Report

of the

Value Engineering Workshop

on Wednesday 31st February 2007

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EXECUTIVE SUMMARY

This report records the progress of identifying Capex savings on the TRAM project, resulting from the Value Engineering workshops on 20.12.06 and 9th, 24th and 31st January 2007.

Ideas generated by SDS (August 2006, with summary issued 30.10.06) and by Transdev (letter dated 5.1.07) are also being examined by the VE team.

The most promising ideas are summarised in the table on the following page, with further detail and any action plans contained in the body of the report.

For many ideas in this table, estimates of the potential savings are yet to be made. For the remainder, just over 50% of the ideas listed, first sight savings are shown and amount to a **total potential Capex saving of £24.3 million**.

It should be noted that some of these Capex savings are achieved by transferring costs onto the Operating budget – e.g. Leasing 5 of the trams in stead of buying them. Therefore not all of these Capex savings represent a whole-life cost reduction.

Ref.	Idea	Filter	1st sight saving £ k
9.1.1	Raise the Depot 1.2m by BAA moving the Runway Threshold north west	A/C	2,000
9.1.3	Design Depot for long-term need. Build part now, with provision to expand later. *(Savings reduced to allow for redesign for 43 metre tram length)*	A/C	1,000
24.1.20	Reduce depot Car Parking	C	Tbe
24.1.20	Reduce numbers to be accommodated in Depot Buildings	C	Tbe
24.1.33	Reduce Cost of Depot Buildings (AS Liverpool)		1,000
24.1.10	Use an existing Mock-Up		250
24.1.5	Buy 26 trams, then lease extra ones when needed	C	10,000
24.1.7	Buy one less tram by reducing spares, but with appropriate re-apportionment of risk for when lower performance achieved.		2,000
24.1.24	Change Trackform to Ballast or embedded sleepers		1,600
24.1.32	Reduce A8 underpass structure (Awaiting Survey results)		Tbe
24.1.19	Infraco Bidders offering discounts to use their trams	C+	Tbe
24.1.29	Cable route (Comms & Power) along Forth linking 1a to 1b	C	Tbe
31.1.4	Buy Trams with no Seats/Luggage Racks (maybe no Grab-Rails). TEL arrange fit-out via alternative source.	C/D	Tbe
31.1.5	Passenger Counters only on 20% of units, not all	A	250
5.1.2	Reduced price for early payment	C	Tbe
31.1.6	Tramco to provide some of the Depot Equipment.	C	Tbe
31.1.7	Reduce height of Overhead Power Line.	A	Tbe
31.1.9	Reduce Noise Mitigation measures (eg Roseburn Corridor).	C	1,000
31.1.12	Remove or Reduce the Bonds (Financial)	C	Tbe
31.1.13	Delete 4 Tram Stops (Ocean Drive, Roseburn, Ravelston, S.Gyle)	C	750
31.1.15	Build 12 substations, not 13, accept reduced resilience	C	500
31.1.16	Reduce Estimate for Power Supply to Substations	A/C	2,000
5.1.1	More Disruption for shorter period	C/E	Tbe
	Total First-Sight Indicated Capex Saving/Transfer =		**£22,350,000**

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For Reference – Idea Evaluation Filter Codes:-

EVALUATION FILTER	Big Benefit	Small Benefit	
Easy to do	A	B	= Minimal design change. No Stakeholder issues. No programme pain, or 3rd Party Agreement issues
Medium	C	D	= Significant design changes. Stakeholders will need convincing
Hard to do	E	F	= Change to LOD and/or Tram Acts Changes to Stakeholder Agreements

1 Introduction

This Value Engineering programme has been initiated on the Edinburgh Tram Project with the clear objective of identifying £50 million of potential capital cost savings. This will create budget headroom for delivery of phase 1a of the project and may even enable phase 1b.

An initial planning workshop was held on the afternoon of 20th December 2006, chaired by Geoff Gilbert, setting the ground rules for this VE programme.

Three subsequent workshops on 9th & 24th January (main project works) and 23rd (MUDFA, Utilities Diversion works) are recorded in *VEDrftRpt.doc, VE2draft.doc, VE3Report.doc.*

This 4th workshop on Wednesday 31st January followed on from those of 9th and 24th.

2 The 31st January Workshop

2.1 Time and Place:

The workshop was held in Thistle 3 Room, COSLA Centre, Rosebury House, 9 Haymarket Terrace.

