

Date: 11 March 2015

Item 15: Bakerloo Line Fleet Life Extension

This paper will be considered in public

## 1 Summary

IP03045/PVEC3088		72TS Weld Repairs		
Existing Financial Authority	Estimated Final Cost (EFC)	Existing Project Authority	Additional Authority Requested	Total Authority
£ 70.26m	£ 68.66m	£ 9.26m	£ 11.51m	£ 20.77m

**Authority Approval:** The Committee is asked to approve additional budgeted project authority of £11.51m, increasing the current authority of £9.26m to £20.77m.

**Outputs and Schedule:** The purpose of this project is to address the deteriorating condition of the Bakerloo line 1972 Tube Stock (72TS) carbody. The repairs are intrusive and are necessary to maintain the structural integrity. The project will complete the first seven trains of repairs and seek final funding for the full fleet by 30 June 2016.

## 2 Recommendation

- 2.1 **The Committee is requested to approve an increase in Project Authority of £11.51m, increasing total Project Authority to £20.77m, to complete the first seven trains of the Bakerloo Line Life Extension (72TS weld repairs) project.**

## 3 Background

- 3.1 The Bakerloo line fleet comprises 36 trains of 1972 Tube Stock (72TS) and has a nominal life of 40 years. The fleet is now 37 years old and is suffering from age related failures impairing its structural integrity.
- 3.2 A London Underground (LU) condition study published in June 2013 concluded that repairs were needed to ensure that the 72TS trains continue to meet relevant safety standards regarding performance in a collision or derailment. The report mandates that these repairs shall be undertaken within four years (commencing 2014) with the repairs prioritised based on condition.
- 3.3 Replacement of the Bakerloo line fleet under the current New Tube for London proposal is planned to commence from 2025/26. Based on the findings from the study the structural repairs identified are of a nature that remediation is necessary in order to allow the fleet to remain in service until its replacement.

- 3.4 Initial authority was approved to complete the repairs on three trains. This was in order to understand, in detail, the condition of the trains through intrusive investigation, develop suitable methods of repair and also to design a production line methodology to deliver the necessary works to the remainder of the fleet in the most efficient and cost and time effective manner.
- 3.5 During repairs to the first train it has become apparent that the overall condition of the bodywork and under frame is in a worse condition than originally concluded. It is considered that the findings from this first train are representative of the condition of the remaining fleet. This has led to an overall increase in scope and hence an increase in the overall EFC.
- 3.6 To date, the project has completed the following:
- (a) engineering assessment reports, project scope, prototypes repairs and creation of detailed process instructions and development of the repairs suitable for production;
  - (b) development of a procurement strategy which recommends that the works are best delivered by LU's internal delivery organisation, Trains Division, for the weld repairs. This has been based on benchmarking work carried out and considers the complexity of the work;
  - (c) procurement of a small quantity of long lead items, to facilitate the repairs to the prototype and trains one to three;
  - (d) on-site enabling works at Acton Works to create a dedicated workshop facility to undertake the repairs;
  - (e) construction of a road ramp at Stonebridge Park depot (SPD). This will permit the on-tracking and off-tracking of train carriages for road transport when suitable train paths cannot be feasibly made available;
  - (f) continuation of train one assessment (amending designs to cater for varying vehicle conditions and layouts); and
  - (g) continuation of repairs to train one (still in production, 73 per cent complete as of 14 January 2015, forecast to be completed by 24 April 2015).

## **4 Proposal**

### **Preferred Option**

- 4.1 The purpose of the project is to address the deteriorating condition of the 72TS carbody. The project comprises of carbody weld repairs and minor modifications to 36 trains (272 cars), including all associated enabling works. This project is to ensure that the fleet can continue to operate until its eventual replacement. A summary of the scope is listed in Appendix 1.
- 4.2 The preferred option is to complete the first seven trains in the fleet incorporating the originally specified scope, and also the new additional works that have been determined as a consequence of the findings from train one.
- 4.3 As a consequence of the new scope, LU has expended more effort and incurred additional costs in repairing the first train. It is highly probable that all trains will

exhibit a similar condition. It is therefore necessary to increase the authority of the trial phase to account for the greater scope and provide confidence in the EFC.

