on the On-street pricing was reviewed. A number of items were identified in the civils sub-contract pricing, the indirect management costs and the systems costs. Tie's estimate is c. £30m compared to the contractor's initial budget price of £56m. The contractor has confirmed an adjustment of £5.7m as a target saving to the Siemens price, giving a revised total of £51m. The F&G report identifies items which they believe are overpriced (lowest civils tenders, resource reconciliation, traffic management and further reductions to Siemens price) which produces a revised total of £41m. In the summary breakdown a base cost of £45.8M has been used and it is understood that the contractor is responding to queries that have been raised by F&G and also verifying sub-contract tender prices. To conclude this, further meetings would be required to validate the finalised pricing with the contractor to determine the status of the pricing and acceptance of the reductions in the F&G report.

Tie provided comments on the risk estimating, the key items being:

- Approvals – concerns that the contractor will seek to secure variations from any drawing changes from the base information.
- Utilities – Tie's figure is £1.8M not £1.25m included in the F&G report.
- Excavation limits – Tie consider that this was a client risk, whereas the F&G states that it is a contractor risk.
- Programme narrative – potential for a high risk of extension of time claims.
- Vandalism - tie consider that this was a client risk, whereas the F&G states that it is a contractor risk.
- Free issue materials – risk of defects in the vested Siemens materials where the contractor could attempt to claim additional costs on the basis that they will be issued back to the contractor as client free issue materials which is a client risk.

If these risks have not been successfully mitigated, Tie consider there is a potential for an additional £5m of risk provision required.

4.4.4 Conclusions

The conclusions reached to date are summarised as follows:

Off – street works:

It is understood that the costs are based upon a proposal at mediation for the Off –street works to be a 'stand alone' price. This requires verification as there is a concern that the contractor may claim overlap in project prelims and resources across the Off - street works and On - Street works. In addition the design should be verified to confirm operational effectiveness. . Also verification of risk allocation is required, for example reference is made in Schedule X that all possessions are assumed to be in place to meet the programme.

On – street works:

The verification of sub-contract prices and build up of preliminaries costs are ongoing and it is understood from sub-contractor tender returns that there is opportunity to secure better value. Currently, excluding risk there is a discrepancy of £6M between the contractors estimate of £51M, excluding the Siemens target saving and the base cost in the cost breakdown of £45.8M. There are factors which are likely to result in change or trigger the cost reimbursable arrangements, for example:

- The work sections are to be free of utilities;
- The programme narrative describes the basis of the programme and any changes to rev3a of the programme results in a cost change;

- A change automatically occurs if the actual facts and circumstances on site are different to the design or the pricing assumptions;
- The trigger occurs if the amount claimed exceeds the contract price by £0.75m or there is an EoT in excess of 21 days).

£3.3M is included in the risk register for moving to re-imbursement of actual costs, it would be preferable if these provisions were negotiated to more equitable arrangements and that the cost impact of cost reimbursable is calculated in more detail to determine the likely time and cost impact if a better risk profile between the client and the contractor cannot be achieved.

Basis of Costs and Risks interpreted from the information made available to TTPM

Issue	**Status**
Off Street – Airport to Haymarket	
The pricing assumptions, provides the basis of the lump sum price	Copy required for review
On-street – Haymarket to York Place	
700mm capping layer included as a tender clarification, design based upon specified depths e.g. 300mm.	Review final solution, either sub-contractor taking quantity risk but excluding CBR risk? Or price including 700mm to represent maximum price and subject to remeasurement. If 700mm then additional utilities to be removed?
Re-use vs. new kerb and paving slabs.	BBS have stated that price based upon 2nd hand kerbs and paving, existing would require selection and refurbishment.
Site investigation works	A budget estimate of £400k has been included, BBS have stated that £200k is required for defined SI and they are willing to review any further final SI requirements.
Traffic and pedestrian management	This item was queried by F&G; BBS have stated that cost is based upon the traffic management requirements and a tendered sub-contract price. This information is

	available for review.
Tenders from sub-contractors are being validated.	Average prices have been used for the budget estimate; it is assumed that final sub contractor prices will be used for the agreed contract price.
Indirect costs	F&G have stated that there may be overlap between the indirect costs for the Off Street works and the On Street works.
Systems and Trackwork	F&G have identified a number of items which they believe could result in a saving of £1m to £1.5m. Feedback is required from the contract negotiations.
Pricing assumptions	£4.1m included, these also cover the 15Nr variations from MOV4 raised by D Murray
Risks	£1.6M, £1m included for OLE design issue, mitigation issue to be reviewed
Utilities	
Further conflicts resulting from the design of OLE bases	£1.25m included for 550 conflicts and an additional £1.8m included for 200 conflicts.
Effect on utilities resulting from the lowering of the formation level for a deeper capping level.	£3M of risk added
Tram Vehicles (CAF)	
Revised contract price based upon September 2013 completion	A further 9 months providing £1.35m of risk included.
Project Management	
Compensation budget and early rates liability	£1.76m of risk included
Risk/Pricing assumptions	
21 day notification – delays move contract to	£3.3m included, equates to 10% of £33m

cost reimbursable	Review assessment and implications on Project Management resource costs
Approval body	Clarification is needed to confirm approvals responsibility
Design approval (8Nr)	Refer comments in On-street pricing assumptions, are all these covered?
Urban Traffic Controls	Status of interfaces with Traffic Lights/Controls
Excavation limits	Referred to as Contractor risk – is this based upon design at July?
Temporary works by tie	Referred to as Contractor risk – where is this scoped and what price has been included?
Utility free construction	Covered by utility items – confirm position regarding utility free designated areas in the programme narrative
Unexploded ordinance	Included in PM risk? Review
Contaminated material	Covered by utility items - Review
Routine maintenance	£0.5M included
Relaxation of time constraints	£0.3m included
Archaeological finds	£0.25m included
Programme narrative	Statement that this is covered by other risks – review, identifies which ones utilities, 700mm capping and traffic management?
Vandalism	Ambiguity – F&G state contractors risk, tie have queried this?
Materials free issue	£0.25M included, agreement needs to exclude Siemens materials owned by CEC through vesting

Failure to certify completion	£40k included
Security incident	£50k included
Exceptional adverse weather	£0.3M included, review exception criteria
Time delay risk	£11.61M, 9 months at £300k per week
General design risk	£5.92m which is the balance figure from £10m less the other specified risks

4.5

4.6 Risk

4.6.1 Introduction

TTPM have carried out a high level review of Tie's Risk Management processes from the 15th to the 26th August and this report outlines our findings and recommendations for improvement.

4.6.2 Assessment Approach

Risk Management represents a key element of TTPM's review of the project delivery process and controls procedures implemented at Tie. We recognise Risk Management as a key contributor to project success, providing the team with a proactive approach and supportive toolkit to reduce uncertainty, minimise threats and maximise opportunities.

Our initial review activities have focused on establishing the "as-is" situation, enabling us to highlight instances where there are gaps, and as part of a balanced assessment, good practice. Our approach uses 3 key methods:

- Interviews with key personnel:
  - It was noted that the dedicated Risk & Insurance Manager, Mark Hamill, had since left TIE (approximately 8 months ago). His responsibilities were then delegated, primarily to Susan Clark
  - Interviewed Susan Clark and Steven Bell, with additional documentation provided by Alan Coyle
- Data gathering & analysis:
  - Project risk register, mitigation tracker report extracted from Active Risk Manager (ARM)
  - Copies of recent minutes and updates from fortnightly "Programme/Risk" meetings
  - Copies of Tram Project Board reports / minutes
  - "Risk Summary for Project Director Review" reports
- Procedural documentation review, including:
  - Tie Risk Management Plan
  - Tie Risk Management Master Procedure
  - Sub-procedure Stage 1 – Identification
  - Sub-procedure Stage 2 – Assessment

- Sub-procedure Stage 3 – Treatment
- Risk drawdown procedure

4.6.3 Level of Maturity

Once the required data had been acquired and collated, our approach involved assessing the maturity of the existing process focused on the 3 key aspects of any robust Risk Management Framework; Control, Analysis, and Enablers. This is illustrated and broken down further in the diagram below:

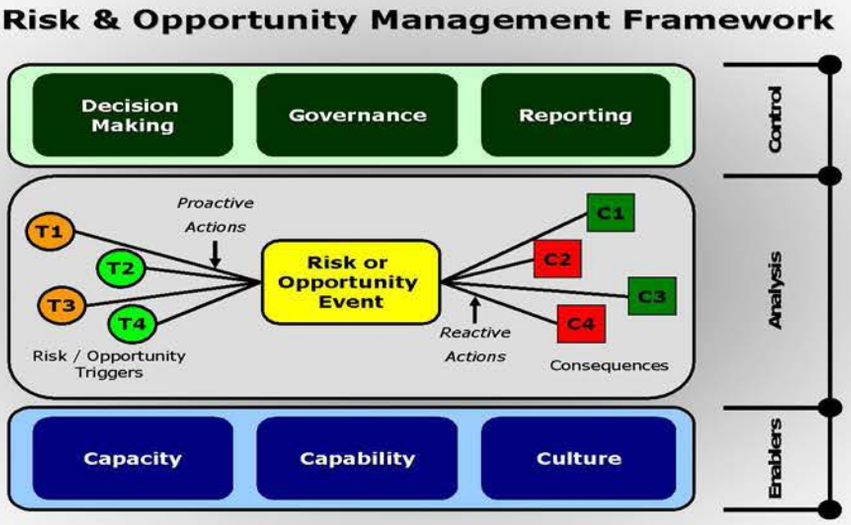


Diagram 1 – Risk & Opportunity Management Framework

4.6.4 Key Observations

We have broken down the Risk Management Framework into 9 specific areas (under each of the Control, Analysis and Enablers characteristics). Our assessment has then focused on identifying both the existing areas of good practice and, the gaps or areas for improvement under each of these. This is captured within the table below:

Expectation	Areas of Good Practice	Potential Gaps / Improvement Areas
CONTROL		
Governance - Clear Process - Clear Roles & Ownership - Risk Management across all levels - Clear reporting formats and timescales	• A dedicated "Risk & Insurance Manager" was in post (Mark Hamill). • Multiple, detailed Risk Management Plans and processes in place (Risk Management Master Procedure and Sub-Procedures, Risk Drawdown Procedure and Risk Management Plan). • Appropriate reporting timescales at various project team forums are noted in the processes (Function level and Project team board). • Clear Roles & Responsibilities are defined in procedure documents and with a RACI Matrix (Responsible, Accountable, Consulted, Informed). • Job descriptions reviewed for senior management personnel include references to Risk Management responsibilities. • Active Risk Manager defines a consistent register format. • Risks are reported to the Project Board as a standing agenda item for the Project Director to inform them of "Red" risks.	• The previous "Risk & Insurance Manager" has since left Tie and would need to be replaced. • Reporting formats at each level, whilst described, could be better illustrated. Lack of clarity over content and/or format. • The processes fail to illustrate a detailed hierarchical, approach to risk at "Strategic", "Programme" and "Project" levels. Whilst risks are reported to the Project Board and are factored into decisions there is an unclear split and no specific "Strategic" board level register. This could potentially result in risks which require board level input, but are not assessed as "red" being missed. • Process refers to quarterly QRA revisions. Susan Clark informed us she was not aware of an update since 2008. After further discussions we are informed the Risk Manager delivered further QRA, but that a conscious decision was taken by the board not to formally rerun it until after mediation due to issues of ownership and unresolved variables at scoping level. Whilst accuracy may have been limited, QRA could have remained a useful tool in management of contingency identification and drawdown. IN its absence it appears contingency remained static, though drawdown continued to be tracked. • No clear thresholds for risk escalation, or escalation routes. Risk Manager acted as a "gatekeeper" between a shared "Concerns Register" and the ARM Risk Register, but this process is not documented. Need to implement clear

Expectation	Areas of Good Practice	Potential Gaps / Improvement Areas
		levels of risk and "appetite" appropriate to delegated authority at each. • It was generally observed that once mediation commenced with the contractors, the original Risk Management process as documented was no longer followed, with an adapted approach taken involving a "Concerns Register" and "Shared Risk Register". Whilst a shift in strategy may have been the correct move, this should have been documented formally as part of annual process guidance reviews.
Decision Making - Leadership / Senior teams engaged - Clear communication of management actions - Clear ownership and tracking of management actions	• Risk reviews noted in Governance procedures at 3 different groups, plus quarterly in-depth reviews. • Evidence of fortnightly risk reviews and minutes ("Programme / Risk Meetings"). • Evidence provided of quarterly Project Director risk reports, including highlighting key risks, and tracking of contingency drawdown. • Risks are reported to the Project Board as a standing agenda item for the Project Director to inform them of "Red" risks. • ARM action tracking reports are produced and followed up by the Risk manager ("Response Owner" performance tracking).	• Minutes and evidence provided suggest frequent reviews, but in a different format to the risk procedure documentation – different formats and forums. Reporting remains evident, but the amended approach should be documented and approved. • During mediation a "Shared Risk Register" document was created in Excel (based on the contractor register and supplemented by Tie) to encourage contracts to re-engage in the risk process. This was less focused on quantification and assignment of ownership between Tie / contractor, but on joint working. A valid approach, but risk treatment measures do not have timescales (almost all marked "ASAP") or any ownership making tracking impossible. • Lack of QRA evidence or refresh throughout project to inform contingency following entry into mediation. However, noted that this was a conscious Tie decision outside the risk manager's control. QRA can be a key factor in the decision making process, taking account of risk. • A formal hierarchical approach at Strategic, Programme and Project levels could assist in decision making by defining delegated authority limits, and clearly recording risks relevant to each group. Concerns the revised, undocumented, risk management approach may have created some confusion over lines of responsibility.

Expectation	Areas of Good Practice	Potential Gaps / Improvement Areas
Reporting - Periodic, consistent reporting formats tailored to audience / correct level of management - Clear definition of risk exposure - Risk information kept current	• Evidence of reporting contained within minutes of "Programme / Risk Meetings" with extracts from the ARM Risk Register contained within. • The Risk Register appears to be maintained regularly. • Report cycle included 4-weekly review of "Concern's Register", "Project Director Report" and a report of "red" risks, with discussion, at the Project Board. • Quarterly reviews held with broad team stakeholders including the Project Director, Commercial Director, Risk Manager, Infraco Director and Finance Director. • Monitoring of contingency drawdown evident.	• Contingency was tracked, but there was a no QRA revision so reporting and understanding of risk exposure is limited. • Though there is a separate "Response Owner" tracking document, most reports do not report on action plan progress and tracking. There is evidence to suggest it was reviewed, with the register kept up to date, but actions progress should be a key KPI with more focus e.g. no action closures notes, success or failure references or action follow-up requirements. • Concerns that with the "Concern's Register" and "Shared Risk Register" both held in Excel, out with the core ARM system, key risks could be missed from ARM reports (i.e. Top risks to the board, primary risk register reports and response owner tracking).
ANALYSIS		
Description - Risk Registers in place in consistent formats - Current information - Content consistent with process definitions and "best practice".	• Primary Risk Register format consistent through use of Active Risk Manager (ARM). • ARM recognised as a "best practice" tool used by other high profile organisation such as Sellafield Ltd and Network Rail. • Content has been reviewed maintained - kept current. • Appropriate categorisation of risk in place. • ARM does allow capture of opportunities in line with best practice.	• Some format variance between the "Concerns Register", "Shared Risk Register" and ARM (less information in Excel register compared to ARM). Concerns multiple register approaches introduce risk of missing key uncertainties and make management / monitoring more complicated. • Risk Owners on "Shared Risk Register" are groups (Tie, CEC etc). Best practice is to have specific named individuals to ensure ownership. • Risk is at times incorrectly broken down into "Cause", "Event" and "Effect". "Cause" factors should ideally be statements of fact which give rise to the uncertainty, not the uncertainty itself as is seen throughout the registers – may not be targeting/managing probability drivers effectively. • No "Opportunities" captured, though the functionality is noted in ARM. Team is potentially failing to recognise and deliver "upside" risk to drive savings, enhance quality or accelerate programme.

Expectation	Areas of Good Practice	Potential Gaps / Improvement Areas
Quantification - Current & target assessment positions - Quantitative analysis for modelling & reporting - Levels of register with appropriate assessment ranges	• Current (Unmitigated) and Target (Mitigated) assessment positions allowed for • Risks assessed on a standard 5x5 matrix • Quantitative ranges sit behind the 5-point scale to facilitate modelling. • Impacts assessed covering cost, schedule, H&S, Reputation and Environmental	• Probability and Impact have qualitative assessments, with quantitative ranges behind them, but there are few examples of specifically quantified values on a risk by risk basis. This is primarily due to suspension during mediation of formal QRA, but poor quality modelling would have resulted and values could have been maintained where possible. • Risks within ARM have been captured and quantified in a single register with no appropriate hierarchy – risks may not be prioritised appropriately for each level. • As previously noted, informed by the Risk Management lead that she was not aware of any QRA since 2008. QRA not formally used once mediation commenced.
Management Actions - Actions are clear, unambiguous and have deadlines - Detailed review on a regular basis - Links to the change control process	• Action plans have been recorded for all risks. Multiple actions against some entries. • Contingency drawdown and change control appears to be linked to the risk register as documented in the "Risk Drawdown Procedure". • Risks are reviewed fortnightly through "Programme / Risk Meetings". • 4-weekly review and reporting cycle, with further quarterly risk reviews. • ARM reports provided illustrating performance tracking of "Response Owners" and treatment plans	• Many actions are unclear and non-specific in the "Shared Risk Register". E.g. many say "close programme management / control", but what does this actually mean? However, noted that actions in the ARM Risk Register are more detailed and specific • "Shared Risk Register" has most actions with a timescale of ASAP as opposed to a specific, monitored and measurable date. However, specific dates are noted in the primary ARM-based register. • On the "Shared Risk Register", where there are multiple actions they do not appear to have their own specific dates or owners. • Actions are tracked, with the registers kept up to date, but reporting on them appears to be limited to ARM exports e.g. actions tracking not incorporated into 4-weekly Project Director risk reports. Potential gap in reporting of action completion, success or failure, and follow-up requirements.

Expectation	Areas of Good Practice	Potential Gaps / Improvement Areas
ENABLERS		
Capacity - Dedicated risk personnel / teams - Clear roles & responsibilities - Clear risk management activities	• Detailed procedures in place which document clear roles & responsibilities and include a RACI system • Dedicated "Risk & Insurance Manager" until approximately 8 months ago. • Documentation outlines clear processes, reporting forums and frequency. • Job descriptions for senior personnel include reference to Risk Management responsibilities.	• Potentially understaffed in relation to dedicated risk personnel for a project of this scale and complexity. • Risk Management process has deviated from guidance documentation following entry into mediation with the contractor parties – lack of formal documentation and potential lack of clarity over roles and responsibilities in the revised approach.
Capability - Staff clearly understand risk and their roles in the Risk Management process - Risk Management training program in place - Risk Management roles including in job descriptions out with dedicated risk team	• Risk Management identified with detailed Risk Management process documents, a dedicated risk management software package, and a dedicated risk and insurance manager. • Risk Management responsibilities included in senior personnel's job descriptions • Informed that the Risk Manager continually engaged the teams to maintain understanding of Risk Management requirements.	• Dedicated "Risk & Insurance Manager" has since left the team approximately 8 months ago with delegated ownership since – with additional tasks outside of risk, potential to lose some of the pro-activity gained with the dedicated role. • Competency of the teams in managing risk difficult to identify due to a lack of visible reporting on action plans beyond ARM performance monitoring. ARM report is useful, but no detailed commentary on action plan progress, success or failure apparent. • No formal training programme in place, or rolling schedule of risk update sessions. Training appears to have been more informal through review sessions. Focused risk awareness sessions / training may improve participation.
Culture - Evidence of Risk Management at all levels of the organisation - Clear risk orientated goals defined - Senior Management	• Evidence that the Risk Register was reviewed and circulated around a number of key team members through "Programme / Risk meeting" minutes • Reporting to the Project Director and Project Board. • Risk reviewed with key stakeholders including Tie, BB, CAF, Siemens, HG Consulting and Plan Delivery.	• Risk Management process in ARM is flat, with no clear breakdown of "Strategic", "Programme" and "Project Levels". Makes ownership and focus areas for individuals unclear. Mitigated in part by undocumented "Concerns Register" and "Shared Risk Register", but clarity issues remain. • As part of this review multiple organisational charts were collected, but the risk manager does not appear in the senior hierarchy suggesting it has been

Expectation	Areas of Good Practice	Potential Gaps / Improvement Areas
support of Risk Management - Risk information openly shared with all members of the project team.	• Risk treatment plans developed. • Procurement of an expensive, dedicated risk system like ARM suggests senior management support.	aimed at too low a level

4.6.5 Summary of Observations

We have identified a number of positive and negative attributes about the current Risk Management process at Tie. In summary, our perception is that there was the solid foundation for strong Risk Management with substantial risk process documentation, a dedicated risk manager, detailed process charts and an industry leading risk management software package in place (ARM). Quantitative Risk Analysis was used at some point, reporting is in place, and senior management clearly have awareness of risk and the Risk Management function. The primary issue appears to have been the shift as the project entered mediation with the contractor groups. At this time approaches to QRA, and adherence to the guidance documentation appears to have been dropped, with a potentially more suitable, but less formal approach. Revisions in the Risk Management process itself should have been met with changes to the guidance.