2.2 Team Members who attended the workshop

Jim Buchanan	tie Depot PM *(part time)*
Alan Dolan	SDS Design team (PB) *(part time)*
Phil Douglas	tie Construction Manager *(part time)*
Bruce Ennion	SDS Design team (PB)
Andy Harper	tie former Project Director
Neil Harper	Brian Hannaby Associates (Liverpool Tram)
Roger Jones	Transdev
Toby Kliskey	TSS
Ken Mosley	TSS
David Powell	tie – Tramco PM
Alastair Richards	TEL *(part time)*
Mike Jefferyes	VE Facilitator

Apologies:

Geoff Gilbert	tie Commercial Director
John Pantony	TSS

2.3 Workshop Agenda

The workshop addressed the following issues:-

a. Review of Action progress, developing ideas from earlier workshop – with initial focus on Depot
b. Review of Ideas from the Bidders
c. New Items reviewed 31.1.07 - 3rd Party Agreements
d. Evaluation of Transdev ideas.

3 Review of Actions from 9.1.07 & 24.1.07 workshops

3.1 DEPOT

9.1.1 "Raise the Depot by BAA moving the runway north west." Has now become:-
Raise the Depot 1.2m by BAA moving the Runway Threshold north west.
Indicated Savings = £2m +

Any physical move of the runway is outside our timescale, but the BAA Board were due to meet on 31.1.07 to consider moving the runway threshold, thereby raising the approach path, allowing Depot construction 1.2 metres higher than current plans. This meeting was postponed, a BAA response is now expected by end of 5.2.07.

2003 estimates of £2m-£3m saving for a 1.5m lift suggest that if BAA agree, then savings for 1.2m could be £2m+, less redesign cost and BAA runway marking costs.

Drainage - a further saving from this raised level may be simplified drainage via an existing drain. This would only then require pumping from the lowest point under the A8 roundabout (arguably not a depot cost).

Programme is now becoming critical, particularly if redesign of the depot is required. However, this proposal plus others below offer the potential for significant Capex savings. All of these opportunities (where recommended by the team) must therefore be explored with urgency such that a clear decision on Depot outline design can be frozen, enabling detail design and construction planning to commence.

→ Follow up BAA decision 5.2.07 – then give clear, urgent direction to SDS regarding the level at which to design / redesign the depot. ***Action: tie***
Note also Planning considerations and other potential Depot savings below.

~~9.1.2 Raise the Depot, but reduce the size, sufficient for Phase 1a. (Capex saving ?? may lead to significantly greater cost to expand later). *This idea has been overtaken by 9.1.3 below.*~~

9.1.3 **Design Depot for long-term need. Build part now, with provision to expand later.**
TSS estimates indicate up to £2m savings may be achievable

Current design drawings were reviewed on 31.1 and showed a layout for the full, long-term Depot/ Fleet requirements, but based on 40 metre trams. Several bidders have 43m trams and it was agreed essential to consider a 43m tram depot layout, even though this may well increase costs.

Open Issue – impact of 43m tram length on Route Alignment and Power

→ TEL to determine how many trams must be accommodated considering 1a & b, also long-term Line 3 (no extra build now, but what provision needed?)
See later item section 3.5 minimising tram numbers – this not only minimises tram fleet purchase costs but also reduces required depot stabling capacity & cost.
***Action**: Roger Jones/ Alastair Richards*

→ SDS to create a tentative Depot scheme design for 43m trams ***Action**: SDS*
This layout must also consider:-
24.1.5&7-Total No of 43m trams to fit (on stabling, Maintenance Shed, other roads)
9.1.1 – What depth? Can the 1.2 metre lift be assumed?
24.1.20 (below) – Reduced Depot Car parking (TSS saving around £1.5m?)
24.1.21 (below) – Reduced Depot Buildings, by reduced numbers accommodated.

24.1.20 **Reduce the Depot Car Parking space** *Evaluation Filter = C*

& 24.1.21 **Reduce numbers to be accommodated in Depot & Buildings** *Filter = C*

→ Examine Bidders proposals for any such benefits ***Action: tie/ TK***

→ What total numbers to be accommodated in the Depot (& car park), inc. Transdev, Tramco, Infraco ***Action:*** *DP/ RJ/ AR*

If reduced numbers can be agreed, enabling a smaller size for some of the buildings, and the car park, this will assist the overall depot footprint layout and the replanning needed to fit the 43 metre trams.
(It was noted that SDS felt the building size may need to increase, not decrease).