4.4 This request is for an increase in funding of £11.51m to undertake the following activities:

- (a) review and finalise the repair processes based upon experience and lessons from the first three trains. This will ensure that repairs are lean and efficient, minimising waste;
- (b) complete tenders for remaining fleet materials for 33 trains;
- (c) refine and update all project costs for the remaining 33 trains, including project management and engineering;
- (d) complete three trains of repairs by 12 February 2016 and update the project cost estimate for the final submission; and
- (e) continue with the repairs for a further four trains (total of 19 per cent of fleet) while final full fleet funding is obtained.

4.5 This submission cost breakdown:

<b>This Submission Cost Breakdown (Outturn)</b>	<b>2013/14 £000's</b>	<b>2014/15 £000's</b>	<b>2015/16 £000's</b>	<b>2016/17 £000's</b>	<b>2017/18 £000's</b>	<b>Future £000's</b>	<b>Total £000's</b>	
<b>Project Base Costs</b>								
Programme & Project Mgt	-	377	769	8	-	-	1,153	
Engineering & Development	-	-	72	2	-	-	74	
Access & Logistics	-	-	84	6	-	-	91	
TMU & Tooling	(67)	(1,406)	6,960	956	-	-	6,444	
Enabling & Road ramp	-	876	-	-	-	-	876	
Repairs @ SPD	-	160	260	21	-	-	441	
Inflation adjustment	-	(262)	-	-	-	-	(262)	
<b>Total Base Costs</b>	<b>(67)</b>	<b>(255)</b>	<b>8,145</b>	<b>994</b>	<b>-</b>	<b>-</b>	<b>8,817</b>	
	<b>% of base</b>							
Risk	31	-	-	1,480	1,211	-	-	2,691
<b>Total This Submission</b>	<b>(67)</b>	<b>(255)</b>	<b>9,625</b>	<b>2,205</b>	<b>-</b>	<b>-</b>	<b>11,508</b>	

## Benefits

4.6 The key benefits from undertaking the project are listed below:

<b>Benefit</b>	<b>Description</b>	<b>Measure</b>
Return carbody structural integrity and condition	Restore the fleet condition and stop further deterioration to ensure the train fleet continues to remain in safe and reliable operation until replacement	Scope items complete and the fleet repaired to a satisfactory condition
Reduction in mitigation activities	Eliminate a number of Cases for Continued Safe Operation (CCSOs), demonstrating a net improvement in asset condition and safety, which is aligned to LU's asset strategy	Removal of asset risks associated with the project scope
Compliance	Fitment of Railway Vehicle Accessibility Requirements compliant floor covering design ahead of the 2020 mandatory date, saves future re-work	New floor covering complete
Avoid unplanned casualty repairs	Reduce Bakerloo line lost customer hours (LCH) exposure (due to service availability impact) by undertaking the repairs in a planned and controlled manner	Only one train out for repairs for project duration (excluding early emergency repairs)
New asset	Create new road ramp asset that will benefit future projects and initiatives such as New Tube for London and track maintenance and renewals	Asset in place and signed off ready for use
Bring back asset into use	Re-develop Acton Works building for this project to carry out repairs. The facility is set up to support future works and maintenance activities	Building used to carry out the repairs

4.7 Options considered and not recommended include:

- (a) Do nothing – There is no “do nothing” option. The repairs will be required as the train condition deteriorates over the remainder of its service life. A reactive approach would be more expensive and will significantly impact LU's ability to deliver a train service as it is predicted that up to five trains would be unavailable for service at any time from 2016 to 2018. Note that individual swan neck repairs have already taken place in recent years due to crack growth reaching allowable limits.
- (b) Delivery at SPD – This would mean carrying out the repairs at the Bakerloo line fleet maintenance depot alongside routine maintenance. However this facility is constrained for lifting and stabling space and would not permit completion of the project within the required timescales. Even taking into account the fleet transportation costs, it is far more economically advantageous to complete the project at Acton Works which will have dedicated facilities as well as benefiting from a fully dedicated production line approach.

