Estimate Report

For

Extension from York Place to Leith

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Edinburgh Trams

City of Edinburgh Council

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THE QUEEN'S AWARDS FOR ENTERPRISE 2009

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Edinburgh Trams – Extension to Leith

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0	Mike Mackenzie	Gary Easton	17 January 2013

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1 Basis of estimate

1.1 Brief

On the 11th of January 2013, CEC requested a "probable cost" estimate for the extension the Edinburgh Tram System from York Place to the following termination points:

- Foot of the Walk (Leith Walk);
- Ocean Terminal;
- Newhaven.

It has been agreed with CEC that the estimate is based upon a "should cost" basis taking into account current market rates. Refer section 1.4 below for further details on the estimating approach.

1.2 Scope

The chainages and distances between the termination of the current project (York Place/Broughton Street junction) have been determined from the drawings developed for the current scheme.

The scope is generally based upon the drawings listed at Appendix A and being constructed in the Haymarket to Shandwick Place and St Andrew Square to York Place. The estimate does account for work items that have arisen in these sections of the work as some of these are likely to apply to the work sections beyond York Place. There are opportunities to refine the design solutions and create an efficient contract structure and these are described in further detail at section 2 below.

1.3 Assumptions

We provide below some assumptions that we have made in developing the estimate. It should be noted that the proposed estimating tolerance is intended to account for the potential outcomes from these assumptions. It is acknowledged that a Quantative Risk Estimate and Opportunities Estimate could provide further analysis on the differing outcomes.

- A current price level, 1Q 2013 has been assumed as there are no details regarding the delivery programme;
- Approvals will be provided from 3rd Parties (Utility Companies, Forth Ports and other Property Owners) to construct the project as currently envisaged.
- Significant work is not required for new structures (bridges or retaining walls), and the track infrastructure can be accommodated within the existing road construction;
- There is no requirement for strengthening or infilling basements adjoining the route;
- Works will be procured competitively and that a fair proportion of the work will be provided by the UK supply base which will result in an economic contract structure and optimise

mainland European engineering input; (Note: using our knowledge of the UK and International supply chain we can design a sourcing and procurement strategy);

- Systems will extend from the existing line and will not require additional capacity upgrades;
- Systems can be extended without incurring a premium from the OEMs (Original Equipment Manufacturers);
- Utilities diversion costs are based upon general assumptions from experience to date however these works are sensitive to the nature of the conflict e.g. is there a "hot spot" of existing utilities and what are the spatial constraints;
- Associated Utility Company management and supervision costs have been included with the Utilities Diversion Costs. It should be noted that the Utility Company has to justify all reasonable costs less a prescribed discount as per the NRSWA provisions. These costs are sensitive to the condition of the existing assets and are subject to negotiation;
- Client On-costs have been based on a general percentage to cover an element of internal staff costs, project management costs, legal costs and design. Whilst designs have been undertaken for the route modifications they will need to be updated to account for utilities, other constraints and to secure the opportunities, refer section 2 below.

1.4 Estimate Approach

The estimate has been priced using elemental / system rates derived from sub-contractor prices to create a "should cost" estimate. The pricing also aims to represent an efficient contract structure and delivery model which does not include for any potential disruption costs caused by discovery of unforeseen obstructions or other constraints or layering of prelims & mark ups. The estimate has been compared with other UK and Irish Tram projects to make sure that the cost falls within the expected range and accounts for the likely risks that will be encountered.

1.5 Estimating Tolerance

To provide an indication on the context of the estimate relative to project stages this estimate would be comparable to Network Rail GRIP Stage 2 Outline Budget which has an estimating tolerance of +/-30%. However the design is much more advanced than would be the case for a Grip 2 estimate and therefore, we estimate the tolerance to be more like +/-20%. This could be further reduced by carrying out a detailed measure from existing design, supported by a complete risk and opportunity review which would aim mitigate some of the uncertainties surrounding the scheme and identify optimal solutions. Through a structured value management approach to developing the scheme we would aim to finalise a budget at the lower end of the predicted tolerance.

1.6 Exclusions

The following items are excluded from the estimate:

- Modifications to the number of lanes/highway design at York Place;

- New or additional structures (bridge strengthening and retaining walls) other than work to Lindsay Road retaining wall where an allowance for resolving the alignment has been included;
- Works outside the Limits of Deviation;
- Land acquisition and property compensation costs;
- Rolling stock;
- Maintenance and spares;
- Alterations to depot and support facilities;
- Floating track slab
- Capping layers to road makeup (the cost of which can include extensive utility protection and / or diversion)
- Finance and interest costs;
- VAT and any other tax liabilities;

2 Risks and Opportunities

2.1 Risks

A detailed risk register is in place for the current project and many of these risks will apply to the works beyond York Place. A summary of the key risks are provided below:

- Works required to divert utilities or to modify the tram infrastructure works to obviate the need to divert utilities (for example piled OLE bases; slim trackform);
- Rebuilding of utility company manholes and modifications to sewers arising from differing interpretations
- Spatial constraints in the route along Constitution Street and the presence of Archaeological Remains;
- Spatial constraints to enable electrical sub-stations to be built in the intended locations;

To gain assurance that the risks do not adversely affect the viability of the project a detailed estimate and risk estimate could be provided to help validate the cost estimate.