24.1.33 **Reduced Cost for Depot Buildings**

Regardless of any possible reduction in depot building occupant numbers and hence building size, it was indicated on 24.1 that depot building costs appeared significantly higher that equivalent buildings for the Liverpool Tram (around £7m vs £4m).

This was considered at the 31.1 meeting, where it was acknowledged that Edinburgh site required excavation, which might account for some part of the difference, but the buildings were designed with a simple slab foundation.

The following actions were agreed.

→ SDS to provide NH with £7m estimate breakdown ***Action:*** *SDS immediate*

→ Neil to compare Edinburgh/Liverpool estimates to identify specific areas of potential saving to examine at the 7.2 VE meeting ***Action:*** *NH to SDS by 5.2.07*

→ For areas identified by NH, SDS please bring design & cost info to the next VE workshop on 7.2.07 ***Action:*** *SDS for 7.2.07*

→ TSS – please bring any relevant Bidder input for this review ***Action:*** *TSS*

31.1.1 **Delete the Depot Loop** (from w. end of sidings to w. end of Maint. Shed)
This was suggested as a means to reduce the depot footprint, either as a possible saving in excavation or to create space for the 43metre trams. *Rejected*

This ideas was rejected as too difficult a redesign – and detrimental to depot operational flexibility. It will only be re-considered if:-

- if it becomes an essential means to fit 43 metre trams
- if it is part of a bidder's major and attractive alternative configuration

3.2 DEPOT EQUIPMENT

24.1.22 **Lease the Depot Equipment (eg Wheel Lathe)** *Filter = E*
From experience, the team thought this most unlikely to be achievable.

24.1.23 **Single Head Wheel Lathe** *Hold*
This equipment is not yet scoped. This idea will be held pending review of Bidders proposals and scoping of maintenance equipment

Responsibilities		
SDS – the PB team	JP – John Pantony	TK = Toby Kliskey
AR – Alastair Richards	GG – Geoff Gilbert	RJ = Roger Jones
NH – Neil Harper	DP – David Powell	Trudi Cragg
AH – Andie Harper	Susan Clark	Steven Bell

3.3 TRAM MOCK-UP

The current plan is to buy a Tram Mock-up to obtain approvals, for PR and for Operator Staff Training. Cost of this mock-up is around £500k.

24.1.10 **Use an existing mock-up**.

It was noted that the mock-up is for indoor use and does not need a roof or water-proofing. Although some costs will still apply, including transport and storage (perhaps in part from the PR budget), worthwhile savings of about £250k might be possible, out of the budgeted £500k.

David Powell reported that some of the bidding Tramco's have existing mock-ups which might be adaptable for our needs. It was agreed that this idea has potential and should be held for review with the final 2 bidders. ***Action****: – Hold DP*

24.1.11 **Use Drawings & Computer Graphics**
Yes, but this does not eliminate the need for the Mock-Up. *(Will do anyway)*

24.1.12 **Use a Virtual Mock-up to avoid the real one** *Filter = C/E*

24.1.13 **Get the TRAMCO to obtain the Approvals** *Filter = C/E*

24.1.14 **Purely Functional mock-up for Approvals only** *Filter = C/E*

24.1.15 **Check the bids for Tramco ideas**

→ Investigate with Tramco's what opportunity for savings through ideas 24.1.11, 12, 13, 14, 15. Accepting that PR and staff training will not be achieved without a Mock-up.
Action*: Hold for review with final 2 bidders with idea 24.1.10 DP*

3.4 TRAMS – LEASE, NOT BUY?

9.1.8 **Lease, not buy all the Trams**. *Reject*
This is no longer tax advantageous and therefore it is not acceptable to lease the entire tram fleet. However, leasing some trams has shown potential advantage and is covered by idea 24.1.25 below.

3.5 TRAMS – HOW MANY? LEASE or BUY?

Current plan – buy 31 trams, sufficient for an 8+8 service on routes 1a & 1b, with spares.

But:- 22 trams would support phase 1a at a 6+6 service

25 supports phase 1a & 1b at 6+6 (ie 6 end to end + 6 centre only = 12 total centre)

26 would support phase 1a at 8+8 service

31 supports phase 1a + 1b at an 8+8 service.