The key gaps in the process appear to be as follows:

- Lack of a hierarchical approach to Risk Management with no formal breakdown of risk across Strategic, Programme and Project level. ARM has this functionality, but it has not been adopted.
- Failure to identify "causes" of risk allowing for prevention and probability reduction at source.
- Some poor risk quantification, and an absence of QRA modelling to influence decisions and set robust contingencies for residual risks. This was abandoned once mediation was entered as a conscious decision, but it is our belief that it could have added value. It will require review in light of revised scope and strategy going forward.
- No Quantified Schedule Risk Analysis (QSRA) to identify risk sensitivities in the schedule, in addition to the cost QRA process.
- The "Shared Risk Register" was implemented to re-engage the contractor groups in proactive Risk Management, which was a positive step. However, it has poor delegation of

risk ownership (groups as opposed to individuals) and poor action planning with vague actions and non-specific "ASAP" due dates.

- No evidence of any formal training program/process to ensure the risk management procedures were fully understood and implemented, helping foster a risk culture across the whole organisation.

- Risk Management not included in Tie organisational charts provided, failing to illustrate where it sits in the organisation as a core service.

It should be noted that the observations recorded in this report represent our initial findings based on a relatively short timeframe. The recent departure of the Risk & Insurance Manager, and the subsequently delegated risk lead being on annual leave at commencement of this review also limited the insight we could collate. Our findings are therefore based primarily on a desktop review of the evidence and documentation provided.

4.6.6 Improvement Plan

Based upon our assessment and understanding of what would be considered best practice, we have outlined a number of improvements under each key framework area. This highlights actions we believe would deliver a tangible improvement for the Edinburgh Tram project going forward, delivering improved ownership and driving risk exposure levels down, whilst realising opportunities.

Performance Area	Improvement Action
Control: **Governance**	1. Revise the current process documentation to adopt a hierarchical approach to Risk Management, as outlined in the HM Treasury "Orange Book", with clearly defined "Risk Appetite" and escalation levels. 2. Update the Governance in line with revised approaches to review, reporting and modelling as the project is re-launched. 3. Monitor the implementation of the Risk Management processes to ensure adoption and understanding across the teams. 4. Ensure Risk Management procedures are reviewed, improved and updated as approaches change in response to changes in strategy or organisation structure.
Control: **Decision Making** **&** **Analysis:** **Management Actions**	1. Seek senior level support and commitment to a revised risk management process, ensuring it continues to be used in the decision making process. 2. Re-launch the reporting process, developing formats specific to the needs of each reviewing forum across project streams and levels. Incorporate a focus on treatment plan monitoring and reporting. 3. Develop treatment plans which are SMART (Specific, Measurable, Achievable, Realistic & Time-scaled) and have named owners and specific delivery/review dates across all levels. 4. Where recurring risk issues are identified, establish integrated focus groups to drive risk and opportunity management in these areas. 5. Ensure that QRA risk information is made available at appropriate forums for decisions relating to risk acceptance, transfer, and delivery strategy.
Control: **Reporting & Analysis**	1. Derive reporting and monitoring/review forums appropriate to the structure of the team and cover all levels (strategic, programme, project). 2. Incorporate QRA modelling updates into reporting, providing clear indications of risk incidences, reduction and overall risk management "success" – key KPI. 3. Reporting templates to be developed, communicated and detailed within procedure documentation Reporting with the principles of "Right time, to the right people, in the right format".

Performance Area	Improvement Action
Analysis: **Description**	1. Risk owners to be clearly identified, with named individuals across the team on all registers. 2. Make sure that the use of the "Cause", "Event", "Effect" breakdown is appropriate and accurately records the factual drivers and effects. 3. Encourage the team to capture opportunities in addition to threats where possible, possibly through introduction of a Value Management process.
Analysis: **Quantification**	1. Work with the teams to capture appropriately quantified risks, using specific values and ranges where required as was originally undertaken by Tie prior to mediation. 2. Undertake revised QRA modelling for both Cost and Schedule, identifying where the risk sensitivities lie and driving allocation of more appropriate contingency sums. 3. Split risk provisions, for example, with the project team granted contingency at P50, and the senior team retaining the difference to P80. This would provide more control and drive the team to deliver for less.
Enablers: **Capacity**	1. Appoint a replacement dedicated Risk & Opportunity Manager with experience in a project delivery environment. 2. Assign responsibility for Risk Management, in line with the existing process documentation, with this monitored and reported on by the Risk Manager to ensure ownership.
Enablers: **capability**	1. Deliver a training programme for the team, delivered through specific targeted training sessions and engagement at Risk Management Workshops.
Enablers: **Culture**	1. Develop clear performance target expectations and encourage senior management to deliver and enforce it. Culture will be driven by a combination of clear process, continued commitment of senior management, visible reporting at all levels, delegation of responsibility with monitoring and training, and a continued message of the benefits in proactively managing risk. Effectively a re-launch on the Risk Management process on the scheme

Clear timescales will need to be set for implementation of these actions, but will be dependent on coordination with the overall programme of structural change on the Edinburgh Tram scheme. This should be revised as the wider programme takes shape.

4.7 Project Controls

4.7.1 Project Controls and Contract Management

Project Controls on the project has been impaired by the lack of agreement on the scope. In the review period we were not able to gather sufficient information to set out the complete chain of events. The following, however, indicates the type of problems encountered in the review:

- The last accepted programme was Rev 1 submitted in 2008
- The Base Date Design Information (BDDI) for the BBS contract was incremented from Version 26 to Version 31 during the tender period. There has been an ongoing conflict between Tie and BBS over whether changes were design development or material changes to the key design parameters.
- Any re-sequencing of the work arising from these changes has been considered by BBS as grounds for acceleration payments
- The payment mechanism was intended to reflect milestone completion. This approach appears to have failed as a result of the lack of an agreed baseline scope or accepted programme.
- BBS have not submitted any schedule impact assessment with changes
- BBS have not acted to mitigate the impact of any delays – in effect stopping the works if information is incorrect or access to any part of the site is not given
- Float is being eroded as BBS focus on critical path activities
- BBS have constrained (fixed dates) on the network based on a resource levelling exercise – this prevents a accurate calculation of the effect of progress
- There is no process for agreeing progress. BBS supply Actual Start and Finish dates and Forecast Finish dates and physical percentage completion. An asssessment of progress on site is not agreed with Tie as part of the application process.
- Tie have not accepted a programme since 2008 (Rev 1) with versions 2,3,3a and 3b being rejected. Employers Requirements for Cost and Resource loading not being adhered being cited as a key reason

4.7.2 Change Management – Schedule Impact

Tie have added activities to their Master Programme that model their assessment of the impact of changes. They have set up a spreadsheet that cross references correspondence relating to changes to WBS nodes. This provides some audit trail and would help in the retrieval of records

in the case of a dispute. As BBS have provided no assessment of the schedule impact of changes, the Tie 'as built' Programme will be disputed.

From this it is clear that the Employers Requirements relating to schedule management are either not adequate or being ignored.

The principles to be followed should be set out as follows:

- Foresight – identify issues and deal with them as they arise;
- Detail – quality and content of the submitted/revised programme;
- Collaboration – all parties contribute to the process that makes a revised programme becoming 'Accepted';
- Realism - the programme should always be a true representation of the progress of the project so far and what is expected to happen in the future.

4.7.3 Planning Resources

The Tie planner has done a good job in developing and maintaining a Master Schedule, however, given the practices described above this schedule is disconnected from the contract programme. To stand any chance of success the project needs to make a break from the adversarial behaviours and practices. The new practices to be introduced may require to be implemented by new people.

The size of the planning team is dependant upon a number of variables:

- The scope of the project
- The degree to which all parties collaborate in the development of single agreed programme and provide comprehensive, accurate and timely progress information and change assessments
- The cooperation and competence of third parties in programme development
- The degree to which it is necessary to maintain independent programmes to protect the interests of CEC in case of disputes.

Depending on the outcome of the above, one senior planner would suffice in the best case, a team of three in the worst.

A schedule risk assessment followed by planning workshops with the key stakeholders to establish a realistic and achievable programme is necessary. This will take a minimum of six weeks. See indicative timeline below:

4.7.4 Document Management

The Tie Document Control Arrangements and System

Tie are using SharePoint 2007 for all correspondence, communications, and documents. Drawings are stored as pdf with some .dwg files by exception. Documents are received by email or disk. The Document Controllers load these on to SharePoint and distribute the information to recipients via email with hyperlinks to the documents. The access controls have become convoluted as the project organisation has evolved. There are circa 250 separate access groups to be managed and included in the distribution lists. There is over a terabyte (1000 gigabytes) of data stored on the SQL server. The Outlook .pst files are also extremely large. There are inevitably problems with performance.

The functionality of the system is suboptimal. The functionality problems are caused by requirements for metadata tags, used for searching, changing over time and users not adhering to document naming conventions. `

The Document Management team and the ICT Managers are developing a spreadsheet that groups and cross references documents by subject matter. The intention is to revise the design of the metadata tags and recode documents with new metadata attributes in due course.

The Document Management team and the ICT Managers are also developing a spreadsheet that groups and cross references documents by subject matter. The intention is revise the design of the metadata and recode documents with new metadata attributes in due course.

4.7.4.1 Options

Ideally a common EDMS would be used by the Project and the supply chain. BBS are using BIW and were originally going to provide access to Tie – but this was withheld.

In view of the large historical content held on SharePoint it would a significant undertaking to import the Tie documents to a new EDMS. This would involve man-months of effort as the documents would need to be individually opened, reviewed and re-tagged. Note that previous versions of documents are embedded in SharePoint and would need to be processed individually.

Tie propose 'starting again' with a new 64 bit SQL database and SharePoint 2010 which would be configured to take into account of lessons learned to date. The old database would be 'moth balled' and information would be retrieved from the old system and added to the new as required.

4.7.4.2 Conclusion

Given the volume of historic information the practical option is to continue with the existing SharePoint database, review options for improving performance by investing in new hardware and review the initiative to modify the metadata and re tag documents to facilitate easier search and retrieval. It has been suggested that no one has considered the information requirements for Operations and Asset Management.