2.2 Opportunities

There are a number of opportunities to refine the design proposals and build on the lessons learned in the execution of the current project. These opportunities are summarised as follows:

- General design review based upon experience of the design and physical conditions that have been encountered;

- Refine track infrastructure design to minimise the scope of work and also the extent of utilities diversions;
- Refine the drainage designs;
- Optimise the road reconstruction;
- Create an efficient contract and delivery structure to optimise the execution of the works.

Turner & Townsend have developed a "lessons learned" register which provides opportunities to mitigate risks and exploit opportunities. The topics include:

- Receiving environment;
- Project Consents;
- Key project risks and mitigations;
- Stakeholder management, approvals and associated costs;
- Leith Walk utilities and diversions;
- E&M and Systems materials purchased by CEC for the route between York Place and Newhaven under the Settlement Agreement;
- Procurement structure and knowledge of Public / Private Partnerships on other UK and Ireland Tram Projects.

3 Estimate Summary

3.1 Summary

Cost Summary £M	Foot of the Walk	Ocean Terminal	Newhaven	Total
Infrastructure (Civils/Systems)	46.0	38.7	21.4	106.1
Utilities Diversions	12.9	8.7	3.5	25.1
Construction Cost	**58.9**	**47.4**	**24.9**	**131.2**
On-Costs at 15% (Design, project Management and Client costs)	8.8	7.1	3.7	19.6
Total	**67.7**	**54.5**	**28.6**	**150.8**

3.2 Estimating Tolerance

As referred to in section 1.5 above, the estimating tolerance is +/- 20%. This is in part a consequence of the nature of current high level exercise which has used a combination of

existing scheme rates and the Turner & Townsend benchmark database to establish a "should cost". The existing design, supported by a structured value management and estimating approach would allow this tolerance to be improved and would identify opportunities to develop the scheme at the lower end of the estimating range.

3.3 Comparison with Industry benchmarks

Turner & Townsend have compiled a list of benchmarks from UK and Ireland Tram Schemes. We are currently working on Nottingham Phase 2, advising on the arrangements at Manchester and also concluding a detailed benchmarking study for the RPA in Dublin for the extension of the Luas line.

A comparison of the average cost per kilometre and the general range from equivalent benchmarks are provided below. Note that, in line with the other benchmark data, we have excluded Client on costs from the cost per km.

	Cost per km excl on cost (£m)	Comment
Estimate	28.6	
Benchmark - lower	18.5	longer length of track, included work on disused rail corridor
Benchmark - higher	46.6	Short section of track – city centre

It is noted from the benchmarks above that the extension of Edinburgh Tram to Newhaven lies within the range of benchmarked projects. The higher benchmark was a single project and is significantly higher than other schemes in the study although it is also the most similar in nature to the Edinburgh Tram scheme in that it is a relatively short extension to an existing line, constructed in an on-street environment.

4 Next Steps

There is a significant opportunity to build on lessons learned and develop a design and delivery structure to achieve an economic out-turn cost and reduce risks. Given funding constraints and the desire to avoid/reduce cost over-run liabilities we would welcome the opportunity to discuss these ideas with the project promoters.

Appendix A – List of Drawings

ULE90130-01-HRL-00003_iss7_rev7
ULE90130-01-HRL-00004_iss5_rev6
ULE90130-01-HRL-00005_iss7_rev10
ULE90130-01-HRL-00006_iss6_rev9
ULE90130-01-HRL-00007_iss6_rev9
ULE90130-01-HRL-00008_iss5_rev8
ULE90130-01-HRL-00009_iss7_rev11
ULE90130-01-HRL-00010_iss8_rev11
ULE90130-01-HRL-00011_iss7_rev11
ULE90130-01-HRL-00012_iss7_rev11
ULE90130-01-HRL-00013_iss6_rev10
ULE90130-01-HRL-00014_iss6_rev11
ULE90130-01-HRL-00015_iss3_rev10
ULE90130-01-HRL-00074_iss4_rev5
ULE90130-01-HRL-00075_iss4_rev5
ULE90130-01-HRL-00076_iss4_rev5
ULE90130-01-HRL-00094_iss4_rev5
ULE90130-01-HRL-00110_iss3_rev3