24.1.4 **Buy 26 trams with option to buy 5 more within x years at an agreed price.**

26 trams enable either 8+8 on phase 1a or 6+6 on phase 1a +1b. This reduction of 5 trams @ £2m gives around **£10m initial Capex saving** *Filter = C*

Note that this merely defers the £10m Capex until a later time, but may bring the required relief to the initial capital budget. Idea 24.1.5 below removes the £10m Capex completely – not as a real saving but as a transfer to Opex.

24.1.6 **Buy 22 trams for 1a 6+6 service, with option to buy/lease 9 more within x years at an agreed price.** The 9 trams deferred give around £18m initial capex saving – but 4 more would need to be added to the firm order as soon as phase 1b is approved for implementation, which may be rapid if the £18m capex is saved.

Update 31.1.07: 22 trams is unacceptably low. This idea is unlikely to be workable, effort should focus on idea 24.1.5, with 26 trams as the safe minimum.

24.1.5 **Buy 26 trams and, when more are needed, lease the extra ones**. Although this is not a genuine lifetime saving, because capex is saved at the expense of increased opex, it is not as unpalatable as idea 9.1.8 (section 3.4 above), which proposed to lease all the trams.
Furthermore, the extra trams would only be leased on the basis of proven demand and revenue, creating a confident business case for the decision to lease the extras.
Leasing of 5 trams out of the full 31 gives the **£10m initial Capex saving**

Update 31.1.07: Alastair Richards reported that a business case might be made for the £750k - £1m per year for leasing 5 trams from 2016 for route capacity increase. Treasury rules (tax benefits) for such leasing are no longer favourable. However, there is still a French cross-border lease arrangement which, although complex, could give benefit.

A possible alternative to leasing is for TEL to borrow the funds to purchase the extra trams – it is thought that TEL have the financial strength to guarantee this loan. This would also achieve the desired goal of transferring 5 units off the initial budget to save £10m Capex.

→ Acceptability of borrowing £10m in stead of leasing to be confirmed ***Action**: AR*

David Powell confirmed that the Tramcos appear receptive to an initial sale of trams, with a further quantity available at a fixed price, held for a further period of time.

→ This will be pursued with the top 2 bidders ***Action**: DP*

Note however that there remains a risk that this period of time may expire before TEL are able to commit to the leasing or loan-backed purchase of the extra units. Any subsequent purchase could then result in a significant cost increase.

24.1.7 (Transdev idea 17) **Buy one less tram by reducing spares, but with appropriate re-apportionment of risk for when lower performance achieved**.
Possible mitigation by having reversionary timetable with slightly longer headways that could be implemented without penalty to the Operator when used.
One tram saved = £2m

This may conflict with a Transdev investigation into conducting routine servicing during daytime operational hours, enabled by spare trams. i.e. this Capex saving may increase operating costs for cleaning/servicing staff overnight.

Update 31.1.07: Alastair Richards reported that, although difficult to accept this (26 trams being considered the safe minimum), it may be possible if satisfactory service level agreements can be reached, reflecting the potential service risk from reduced fleet resilience.

3.6 TRACK FORM

This will be subject to VE reviews with the preferred bidder. Meanwhile three sections were considered at the 24.1.07 workshop. The possibility of changing WEBS area from concrete sleepers to ballast was rejected as difficult and minimal benefit.

Two areas remain for consideration:-

24.1.24 **Roseburn Corridor – change from "grasstrack" to Ballast** *Filter = C / E*
Concerns over Noise, Vandalism, Local Objection, not as Parliament agreed, Stray current risks – protection required

24.1.26 **Edinburgh Park – change from "grasstrack" to Ballast** *Filter = C / E*
Third Party issues *Unlikely, but hold for results of 24.1.24*

Update 31.1.07: One Bidder has proposed changing around 4 km to Ballast, indicating a potential saving of around £2m. (TSS estimate shows around £1.6m)

The risks of vandalism etc remain (as described in 24.1.24 above), but could be reduced by the use of Epoxy Resin. Such glued ballast could be tamped as normal, but would need to be re-glued afterwards, adding to Opex.

The Bidder also suggests using Embedded Sleeper track in more areas.

→ Review the Bidders proposals for Track Form savings and identify areas where this cannot be accepted. ***Action**: Trudi*

→ Explore Track-form change opportunities with Bidders ***Action**: GG/ Toby*

Track-forms are traditionally 400-750mm deep from road level. Ours is 570mm concrete (was 525), then 200mm bed – ie 770 total (concrete plus bed).