4.7.5 Cost Management and Financial Performance Reporting

4.7.5.1 Current Arrangements

The Financial Manager explained Tie use Microsoft Dynamics NAV for financial management and HR. The product is an ERP system for small to medium sized enterprises. It is used by Tie to record invoice values, accruals and costs against cost account budgets. The software is not used to manage procurement and there is no three way matching purchase- to-payment process.

The product has limited reporting functionality so Excel is used to produce reports for budget holders. There are 20 summary Cost Centre ('T-Codes') allocated to several Budget Holders. These Cost Centres are broken down into 718 account code lines.

The suite of reports generated by interlinked Excel spreadsheets summarises to a project total and the 20 Cost Centres. The Report includes Budgets, Cost of Work Done, Forecast to Completion and Anticipated Final Cost. They do not include any commitment or contract change information.

The list of account codes currently used does not adhere to a typical project cost breakdown structure, or appear to align to contract packages. For example all prelims and variations are allocated to on the T19 series. The cost reports are unlikely to provide useful cost performance information.

4.7.5.2 Project Accounting and Cost Reporting Next Steps

To achieve improved reporting we will need to:

- Confirm if CEC are going to undertake the project accounting, payment of invoices, cash flow forecasting etc or if this is in T&T scope.
- If T&T then we need to procure and setup a Finance system or if CEC, work with them and agree the approach.
- Define an appropriate cost accounting and project cost reporting breakdown structures
- Determine the closing and opening balances and manage the implementation of the new Project Accounting system.
- Develop / specify export routines from the accounting system.
- Develop Report Formats and get them accepted by CEC
- Develop Reporting Tool (Excel) or configure Off the Shelf Software.

4.7.5.3 Cost Forecasting, Performance Measurement and Earned Value

Tie appears to allocate forecast costs to time periods manually using spreadsheets. If the main contract is to remain fixed price with payment against milestone completion then there is a case for cost loading Primavera to provide a more accurate and automated forecast.

This approach should only be considered if the historic problems associated with not being able to define and agree the scope have been resolved. High volumes of change and/or de-facto re-measurement will increase the effort required to maintain the baseline and forecast in Primavera resulting in the need for two or three additional people.

4.7.6 Contract Administration

4.7.6.1 Current Arrangements

Tie have explained that the main contract had been split in to seven sections and that 14 surveyors were engaged during the peak of the activity. They reviewed applications for payment and passed them to the PMs for approval. They were very active in reviewing certificates for changes against estimates. Tie noted that very few of the original Milestone based applications were processed as a result of the lack of agreed scope.

The QS's maintain Excel registers of changes InfraCo Notice of Tie Changes and Tie Notice of Changes and the contractors entitlement to payment against these changes is entered by the QS's on these spreadsheets which are passed to the Finance Manager.

Note there is no contractual requirement for the contractor to submit a cost estimate or schedule impact for changes and so disagreement about the value of work done is inevitable and is likely to result in protracted disputes. Tie stated that no Contractors' Prelims had been paid for over a year.

4.7.7 Contract Admin Next Steps

Further information is required about how the project is to be taken forward before a definitive recommendation about contract administration management arrangements and systems can be made. It is clear that that the current arrangements that consist of a large number of spreadsheets collecting information against several hundred cost account codes set up on Microsoft Dynamics NAV are not adequate.

The project would benefit from the implementation of a robust contract management system but this would only be practical if the following areas were addressed:

- The scope can be baselined and agreed,
- Flaws in the contract addressed (relating to change management in particular)
- Appropriate payment mechanism established (milestone payment can only be effective if the scope and acceptance criteria are agreed)
- A new Cost Code of Accounts aligned to the Contracting Plan is established

4.8 Project Assurance

4.8.1 Overview

TTPM met the following representatives from tie to review the project assurance proceses: Mr Steven Bell (Project Director) – part time, Mr Ralph Baqar (Project Assurance Manager) and Mr Colin Kerr (System Verification Manager).

It was identified by Tie that the assurance process had been structured into the following work streams:

- Deliver a tram safely - Addressing the requirements of the CDM Regulations, environmental requirements and the Code of Construction Practice.
- Deliver a safe tram – Addressing the requirements of the safety verification scheme, design, construction + testing & commissioning assurance.

The meeting was held following the meeting of The City of Edinburgh Council which voted for the tram project to terminate at Haymarket, rather than St Andrews Square.

The meeting was held on the basis of the consortium comprising Bilfinger Berger, Siemens and CAF. Post meeting it was identified that CAF would no longer be part of the consortium. This introduced specific issues which impact on assurance within the project.

4.8.2 Construction (design & management)

The CDM duty holders for the main tram contract were identified as being:

CDM Client – tie

CDM Co-ordinator – tie

Principal Contractor – consortium

There were also a number of contracts that were let outwith the main tram contract. The CDM client and CDM Co-ordinator were as above, but the Principal Contractor with the contractor undertaking the role of Principal Contractor. Examples included enabling / accommodation works e.g. works that had been undertaken at Edinburgh airport.

The role of the consortium as Principal Contractor was queried. It was noted that there were separate health and safety managers for Bilfinger Berger and also Siemens. It was advised that health and safety standards on the project were primarily driven by the subcontractors e.g. Barr, Farrans and Grahams and not from within the consortium.

4.8.3 Environmental management

There was an Environmental Management Plan for the project which was being implemented by the contractors and being monitored by tie.

There was a project Code of Construction Practice (COCP) that was being implemented by the Contractors and monitored by tie. Tie is the 'appropriate person' identified within the COCP.

4.8.4 Quality management

The project was based upon contractor assurance of the works. There was a right of audit on the consortium and their supply chain and also on the operator.

Joint inspections between tie and the contractors were being undertaken. It was advised that contractor assurance was weak, with a lack of input from the consortium. It was commented by tie that in some instances this had led to tie personnel becoming more involved in the construction process than was appropriate.

The contract with the consortium allowed for a right of audit on the consortium and their supply chain and the operator.

4.8.5 Safety assurance

The scope of the safety assurance was advised as being:

- Design – scheme from Newhaven to Edinburgh airport
- Construction, testing & commissioning – scheme from Haymarket to Edinburgh airport.

The project had been taken forward under the ROGS Regulations (The Railways and Other Guided Transport Systems (Safety) Regulations. This had required a number of actions to be undertaken:

- The appointment of an Independent Competent Person – Mr John Dolan.
- The development of a Safety verification Scheme.

The safety assurance covered the consortium and the tram operator. Tie were the 'Responsible Person' under the ROGS Regulations. Any alteration to the Safety Verification Scheme e.g. responsibilities, structure would require to the review and 'no objection' from the Independent Competent Person.

A Project Safety Certification Committee (PSCC) (attended by tie, the consortium, the Independent Competent Person and the operator) had been established to enable issues relating to the safety assurance process to be addressed. The remit of the PSCC had been agreed with the Office of Rail Regulation.

The design assurance had been progressed on the basis of the submission of the cases for safety. The consortium had advised that the submission of the 'Design Assurance Statements' were now not to be made until the end of the project. This had resulted in design assurance within tie being undertaken using a sample of the 'Approved for Construction' issue information to review and check key issues. Tie were utilising key individuals to undertake the design assurance activities using the TSS contract.

A change to the Conditions of Contract had been made under the mediation process undertaken in June 2011 (MOV4) which had removed the requirement for submissions from the consortium to be reviewed and returned with a category of A, B or C, together with the removal of the obligations regarding deliverables. These changes had diluted the ability of tie to challenge the design that had been developed.

Tie stated that a key aspect of the safety verification process was the development and presentation of documented evidence. There was concern raised that this process was not being carried out effectively due to under resourcing by the consortium and issues regarding document management (see below for details).

4.8.6 Document management

There were different document management systems being implemented by tie and the consortium. Tie were implementing Sharepoint and the consortium were implementing BIW. This had resulted in their being a lack of compatibility between the systems – with Sharepoint not being able to recognise the file referencing being used within BIW. It was advised that this issue was in the process of being resolved by the consortium.

4.8.7 Interfaces

There were two key interfaces that were identified. These comprised:

1 Interfaces between the consortium and CAF. It was advised post the meeting with tie that CAF had left the consortium i.e. at the meeting the discussions had been held on the basis of the consortium being comprised of Bilfinger Berger, Siemens and CAF, post meeting the consortium was identified as comprising Bilfinger Berger and Siemens, with CAF being contracted directly to City of Edinburgh Council. This change would have a significant change to the interfaces within the assurance process and introduce key interface criteria between the tram vehicle and the other infrastructure that would require to be managed. It would also impact on the responsibilities of the consortium with regard to the assurance process.

2 Interfaces at the depot at Gogar. At the meeting with tie it was identified that a significant interface would occur when the depot was handed over to tie and to the operator at handover stage T1 on the 16th December 2011. At this point the depot would cease to be classed as a construction site, although there would still require to be construction works undertaken by the consortium for fitting out the SCADA and operational equipment within

the building. The external depot area would however remain as a construction site under the control of the consortium as Principal Contractor.

At this time the OLE would be energised within the depot building and within the external depot area. All isolations and switching would require to be undertaken manually.

5no trams will be delivered to the depot site. With the change in consortium structure the trams will now be delivered onto a construction site by a third party (previously they would have been delivered by the principal contractor).

A 500m long test track will be operated within the external depot area. This will involve an interface between the operator, the consortium and CAF.

4.8.8 Competency requirements

The project was being managed by Network Rail as a Third Party Works contract. Tie were undertaking the role of Third Party Representative. For this arrangement to continue a competent resource approved by Network Rail will be required. It was reported at the meeting that due to poor contractor performance Network Rail were considering changing the arrangement from a Third Party Works contract to an Outside Parties contract. (One aspect that was identified was the lack of robust proposals for track monitoring). If this change were made it could result in additional costs to the project.

A specific resource – Dr Roger Wright from Atkins had been appointed as the project's expert on stray current issues. His appointment had been agreed by third parties. It was reported at the meeting that his appointment had lapsed.

The Independent Competent Person as required by the ROGS Regulations – Mr John Dolan had been appointed through the TSS contract.

4.8.9 Risks & Mitigation Measures

Risks	Mitigation measures
Obligations under the COCP are not undertaken.	Ensure that responsibilities and appointments under COCP are reallocated.
Consortium do not implement self assurance role and third party is sucked into undertaking inspection role.	Ensure that the consortium undertake their self assurance role as contractually required. Establish processes that ensure the responsibilities are retained by the consortium.