Utilities are planned to be between 900 and 1200mm, some with re-enforcement above.

3.7 STRUCTURES in Sections 5A and 5B

The section of track by Murrayfield is at high level on a significant retaining wall above the pitches. This high route is essential to maintain tram operations during events at Murrayfield, which for evacuation safety reasons require local roads to be closed to traffic. Murrayfield pitches are part of the flood plain which extends to this retaining wall.

24.1.27 **Ensure that the retaining wall is built to hold the track, not as flood defence**. What savings are possible? e.g. Build as a steel or concrete viaduct.

Update 31.1.07: Wall is not for flood defence. *Recommendation, No Change.*

24.1.28 **Reduce the Durability target/ design-life** (generic proposal for many locations). *Why does 60 year tram need 200 year structures?*

Update 31.1.07: Life is 120 years (Design Standard) *Recommendation, No Change.*

24.1.31 **Edinburgh Park bridge crossing over the railway**. This is in a politically sensitive area. £500k added to the structure to meet CEC Planning wants. *No Change*

24.1.32 **A8 Underpass** (by Depot). This structure was challenged as being over-sized.

SDS are fine-tuning this in detail-design. A key open issue is the precise location and depth of a bank of ducts containing many critical fibre-optic cables. Surveys are planned. There is also a major retaining wall between the A8 and the Depot.

→ Examine opportunities when survey data available in February. ***Action**: SDS*

3.8 OTHER IDEAS FROM PREVIOUS WORKSHOPS

9.1.9 **Business or Advertisers to take over individual tram stops** (as Royal Bank of Scotland have done already). Primarily this would generate revenue to justify capital expense. Alternatively would some capital funding be possible and permissible?
Action: *Investigate the opportunity – AR ongoing*
Bank of Scotland in City, Harvey Nichols, Ocean Terminal, Airport, Murrayfield?

24.1.19 **Infraco Bidders offering discounts to use their trams** *Filter = C+*
Besides potential savings, could reduce interfaces and potential Supply Chain conflicts. Investigations already in hand ***Action GG***

24.1.29 **Install cable route (Comms & Power) along Forth linking 1a to 1b**. *Filter = C*
This reduces the need to dual route elsewhere.

→ tie to issue TQ to SDS ***Action: tie***

Update 31.1.07: One Infraco Bidder has priced for this, and for complete network linking 1a and 1b.

→ Identify Bidder costs and overall saving opportunity ***Action:*** *Toby*

24.1.30 **Pre-fab drop-in tramstops & other items**. *Filter = D*

→ Hold for VE review with Bidder ***Action****: Hold for VE with Bidder. GG*

4 Added Ideas from Bidders & the 31.1.07 VE team

31.1.2 **Delete some of the Luggage Racks** *Evaluation Filter = C/D*

31.1.3 **Delete some of the Luggage Racks and add more Seats** *Filter = D*

31.1.4 **Purchase Trams with no Seats or Luggage Racks (maybe no Grab-Rails). TEL then to arrange fit-out through an alternative source.** *Filter = C/D*

Quotes received look promising. This is still Capex spending, but appears to offer a worthwhile saving.

→ What cost saving if trams are not fitted with seats. Luggage racks etc. ***Action****: DP*

→ What added cost for TEL to arrange this fit-out for 26 trams? ***Action****: AR*

Note that issues of maintenance liability must be clarified/ accepted.

31.1.5 **Passenger Counters on only 20% of trams, not all** *Filter = A*
These are not 100% reliable and a sample count was recommended as a sufficiently accurate measure – with counters fitted to only 20% of trams. Potential saving is judged approx £250k ***Action****: TEL Confirm Acceptance. AR*

5.1.2 **Reduced price for earlier payment**. *Filter = C*

→ Investigate potential with Bidders ***Action****: DP/GG*

31.1.6 **Tramco to provide some of the Depot Equipment**. Might gain advantage from Tramco procurement knowledge &/or buying power. The question has been asked – Tramco replies awaited. *Filter = C* *Action: DP*

31.1.7 **Reduce height of Overhead Power Line**. Tramcos indicate this makes pantograph shorter and less costly. *Filter = A* ***Accepted***

→ Designs will be brought in line. *Action: SDS*

→ Any saving in OLE Support Poles throughout route? *Action: SDS/ TSS*

→ Does this allow the Depot to rise by the amount the OLE lowers? Potential clash on Jacking Road in Maintenance Shed (see 31.1.8) Opportunity to be maximised. What potential in Depot? *Action: SDS/ TSS*

31.1.8 **Use Bogie Drop Pit, Not Jacking road to allow 31.1.7 Depot rise** *Filter = E*
First sight response – Jacking Road height also used for essential lift off of roof-mounted equipment (Pantograph etc), so pit will not reduce the overall height.