ROGS process is not implemented.	Ensure Independent Competent Person is appointed.
Safety verification scheme is not acceptable.	Ensure safety verification scheme is reviewed by Independent Competent Person.
Documented evidence required for safety verification is not produced.	Ensure document management is effectively, resourced and managed.
Design verification is not complete until Design Assurance Statements are presented at the end of the project.	Ensure design verification is monitored through the process, utilising appropriate resources as required.
Interfaces between the operator, the consortium and CAF are not	Ensure that interface management is highlighted within project organogram and responsibilities.
Network Rail reclassify the project as 'Outside Parties' rather than 'Third Party Work' – additional costs and possible extension to review timescales.	Ensure competent resource is allocated as Third Party Representative.

4.8.10 Future arrangements

It is proposed that for the future structure of the project team the following measures are taken:

- The organisation includes provision for an environmental clerk of works for monitoring the COCP and environmental management.
- Due to the change in contractual arrangement there are interface managers for the operator, the consortium and CAF.
- The depot is included within the scope of the Project Management workstreams.
- The Project Management responsibilities for the Depot to Haymarket section specifically highlight the role of Third Party Representative.
- Provision is made for specific resource to review of design information to enable design assurance to be undertaken.

4.9 Utilities

4.9.1 Background

T&T were instructed to concentrate its review to the on 'on street' works only, namely the utility conflicts that exist between Haymarket and York Place. A contractual obligation exists for *Tie*/CEC to ensure that no Utilities remain in the Utility Free Zone when the Infraco works commence.

Utility conflicts are defined as any utility that is *sh*allower than 1.2m deep that remains in the Dynamic Kinetic Envelop of the tram plus 2m either side (Utility Free Zone). The conflicts were identified by overlaying the Utility Free Zone on the MUDFA as built utility drawings and the Statutory Utility Providers (SUP) records and captured by *Tie* on a Utility Conflict Schedule' (UCS).

The utility conflict information comes from two sources, 'as built' drawings that are as a result of the recent MUDFA contract, and the respective utilities companies' own information, and compiled by way of a desk top study only. Confidence in the accuracy of the identified conflicts should be qualified accordingly. In supporting the development of a strategy for moving forward, TTPM have assumed that this base data is robust. No separate validation process has been undertaken in this regard.

The USC compiled by *Tie* has been reviewed and agreed in principle with Infraco. Bilfinger Berger, Si*em*ens & Parsons Brinkerhoff (Infraco) have confirmed that the UCS as prepared by Tie should be used as the baseline for the 'on street' utility conflicts.

Following initial discussions with *Tie* and Infraco it appears that a fundamental difference of opinion remains over the definition of a Utility, and what Utility Free means.

Tie has defined a Utility as only items that are 'live' and have been provided by a Statutory Utility Provider (SUP):

- Scottish Power,
- Scottish Gas Network,
- Scottish Water, and
- British Telecom

And the following communications companies:

- Cable and Wireless
- Energis

- Thus
- Virgin Media
- Verizon

Tie have excluded existing street lighting, power and data supplies to bus stops etc. and all other items not listed above including legacy ducting.

Infraco define a Utility as both 'live' and 'dead', as provided by the SUP and communications companies, including existing street lighting, power and data supplies to bus stops, along with all other 'live' power and communications feeds.

4.9.2 Work Done to Date

Following receipt of the UCS, TTPM tested a random sample of the conflicts. Assumptions were tested, supporting information reviewed, and the validity of the conflicts confirmed based on the accuracy of the information available. (46% of conflicts are identified against 'as builts', with the remaining 54% against utility company records.)

TTPM carried out a GAP Analysis on the UCS, and following further discussions with *Tie* and Infraco identified that the UCS was missing the following:

- Legacy MUDFA works that remains outstanding; (Now included).
- BT conflicts due to outstanding information; (Now included).
- SW conflicts due to outstanding information; (Open Item).
- Road level changes conflicts which result from the MUDFA contractor moving the utilities to a depth as measured from the existing road level, a road level that the Infraco design has subsequently reduced. T&T has started work with Tie and Infraco to determine their extent and this work is ongoing. (Open Item).

The quantum of the open items above remains unknown, though when know they will be added to the UCS. The UCS was updated and currently identifies 646 'on street' utility conflicts. The UCS was then analysed as set out below.

4.9.3 USC Analysis

TTPM has carried out a further analysis of the UCS as detailed below:

Table 1 – Utility Provider

The top four conflicts by utility provider are in bold below. They have been identified based on lead times and complexity, and the categorisation has been agreed with both Tie and the Infraco.

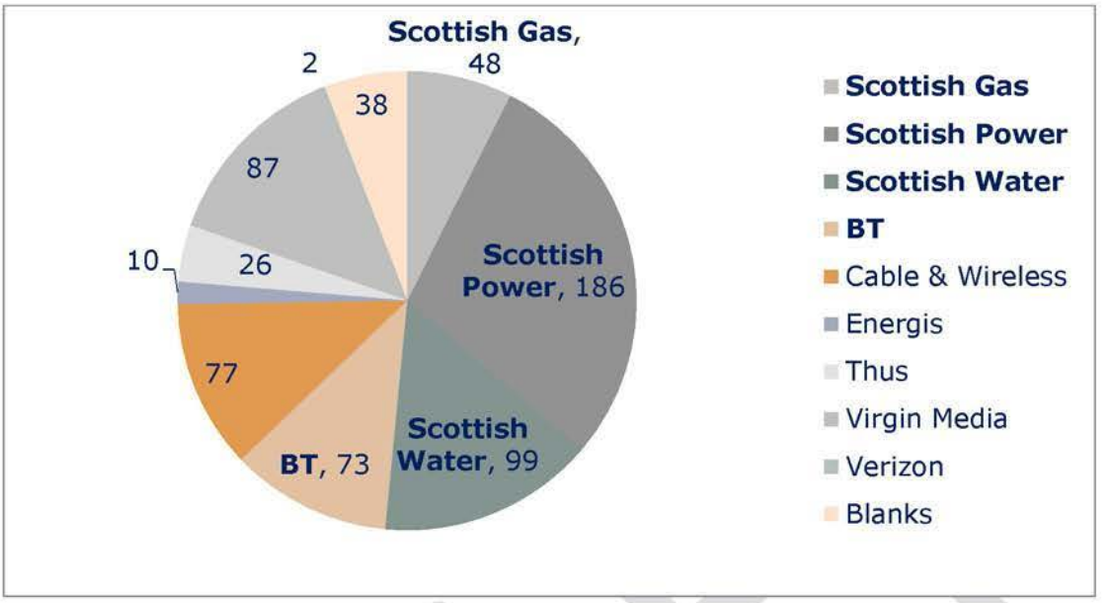


Table 2 – Conflict Type

The top two conflict types are in bold below. They have been identified based on complexity and design/construction impact, and the categorisation has been agreed with both Tie and the Infraco.

In order to make the UCS data meaningful T&T broke it down further by Infraco Construction Phase, and it is shown below in table 3, in order of proposed start on site dates, with the earliest at the top. (The dates and phasing were provided by Infraco, with numbers extracted from the UCS).

What is immediately apparent is that the utility conflicts in Haymarket Phase 1 can not, and will not be complete prior to the Infraco's proposed start on site date of the 05th September 2011. This will result in CEC being in breach of its obligation to provide a Utility Free Zone.

Table 3 – HIGHLIGHT REPORT				Conflict Source	
Infraco Construction Phase	**Start Date**	**Finish Date**	**Conflicts***	**As Built**	**Utility Provider**
Haymarket					
TM Haymarket	**05/09/2011**				
Haymarket Phase 1	14/09/11	06/03/12	76	32	44
Haymarket Phase 2	07/03/12	28/09/12	62	27	35
Haymarket Phase 3 – a&b	03/07/12	25/04/13	57	39	18
Haymarket Phase 4	01/10/12	09/10/12	0	0	0
Haymarket Phase 5	26/04/13	14/05/13	9	7	2
Haymarket Phase 6 – a-e	26/04/13	28/06/13	14	4	10
St Andrews Square – Phase 1	**09/01/2012**	20/04/2012	162	105	57
Shandwick Place					
TM Shandwick	**09/01/2012**				
Shanwick Place Phase – 1	16/02/12	03/07/12	68	49	19
Shanwick Place Phase – 2	23/02/12	02/07/12	22	15	7
Shanwick Place Phase – 3	04/07/12	20/03/13	50	45	5
Shanwick Place Phase – 4	03/07/12	07/01/13	29	13	16
Tramstop @ SP4	27/07/12	17/04/13			
Shanwick Place Phase – 5	21/03/13	15/05/13	20	12	8
Shanwick Place Phase – 6	16/05/13	03/10/13	30	14	16
Shanwick Place Phase – 7	04/10/13	31/10/13	9	9	0
York Place					
York Place – Phase 1	**17/09/2012**	04/03/2013	45	39	6
York Place – Phase 2	26/02/2013	22/04/2013	51	47	4
York Place – Phase 3	23/04/2013	18/10/2013	61	50	11
***646 Conflicts straddle phases**					

4.9.4 Next Steps (including potential mitigation)

1 To validate the conflicts identified against utility provider records, such that a solution can be designed out by Infraco.

2 To establish a working group with SUP's that are suitably empowered.

5 Key Strategic Risks and Mitigation Measures

As part of the wider Tie review, TTPM has adopted a risk-focused approach, seeking to identify the threats to successful project delivery as we adopt a revised scope and strategy. Our review has uncovered a number of key areas of concern and uncertainty, which would need to be successfully managed as a priority, to ensure "lessons learned" from past errors and maximise the opportunities to deliver "success" going forward. These key risks are outlined below, alongside our proposed mitigation strategies:

Ref	RAG	Category	Route Cause	Risk Definition	Potential Mitigation
1	R	Utilities	Obligation on CEC to provide "Utilities Fee" worksite. 21 day notification - delays move contract to cost reimbursable. Lack of joined up agreed strategy to address utility clashes. Informal agreement not supported by current contract provisions.	Risk of contract moving from Target Cost to Cost Reimbursable on encountering first work site utility. 638 utility clashes currently identified within On Street Works.	Establish cross party working group (Client, Infraco, SUP) to confirm and implement utility clash mitigations in advance of, and in parallel with, the On Street Works. Infraco to take responsibility for implementation of utility clash remedial measures other than utility diversions (to be by SUPs coordinated with Infraco works by Infraco. Contract negotiation to remove as much risk as possible.
2	R	Utilities	Failure to define a 'Utility' and 'Utility Free'.	Lack of agreement on definitions leads to dispute	Contract to clearly define 'utility' and 'utility free'.
3	R	Utilities	50% of utilities currently not verified.	Cannot finalise mitigation or design until utilities clashes are verified.	Additional Slit trenching/verification

4	R	Utilities	Infraco entitlement to exclusivity within designated working areas.	Risk of Client being unable to resolve utilities clashes in parallel with Infraco works.	This entitlement needs to be re-negotiated, otherwise On Street works are undeliverable.
5	R	Utilities	50% of identified Utility clashes fall with the "high risk" classification (potential gas, power, water).	Risk of potential need to further divert extensive utilities with long lead in times.	Design mitigation (agreed by all parties) to be undertaken by Infraco to reduce to a minimum the need for utility diversions. Engage with SUP's and integrate them into the CEC team. Ensure that they are empowered to answer questions in a timely manner.
6	I	Utilities	CEC unable to verify utilities due to restricted access caused by embargos and extent of worksite required.	Utilities unable to be verified due to inability to carry out the works as a result of embargos and large work areas in streets and footpaths that require a tmp.	Obtain a relaxation from CEC to open up worksites early and in contradiction to embargos.
7	I	Programme	The Rev 3a programme only relates to Infraco construction works. There is no visibility of activities relating to design, approvals and consents, assurance & acceptance testing. Also no visibility of construction works which sit outside of the infrac0contract, including utility works diversions and basement works.	Risk that the overall project requirements are not understood and that the true project progress is not correctly quantified. Risk also that all currently known client changes may not be accounted for.	Establish Baseline Master programme to cover all project activities (Infraco and non Infraco). Establish jointly agreed key milestones so that short to medium term targets are understood by all.

8		Programme	Critical path of Rev3a programme runs through the On St Works. Rev3a programme assumptions relating to design production, submission, approval and assurance are either unknown or the implications not understood.	Risk that any delay to the On St Works results in delay to the overall project. Risk also that all parties, including 3rd parties, are not bought into, and are unable to deliver on the Rev3a programme requirements.	Develop "master programme" for the overall project to show true inter-relationships between the various sub contracts. Programme assumptions to be published and made public to all parties as part of a management plan. Explore opportunity for less onerous Traffic Management restrictions.
9		Programme	No common view on progress against MOV4 (Advance Works) activities.	Risk that progress against MOV4 is being over reported by Infraco. Risk also that MOV4 programme impacts on MOV5 works and beyond.	Undertake thorough audit of Rev3a programme as part of the development of a "master programme."
10		Programme	Rev3a programme contains no resource loading or levelling.	Risk that Rev3a programme is used as justification for over inflated claims in favour of Infraco.	Rev3a programme should not be incorporated into the Infraco contract.
11		Programme	Programme contains extended durations for areas due to complex TMPs	Lothain buses require a constant bus corridor to be established and maintained during the works. The maintenance of which impacts on the size and the duration of the site required.	CEC to obtain a relaxation form Lothain buses that enable the worksites and durations of occupation to be increased.
12		Programme	Rev3a programme has not been progressed since March 2011. No process in place for agreeing schedule impact.	Risk of no common understanding / agreement of current progress.	Establish Baseline Master programme to cover all project activities (Infraco and non Infraco). Agreed progress to be recorded every period (4 weeks). Programme to be re-baselined every 6 months .

13		Programme	Known activities excluded from the Rev 3a programme (utilities diversions, traffic management constraints, basement works).	Risk that the On Street works will be delayed by the introduction of these works streams.	Rev3a programme should not be incorporated into the Infraco contract.
14		Programme	Princes St remedial works and On St works generally are excessive in duration (according to Tie).	Risk that critical path is incorrectly identified as being through the On Street Works. Risk also that delays to Princes St works (Infraco responsibility) are linked, incorrectly, to other project activities. Princes St works should be isolated.	Rev3a programme should not be incorporated into the Infraco contract.
14		Programme	No incentive for BBs to complete on time or early.	Risk that contractor is only incentivised to delay.	Ideally manage utility diversion work stream to avoid contract moving to cost plus basis (almost certain with proposed contract provisions - see contract section of this report).
16			1. Poor definition of programme milestones. 2. No QSRA undertaken – lack of certainty over plan or ID of key sensitivities 3. Known activities excluded from the rev 3a programme (utilities diversions, traffic management constraints, basement works – plan for failure 4. No agreed progressed programme in place.	1. Failure to focus on delivering critical path activities 2. Failure to monitor and report on critical performance indicators. 3. Incorrect prioritisation of risk control measures – not managing those linked to critical activities. 4. Potential delays	1. Undertake a QSRA process to define programme confidence and identify key sensitivities. 2. Identify and incorporate key milestones and associated KPIs 3. Ensure programme is given priority as part of project team meetings and monitoring processes.
17			Poor visibility / understanding of programme assumptions	Potential compensation event trigger e.g. commitment to work within designated working areas	Undertake a process of assumption review – either verify assumptions, or agree which ones to accept, with an allowance in risk contingencies.

18		Assurance	Responsibility for safety validation currently resides within Tie team.	Risk of failure to maintain valid Safety Case once Tie are no longer in place.	Key Tie resources to be maintained within future client project management team.
19		Assurance	Novation of CAF contract to CEC. Historical SDS design issues. Non acceptance by BBS of responsibility for SDS design and / or BB, Siemens, CAF integration. Lack of visibility of assurance acceptance certificates.	Risk of breakdown in technical interface resulting from no overall responsibility for system wide design solution. Risk of gaps within systems integration and / or BBS and CAF integration.	Client team to undertake audit of technical integration requirements through to completion of project. Currently not clear how integration responsibility will be addressed in practice.
20		Governance , Reporting and Project Controls	According to Tie, BB are guarded in the release of key project information relating to H&S, quality and assurance.	Risk that hrs. performance of the project is not at the standard it might otherwise be. Risk of negative impact on key stakeholder relationships through failure to deliver on their expectations.	Engender a project culture where information is freely shared to and from the Infraco for the mutual benefit of the project. Establish a programme of auditing and continuous improvement throughout all safety and quality related issues. Establish a comprehensive reporting tool for informing 3rd parties of the requirements of them by the project.
21		Governance , Reporting and Project Controls	No rigorous risk management process currently in place within client team.	Risk that true project risk profile is not understood or quantified.	Establish period risk review by project section taking account of programme assumptions and proposed contract provisions. Agree risks and actions within period "senior risk team."

22		Cost	Current cost & risk forecasts may not take adequate account of Rev3a programme assumptions and proposed contract provisions (particularly in relation to the On Street Works). BBS progress reports include a significant number of un agreed client changes in the pipeline.	Risk that current budget is inadequate to deliver the project within the proposed contractual arrangements. Risk also that current and potential future changes have not been allowed for in programme / cost forecast.	Client team to undertake a comprehensive audit of the project cost forecast, risk profile and Rev3a programme assumptions.
23		Utilities	Current Traffic Management arrangements include restrictions required to maintain bus services.	Risk that utilities / Infraco works are not deliverable within approved Traffic Management arrangements.	Confirm methodology for the implementation of utility diversion works is achievable within the currently proposed Traffic Management proposals.
24		Utilities	Assumed utility clashes within on Street areas may dictate method of working within Infraco worksites.	Risk that Infraco will claim for delay and disruption as a result of the need to protect completed or pre-existing utilities works.	Client team to undertake independent assessment of potential for proposed Infraco working methods to impact on existing services.
25		Utilities	54% of identified On St Works utility clashes have yet to be verified.	Risk that extent and impact of Utility clashes unknown.	Utilities clash validation to be undertaken (preferably by Infraco) in advance of and in parallel with On Street Works.
		Design	Design by Infraco has been carried out in isolation of utility diversions	Infraco design was carried out on the understading oa utility free zone with no cocnisance of know clashes.	Infraco to mitigate a number of clashes by designing out. OLE bases, trackfrom & road depths
25		Programme	Significant structures works (bridges and retaining walls) have yet to commence within the Off Street works section.	Risk that delay in completion of structures impacts on trial running and commissioning?	Undertake thorough audit of Rev3a programme as part of the development of a "master programme."

26		Programme	No current QSRA exercise exists.	Risk that confidence level of successful project delivery is unknown.	Client Team to undertake thorough audit of Rev3a programme and risk profile of the project. Undertake QSRA to determine the likelihood of a successful outcome to the project.
27		Governance, Reporting and Project Controls	Weekly issues and actions for the civils works are being agreed by the Section heads. This is not taking place for the systems works. There is no agreement between Tie and BB on construction progress or production rates. 4 weekly progress meetings have broken down and no longer take place.	Risk of continued on going disputes in the agreement of cost entitlement. Risk of lack of joined up approach to problem solving.	Develop "master programme" for the overall project to include all Infraco activities (including assurance) required prior to completion of the contracted works. Re-establish regular (monthly) Client Team / Infraco planning meetings, remitted to agree status of progress.
28		Governance, Reporting and Project Controls	Risk management process is not linked to programme / cost reporting.	Risk that the interdependency of risk, cost, programme is currently not understood or quantified.	Establish single point of truth reporting for the project combining the impact of risk, cost and programme, providing a true forecast of the likely project outcomes at any point in time.
29		Governance, Reporting and Project Controls	Tie have reported that construction integration between Siemens and BB works is poor.	Risk of quality issues at sub contractor interfaces.	Implement rigorous quality audit programme to include evidencing quality certification between adjacent sub-contractor work streams.

30		Governance, Reporting and Project Controls	Project EDMS is Sharepoint. Only used by Tie and ECC. All communications with BBS and external parties is by hard copy and e-mail. Tie report that version control is un-reliable	Risk of laborious doc control and breakdown in version control.	Review document control interface between client team and Infraco. Establish shared "single point of truth" version control and where possible less onerous document control and administration arrangements.
31		Cost	BBS have historically taken a position that they will seek to secure variations from any drawing changes from the base information.	Risk that cost impact of legacy design issues and future design development are not accounted for within the cost forecast and/or risk profile.	Establish true design baseline and confirm where risk of future design development lies.
32		Cost	Tie have advised that there is no common agreement between the Infraco and client team on the definition of key milestones within MOV4.	Risk of continued on going disputes in the agreement of cost entitlement.	Establish working meetings with Infraco to define common understanding.
33		Governance, Reporting and Project Controls	Change process is time consuming.	Risk of delay to construction while changes are formalised.	Define project governance within client team to include appropriate delegated authority such that client changes may be processed with minimal impact on the programme.
34		Governance, Reporting and Project Controls	Reporting is generally lengthy and unclear. no summary dashboard reporting exists.	Risk that key messages, issues and actions are not understood by either the project team or the client.	Undertake a comprehensive review of all project reporting with an ambition to inform and manage. Establish a suite of dashboard reports for simple, "project on a page", reporting.