→ Designers to explore this. What determines Depot height, once OLE is lowered? Any way to raise most, if not all of Depot with lowered OLE? *Action: SDS*

31.1.9 **Reduce Noise Mitigation measures (eg Roseburn Corridor).** *Filter = C*
This is proposed by one Tramco based on "quieter trams"
Total project Noise Barrier costs are £5m, so savings could be useful.

→ What Noise Barrier savings vs the £5m ? Say £1m? *Action: SDS/ TSS*

→ Is this only possible with one Tramco? *Action: DP/ SDS*

31.1.10 **VE with top 2 bidders, once nominated**. *Filter = A*
Tramcos will be motivated and worthwhile savings anticipated. However, this will not be implemented/quantified in short-term

→ Hold for selection of Top 2 Tramco Bidders *Action: DP/ GG*

31.1.11 **Reduce Power Demand** *Filter C/D*

This may enable savings in Substations or Power Supplies, although major costs may be in providing the power supply infrastructure, with only minor saving potential from the size of the equipment.

However, power reductions may attract Grants/ Match Funding for any Environmental measures. It could either apply overall or be controlled to specific times or route sections.

Regenerative Braking is already planned, feeding back into the OLE if nearby trams are in a position to use the recovered power.

→ Check for feasible technology for onboard storage *Action: DP*

31.1.12 **Remove or Reduce the Bonds (Financial)** *Filter = C*
Significant savings may be negotiated, if the commercial risk can be accepted

→ Investigate the opportunity and the risk *Action: GG*

31.1.13 **Delete 4 Tram Stops** (Ocean Drive, Roseburn, Ravelston, S.Gyle) *Filter = C*
Potentially around £750k saving. Also improves Runtime.
Leave provision to add these stops later

→ Investigate acceptability of removal of these 4 stops *Action: tie/TEL*

31.1.14 **Delete Fencing around Substations** *Filter = D*
Potential £26k saving on 13 sites, but introduces security and vandalism risks.

→ Investigate the opportunity and the risk *Action: GG*

31.1.15 **Build 12 substations, not 13** *Filter = C*
13 substations enable a full service with any one substation out of service.
12 substations gives potential £500k saving, but would need acceptance of risk to operations if 1 substation fails.

31.1.16 **Reduce Estimate for Power Supply to Substations** *Filter = A/C*
Liverpool experience suggests the £300k estimate (x13 Subs) is high

→ Check Utility/DNO prices and quotations, including Back-up supplies and Network Re-enforcement *Action: Toby*
First sight potential around £2m saving from £6m budget, ref e-mail discussion of 2nd Feb below – with thanks to Neil and Bruce.

A. Further to our discussions at yesterday's VE workshop, I have reviewed the project estimate data resulting from our capital cost validation exercise and confirm that circa £300k per substation has been included within the E & P section for 11 kV feeds. However, in addition, a sum of £2.35m has also been included within 3rd Party Agreements costs for Power Utility Company network reinforcement. I have double checked this with John Pantony.

   It would appear, then, that there could be a substantial saving available from the total estimate of approx £6m included for this element.

   Neil Harper, Brian Hannaby & Associates

B. My quick review of the Project Estimate confirms your observations as correct however whilst the estimate may be high I am of the opinion that your anticipated saving is also high.

   I believe tie are in receipt of a budget figure from the DNO suppliers, Scottish Power, and I am also aware that Scottish Power may not have been fully appreciative of the actual requirements at the time they produced the estimate.

   I have been present at a number of SDS/Scottish Power meetings when SDS were trying to eliminate the need for duplicate HV Switchgear (Scottish Power in series with tie) as they achieved on the Liverpool Project and others in England. Although it was the same DNO the Edinburgh contingent were unable to accept the principle.

   Irrespective I believe a budget figure of £130k per substation would be more appropriate at this stage.