35		Assurance	Tie currently have obligations to 3rd parties (utilities, NwR etc.) under a number of tri-partite agreements.	Risk that obligations to 3rd parties are not fulfilled once Tie is no longer in place.	Client team 3rd party obligations to be passed to CEC.
36		3rd parties	Client team take the risk of 3rd parties.	Risk that Infraco performance contributes to frustration of 3rd party approvals.	Establish a comprehensive reporting tool for informing 3rd parties of the requirements of them by the project. Close management of Infraco delivery against 3rd party requirements and expectations.

Note: Specific findings from TTPM's review of Contract and Cost are contained within the respective sections of the body of this report

6 Organisational Structure

Context

From the relatively short period over which TTPM conducted this project review it was clear that there are many capable and dedicated individuals engaged throughout the project by the various represented parties, including within the TIE organisation. There is, however, a strong sense that a number of individuals are performing well below their capability as a result of the current project structure and environment. As a result the wider project team are either not able or not empowered to work together towards a common set of objectives for the mutual good of the project. This is evidenced by a breakdown in trust between TIE and the Infraco, to the extent that there is little to no direct contact or communication between their respective representatives, other than through formal channels. There is also a fundamental lack of agreement on the status of the project, the project's critical needs and how they may be addressed.

As a result many of the project teams, particularly within the TIE organisation, have become inefficient and ineffective and the morale of the individuals has become very poor.

Proposed changes in operating principles

The Project Organisation should be restructured to achieve the following objectives:

- Single team approach – for all client side team members
- Continuity of critical project knowledge – CEC, TIE and third parties
- Introduction of best practice – knowledge sharing from previous experience
- Focus on key risk areas – Project controls, proactive risk management and mitigation, Infraco/CAF integration, structures, 3rd party approvals and consents and
- Maintain safety validation and technical assurance

The organisation chart shown within Appendix A sets out to address the above objectives in a number of ways:

Single Team Approach

With the breaking up of TIE, a number of roles previously under their control are being absorbed within CEC. Such roles principally relate to Customer Services & Communications and Finance. These teams are vital for the successful delivery of the project and it is essential that appropriate communications are established and clarity of responsibilities confirmed to enable a common approach to the management of the Infraco, CAF and project stakeholders post

contract award. These protocols will be a key item for discussion when establishing the project delivery team going forward.

Continuity of Critical Project Knowledge

In order to appropriately protect the interests of CEC it is essential for the future project delivery team to contain the right balance between fresh thinking and reinforcement of existing capability. TTPM believe there remains significant knowledge and skills within TIE which should play a key role in linking historical understanding and agreements with future innovative thinking and management. In this regard, TTPM would seek to retain a number of key individuals who have been assessed as having knowledge necessary to protect the interests of the project going forward. These individuals represent the high risk work streams, namely, commercial, utilities project management, 3rd party permissions and assurance.

In addition to the key individuals, we would look to retain a spread of knowledge across the project team more widely through migration of TIE resources. These resources are further broken down as either Continuity Resources (assessed as being of long term benefit to the project) or Transitional Resources (assessed as being required in the short term but may not be needed over the full duration of the project).

Going forward, TTPM would wish to adopt a flexible approach to the project structure, making changes as required to suit the evolving project need.

Introduction of Best Practice

Through the deployment of high calibre senior individuals with relevant project experience TTPM would implement a management team of construction professionals capable of bringing best practice and raising the impetus across all elements of the delivery needs of the Edinburgh Tram Project.

Specifically we would draw on senior resources with knowledge of the issues surrounding the Edinburgh Tram Project; who have significant experience in construction, cost control, planning, 3rd party management and technical compliance; and who have a proven record in the successful delivery of infrastructure projects.

Through the amalgamation of these senior team members and identified key TIE resources the resulting team would have the necessary skills and knowledge to draw on past successes, address the current project shortfalls and protect the client against commercial gain by the Infraco and other project contractors.

Focus on Key Risk Areas

TTPM's proposed organisation is structured to target the key risks identified during the project review, namely:

Project Controls – Strong team established as the central hub of programme, cost, risk and change information. Responsible for the provision of up to date accurate reporting both in traditional and dashboard form. This team's primary mandate will be to provide the necessary information to enable informed project decisions to be made and agreed by all parties. Experienced TTPM project controls specialists would be reinforced by existing TIE resources with vital knowledge of existing processes and the whereabouts of project data.

Proactive Risk Management and Mitigation – By combining tried and tested risk identification and management techniques with the deployment of proactive and inclusive project managers at senior level, we will work with the Infraco, CAF, CEC and project stakeholders to agree action plans around each of the risks and proposed mitigations identified within Appendix B Progress against these mitigations will be reported through enhanced project controls.

Commercial Management – The commercial team is an area where communication and agreement between TIE and Infraco have historically been far from ideal. Going forward it is important to get the right balance between fresh thinking, to improve relationships, and knowledge continuity. The proposed team achieves this by, firstly introducing a senior T&T resource to oversee all commercial issues and secondly by retaining key individuals from the TIE team working along side new TTPM resources.

On Street Utilities – The proposed organisation addresses the risk of delay to the infraco resulting from the discovery of utilities by focussing a small team dedicated to utilities issues resolution. This would comprise a project manager to deal with up critical anticipated utilities clashes within the early work sites; a project manager addressing medium to long term utilities issues and the continuity of CEC/TIE resources in relation to 3rd party utilities approvals. In addition we would seek to build a small on site team of the main statutory utility providers dedicated to working with the project delivery team.

Infraco / CAF Integration – The removal of CAF from Infraco generates a number of design, construction and logistical interfaces as identified within Section 4 of this report. If not managed effectively, these interfaces will leave CEC vulnerable to costs associated with disruption. The proposed organisation addresses this risk through the introduction of a dedicated Infraco/CAF Interface Manager. This resource will be responsible for smoothing delivery across this interface, for identifying potential interface issues and making sure appropriate risk mitigation action plans are put in place.

Structures – In addition to a geographic split of our project management capability (ie. Airport to Depot & Depot to Haymarket), we propose to include within our organisation a dedicated Structures Project Manager. This resource would take responsibility for the close out of legacy design issues, completing 3rd party approvals and consents (through liaison with the 3rd party approval manager) and liaison with the Infraco in respect of the successful completion of all structures in advance of the planned track works.

3rd Party Approvals & Consents – It is TTPM's understanding that Infraco maintain responsibility for 3rd party approvals under the proposed contract structure. It is perceived, however, that

this responsibility may be compromised in the event that 3rd parties do not deliver in accordance with the Rev3a programme. To address this risk we would propose to maintain a 3rd Party and Consents Manager within the project management team. To be successful this resource would need to work very closely with their Infraco counterpart to develop a clear programme for the completion of this key documentation.

Maintain Safety Validation and Technical Assurance

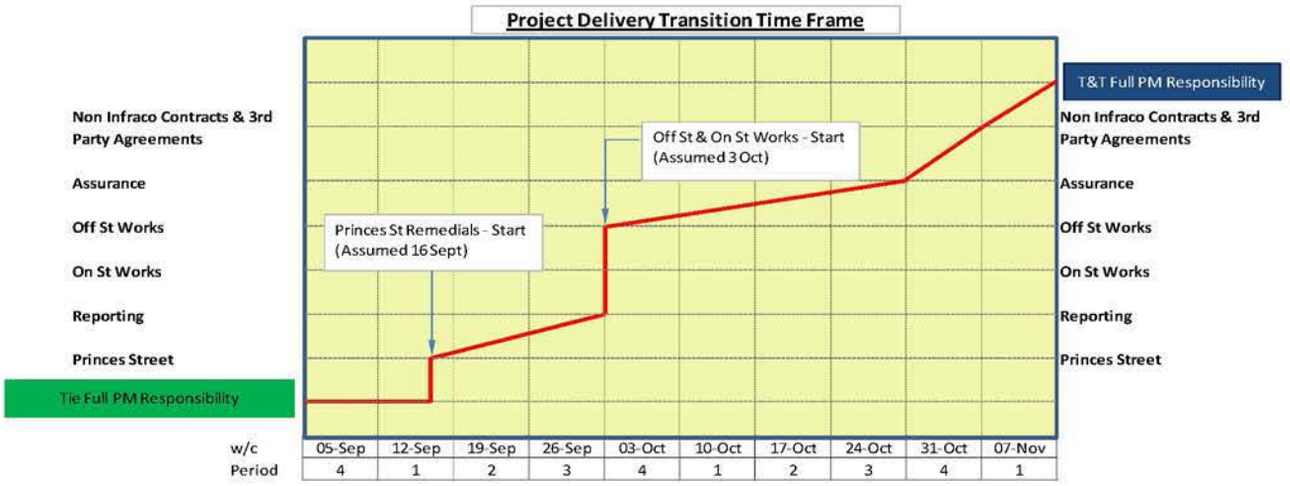
TTPM are aware that maintaining the Project Safety Validation is vital to the continued progress of the project. TIE have set out the process by which the current safety validation regime was obtained and the parties involved in that process. This facet of the project was generally reported, during TTPM's review, as fulfilling its need. Although some areas of enhancement were identified. At this stage our approach would be to retain and enhance the TIE safety validation and assurance team members going forward. A re-assessment of the Project Safety Validation would be undertaken following any change to the individuals currently involved.