   This provides a saving of circa 12 x £170k = £2.04m – *(but see below)*

   At this moment I am not aware as to why Scottish Power should be paid for Network Reinforcements and I propose to discuss this aspect with Trudie just in case some form of undertaking/Agreement or understanding exists between the parties. If so then I suggest the figure needs reviewing in the light of the knowledge Scottish Power now have, if not then its more money towards your target.

   Bruce Ennion, SDS

C. In clarification, I'm not suggesting that there would be a £6m saving, only that £6m is currently the total included in the estimate for this element. I agree with you that £130k per substation would be nearer the mark.

As far as the network reinforcement is concerned, I wonder if the situation is similar to Liverpool whereby it was required for the city generally due to all developments and it was established that Merseytram would not be picking up the cost.

Neil Harper, Brian Hannaby & Associates

D. Your comment re overall potential savings is agreed.

As already mentioned I believe the whole issue of betterment/upgrading needs addressing by tie and I shall speak with Trudie when she is available.

The location of the Gogar Depot is remote from anything electrical and could/will attract a significant cost over/above the £130k that we have today identified.

Equally so the arrangement at the Park & Ride substation could attract additional Scottish Power infrastructure over and above our norm.

I suggest we discuss this next week and see what we can happily provide as a contribution to the target Andy has identified.

I assume somebody in tie will be evaluating the information provided to them by Scottish Power in the autumn of last year and will be able to contribute to the identification of a updated budget estimate for these works. *Action: Toby*

Bruce Ennion, SDS

5 VE targets addressed 31.1.07

5.1 3rd PARTY AGREEMENTS

Significant cost is attributed to meeting 3rd party agreements – which is why this item was placed on our list of targets.

Andy Harper tabled a list of all 3rd Party Agreements, supplied by Trudi Cragg.

We were cautioned that much negotiation had gone into these agreements and care must be taken in making any changes. It was therefore agreed that:-

- We would only focus for potential savings on those with the major cost impacts These include:-
  - BAA, for which we await news expected 5.2.07 of runway threshold move,
  - SRU, in final stages of Murrayfield agreement and signature, with the good news that pitches are unlikely to need to be moved.
  - NR. Jeff Lloyd will join the VE workshop on 7.2.07 to present the detail of work to be undertaken under this Agreement with Network Rail – indicating the major areas of Cost and Risk.
- Any other high cost 3rd Party Agreements to be identified 7.2.07 *Action: AH/Trudi*
- Beyond these few saving opportunities, VE attention would be reserved for the purpose of Pre-Implementation Review with the Contractor, tie and the 3rd Party, to ensure understanding and agreement, and to anticipate and minimise any construction pitfalls - i.e. not primarily for cost saving, but for cost and cock-up avoidance!
  → Hold for use as and when required *Action: GG*

6 Evaluation of Transdev ideas

Transdev issued a paper on 5.1.07 containing many ideas for saving opportunities. A number of these were evaluated by the team at the 24.1.07 workshop. Others will be examined at future meetings.

The more important and urgent ideas from this workshop include the following:-

5.1.1 **More Disruption for shorter period** *Filter = C / E*

→ Examine Bids. Pick opportunities and ask Bidders for best proposals.
(Caution – watch item 4.7, don't share bidders' ideas)

Maybe use MUDFA Ocean Drive test case? Close road completely, not lane by lane? Need to demonstrate quickly to CEC clear benefit for any relaxation in COCP (Code of Construction Practice)

Action: *Susan Clark(tie), Andrew Holmes(CEC), K Rimmer*

Update 31.1.07: Actively being pursued with CEC. COCP variations under investigation.

5.1.7 **Aligning SDS and the Employer's Requirements**; making best use of design that has been done. Accept that there are scope mismatches now between SDS & Infraco, and implement a funded strategy to resolve the issues.

→ In hand - must accelerate/ communicate. → Update 31.1.07: Action in Progress
Ensure SDS/Transdev aligned with tie (& TSS). Involve Infraco also. ***Action:*** *GG*

5.1.19 **Omit all customising of cab exterior** (maybe not accepted by Promoters) *Filter = C*

→ A) Is base appearance OK?
B) if not, what cost to beautify? ***Action:*** *DP / AH*

5.1.20 **OLE: Minimise building fixings?** (what allowances in budget for management and compensation vs cost of poles?) *Filter = D/F*

More likely to be lower cost, but higher risk on buildings.