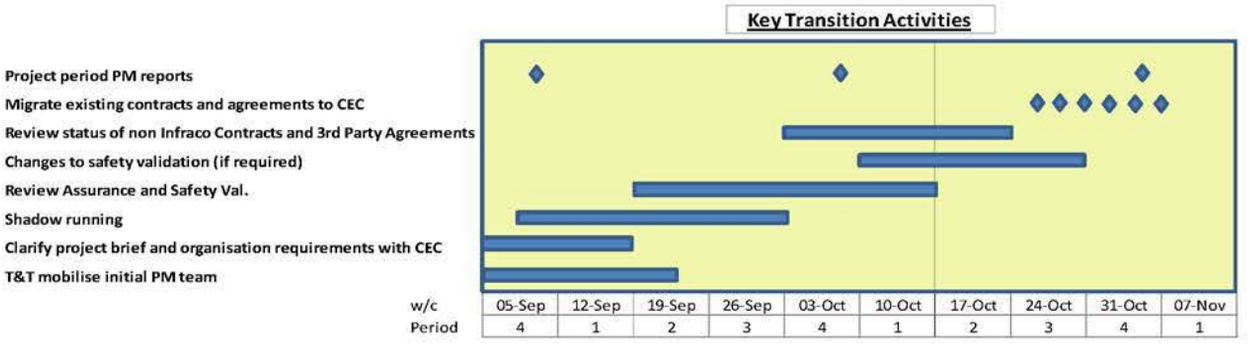
7 Transitional Proposals

Turner & Townsend's proposed approach to a transition of project management responsibility from the existing TIE team to T&T is summarised within the diagram below. In undertaking this transition we would seek to achieve the following:

- Determine clarity of CEC requirements, project brief and governance arrangements
- Build the right team for the future needs of the project
- Maintain critical support to CEC throughout, in relation to high risk areas
- Confirm future Safety Validation and Assurance protocols
- Set in place necessary project delivery processes

In implementing this approach, we recognise CEC's ambition to effect a transition of project management responsibility at the earliest opportunity. We would therefore look to influence current project delivery on mobilisation by shadowing and supporting the TIE team with existing meetings, process and decision making with increasing influence up to phased points of handover.





We would adopt a flexible approach to the period of transition assuming control for each element as soon as an appropriate level of knowledge has been gained by our team. Control would be assumed according to the extent of investigation and understanding required for each of the key project delivery elements. We would suggest a practical target time frame to be as follows:

Project Management Element	Proposed Timeframe for Transition to T&T
Utilities	**16 Sept 2011**
Princes Street Works	**16 Sept 2011**
On Street Works	**3 Oct 2011**
Off Street Works	**3 Oct 2011**
Reporting	**3 Oct 2011**
Safety Validation & Assurance	**31 Oct 2011**
Administration of Non Infraco Contracts	**7 Nov 2011**

Determine Clarity of CEC Requirements, Project Brief and Governance Arrangements

A successful project transition needs to be judged against a clear remit for project delivery. Through discussions with CEC and the existing TIE team we will agree the needs of the project with the council and confirm a corresponding scope of services for on going delivery. In particular we would wish to understand the council's wishes for Princes Street and the On Street Works. In deriving our transition proposals we have assumed that Princes Street remedial works and the On Street Works will commence on the 16 Sept and 3 October 2011 respectively.

Build the Right Team for the Future Needs of the Project

Our vision of the right delivery team for the Edinburgh Tram Project is one which combines the necessary experience, knowledge and skills with the right behaviours to provide the project with the momentum required to turn its fortunes.. At Turner & Townsend, we take pride in our company culture which engenders an inclusive approach to problem solving and encourages individuals to deliver the best of themselves for the good of the project. We would seek to foster this culture within a holistic team comprising T&T and TIE individuals.

Whilst undertaking our project review we obtained a view of the capabilities of a number of individuals within the TIE organisation and from this formed opinion of the areas of a future organisation which these individuals could best support. We also set out within Section 6 of this

report, the essential need to benefit from existing project knowledge going forward and to provide a level of continuity across all work streams where possible.

An early activity within the transition will be to talk in detail to each of the remaining members of the TIE team. We will discuss their ambitions going forward and establish their skills and knowledge and in doing so determine where they might fit into our proposed organisation. We envisage that a recommendation on the retention of TIE individuals would be made within two weeks of our mobilisation for project delivery.

It should be noted that the extent and speed of the transition will be heavily influenced by TUPE arrangements. At the time of writing discussions are ongoing between TTPM and the council to determine how the project's aspirations going forward are most effectively realised whilst taking account of TUPE requirements.

Provide critical Support to CEC in Relation to High Risk Areas

During our review of the project we have identified a number of risks to its future success. These include the approach to On Street utility diversions, progress on structures, Infraco / CAF interface, quality & H&S, planning, reporting and risk and change management. We would support these areas on mobilisation by introducing experienced individuals into each of these work streams. By working with the incumbent TIE team we will set in place a development and improvement programme with a remit to manage the prevailing issues to an acceptable level of risk and with agreed outcomes and deliverables.

Confirm the Safety Validation and Assurance Protocols

A key risk to the successful delivery of the Edinburgh Tram Project lies in the continuity of the in place Safety Validation and Assurance regimes. Within Section 6 of this report we highlighted our intention to support, rather than replace, the existing provisions of this key area going forward. In producing this report TTPM have assumed that a number of current TIE resources deployed within project assurance work streams will be retained on the project through CEC. Notwithstanding this, an important early activity would be to audit current arrangements in detail with all involved parties (Designers, Approvers, Operator, CIP) and confirm the protocols by which ongoing Safety Validation and Assurance are to be ensured. It is essential for the timely progression of the project that existing arrangements are maintained until such time as any required changes are formally endorsed through a revised Safety Validation.

Given the complexity of this aspect of the project, and the number of persons involved, we envisage that the transition of responsibility for Safety Validation and Assurance would not take place until the end of the transition period.

Set in Place the Necessary Project Delivery Processes

In addition to establishing an inclusive and positive culture, see above, we would seek to provide improved clarity across the project through enhanced process and reporting. A key

activity of the transition is therefore to replace existing arrangements, where necessary, to effect a less burdensome and more empowering set of project processes. Particularly, this would address current shortfalls discussed within Section 4 of this report in relation to planning, risk management change control and reporting.

We believe that significant improvements can be made early in our deployment, however we would recommend a cycle of shadow running throughout one complete Project Period with Turner & Townsend assuming increasing control during the second period leading up to the Period Report at the end of October. The TT standard suite of Project Controls reports requires the design and mobilisation of integrated processes and accompanying software. The effectiveness of the mobilisation period will be dependent on the level of cooperation from BBS and CAF as a much greater degree of visibility on cost and programme will be necessary to achieve these objectives. It is likely therefore that there will be a staged path to full project controls capability over a number of reporting periods.

8 Further Actions

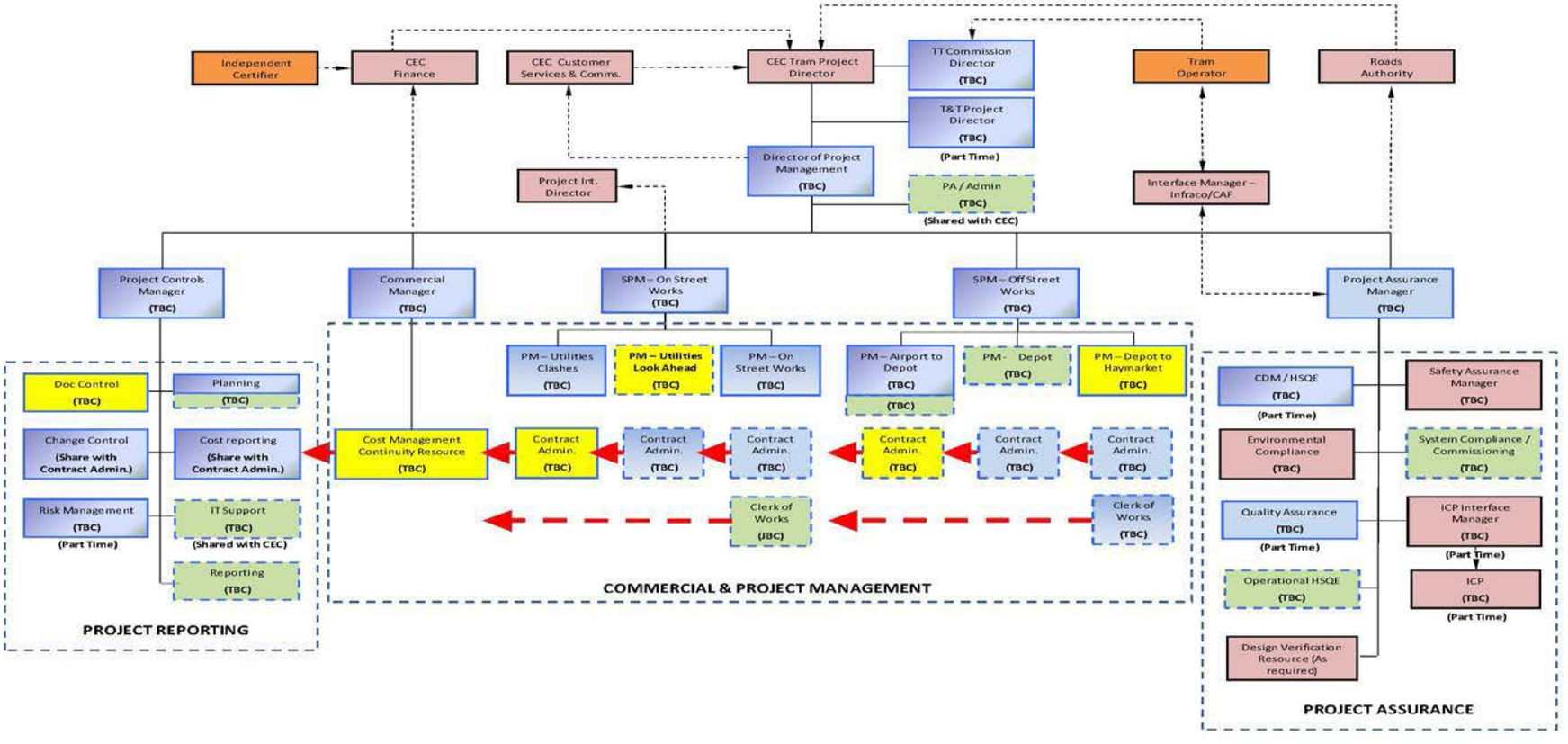
There are a number of further actions that we would recommend are carried out in the immediate future to further inform the review and allow the Council to make upcoming decisions on an informed basis. These actions are also required as part of the TTPM due diligence prior to taking responsibility for the delivery of the project.

These actions include:

- A full review of the costs associated with the On street and Off street works
- A full review of pricing assumptions and cost risk assessment
- A full review of schedule 3a including assumptions, critical path, linkages and the development of the master programme incorporating activities beyond the Infraco contract
- Review of the outstanding changes yet to be agreed between BBS and Tie
- Review of all outstanding schedules to the Infraco agreement
- Identification and interviewing suitable individuals within Tie to be included in the orgniation structure going forward
- Assignment of powers to CEC and delegation to TTPM for the existing contracts currently managed by Tie
- Confirmation and implementation of the transition plan
- Development of a more detailed review of obligations so that CEC is able to understand the fullness of its obligations and requirements.
- Design of the project controls architecture to reflect the KPI's important to CEC at each level of governance within the report audience.

Appendix A – Org Chart

Proposed Project Management Organisation



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