Update 31.1.07: Occupiers can only object up to 30 days after agreement

→ Site-by-site opportunity / decision, considering programme risk.

Action: *SDS/Geoff Duke/John Panthony*

5.1.21 **Review size of pre-packaged Traction Power units to make smaller**

→ Review vs others (Nottingham, Sheffield) ***Action:*** *SDS/ Transdev*

Update 31.1.07: Under review with Nottingham. If useful, VE with Bidders.

5.1.23 **Reconfirm the necessity for each of the subsystems comprising Supervisory Control & Communications.** *Filter = D*

NB PIDs joint with LB for TEL; Enquiry as well as Emergency Help points; System architecture; CCTV at stops?

→ Design review to determine requirements and eliminate unnecessary cost.
Only Emergency, not Info also?
Delete Emergency also? ***Action:*** *Steven Bell/ TEL/ Transdev*

5.1.24 **Platform finishes to minimum standard throughout.** *Evaluation = C / E*

→ Design development in progress, then VE with Bidder ***Action:*** *SDS*

7 Next VE Workshop – 12.00 until 17.00, Wed 7.2.07

The meeting will start with a sandwich working lunch provided.

The venue is
the COSLA Centre, Rosebury House, 9 Haymarket Terrace, Edinburgh , EH12 5XZ

Scope of the 7.02.07 meeting will include.

A. Review of actions from 9.1.07, 24.1.07 & 31.1.07 meetings.

B. Review of following items identified for hold-over or follow-up from 24.1.07 meeting
   1) 3rd Party agreements, identifying those requiring VE attention *AH / Trudi*
   2) Specific 3rd Party Agreement detail with Network Rail *Jeff Lloyd / SDS*
   3) Depot Buildings – and BAA news *NH / SDS*
   4) Depot Layout / Footprint – 43m trams and buildings examined *SDS*

C. Examination of items on the following lists not yet addressed:-
   - TRANSDEV list of 5.1.07
   - SDS VE Summary dated 30.10.06
   - Andie Harper list dated 31.1.07

Rejected Ideas

(listed here for the record in case of future queries)

9.1.6 Low Level Depot, Car Park above. *Evaluation = F (minor benefit, hard to do)*
Would conflict with local car park operations, would create traffic congestion on the busy A8 roundabout, would add to construction cost more than would be offset by any funding brought in – and would jeopardise a critical programme. This may be infeasible without lowering the depot further, adding major cost. *Rejected*

9.1.7 As 9.1.6, but as PFI Car Park to fund Depot Construction. *Evaluation = E* *Reject*
i.e. could be major capex boost, but would threaten programme and be hard to do.

9.1.10 Tram Branding – revenue generation *What opportunity?*
In progress and in Business Plan for 1A. Maybe opportunity in 1B?
Better focus on Tram Stops. No further opportunity. *Item Closed*

24.1.1 New Idea: Depot at Leith in stead, land available. *Examined before and rejected.*
Now too late to reconsider without major programme threat. *Reject*

24.1.2 New Idea: Move to Ingliston Park & Ride – Evaluation = E/F *Reject*
This is outside LOD, major delay on programme-critical construction.

24.1.3 New idea - Sponsor a tram – Name Plates – Auction? Evaluation = F, *Rejected*

24.1.8 No mock-up, use an existing tram in another fleet. Either borrow one and bring to Edinburgh, or take the necessary people to it.
Thought unlikely *in UK without rework. Not easy to find, would not meet all required objectives and would not be a great saving.* *Rejected*

24.1.9 No mock-up. Pull ahead one of our own units and use that. *Rejected*
Would be a costly one-off build, most likely requiring rework to incorporate changes as designs & approvals are progressed, not easily transported or displayed (the planned mock-up will be a "light-weight" structure, transported by normal road-going low-loader). Major difficulty, minimal saving.

24.1.16 "Free-ride" approvals by using an existing design to avoid a Mock-up
None suitable approved by UK Authorities *Reject*

24.1.17 Defer Approvals for the first of our production units (phased).
Minor benefit vs idea 24.1.9 and risks rework to many units *Reject*

24.1.18 Use a tram route elsewhere – eg for staff training *Reject*
Not relevant now – but may be needed for problem resolution later

24.1.25 WEBS Area – change from concrete sleepers to Ballast *Reject*
Idea rejected as difficult and minimal benefit