4.8 The preferred option is to deliver the project in a planned controlled manner, by carrying out repairs off-site. This means that the repairs can be completed sooner, more efficiently and reduce the risks of taking up needed lifting road capacity at SPD. By undertaking this approach, it avoids suffering significant impacts to service.

## Delivery of Preferred Option

- 4.9 The repairs are to be carried out in-house by Trains Division and are programme managed by the Legacy Train Systems team in Capacity Optimisation Programme within the Capital Programmes Directorate.
- 4.10 Funding is requested for up to seven trains to be repaired and up to ten trains of long lead items; this is to allow for the continuation of production whilst seeking the final funding for the remainder of the fleet.
- 4.11 The forecast dates and milestones associated with the project are:

Activity - Description	Forecast	Milestones	Status
Complete train 1	28/03/15	24/04/15	In production – revised date
Start on site enabling works	01/04/14	-	Complete
Finish enabling works	28/05/15	-	In production
Complete train 3	15/01/16	12/02/16	Revised date
Finish train 36	18/05/21	-	Estimated completion date

## Risk

- 4.12 The project delivery strategy is a phased approach using internal expertise to build confidence in the scope, implementation and costs; this is to reduce overall financial risk. The subsequent implementation phase will be developed based on experience from the first three trains. The top five risks for completing up to train seven are summarised below:

Risk No	Risk Description	Mitigation Actions
1	Late delivery and non-compliance of parts causes delays	Order parts early, engage with suppliers to understand project requirements and processes
2	Enabling costs exceed budget (Stations Works Improvement Programme overspend)	Review and verify costs via SAP. Conduct regular site visits and meetings
3	Delays in project due to late enabling works, leads to stopped cars and unplanned repairs at depot	Engage with stakeholders and complete enabling works in-house. Regarding signalling at SPD, this would require additional emergency repairs to be carried out at SPD
4	Delays due to work instructions not approved in time and leads to delays for tooling and consumables ordering	Plan works and lifting jack availability with other projects. Focus and prioritise on tasks which have a high level of uncertainty
5	Fleet do not accept modified train	Early engagement with Fleet and involvement in assurance activities

- 4.13 The total risk P50 value for trains one to seven is £2.69m (outturn).

## Resources and staffing considerations

- 4.14 The table below summarises the project resources required (Trains Division is planning to work double shifts from train three). Previously the full time equivalent

(FTE) total was 46.6, the new total required to complete the additional work is 79.5, an increase of 32.9.

Description	Type	Staff	Quantity
Legacy Trains Systems - Project management team	Permanent	FTE	3.3
Train Maintenance Unit Management (funded by project)	Permanent	FTE	3.5
Legacy Trains Systems - Engineering Support	Permanent	FTE	3.1
Trains Division Management	Permanent	FTE	1.5
Trains Division Support	Permanent	FTE	8.2
Trains Division labour	Permanent	FTE	10
Trains Division labour	Temporary / Contract	FTE	45 (25.5 first year)
Asset Performance Engineering	Permanent	FTE	1.5
Stations Works Improvement Programme	Permanent	FTE	3.4 (only first year)
		<b>Total:</b>	<b>79.5</b>

4.15 The accommodation facilities for the additional staff are part of the enabling works at Acton, e.g. fitment of toilets, showers, lockers, etc.

## 5 Financial Implications

### Capital Costs

5.1 The project EFC is summarised in the table below. There is currently £61.1m unapproved project authority and £9.26m approved project authority (total budget: £70.3m).

Funding and Project Authority Breakdown (Outturn)	Prior Yrs £000's	2013/14 £000's	2014/15 £000's	2015/16 £000's	2016/17 £000's	Future £000's	Total £000's
<b>Funding</b>							
Budget/Plan	-	650	7,947	11,965	12,773	36,927	70,262
Estimated Final Cost	-	762	8,176	9,625	13,102	36,998	68,663
<b>Budget/Plan Surplus/(Shortfall)</b>	-	(111)	(229)	2,340	(329)	(71)	1,599
<b>Project Authority Breakdown</b>							
Prior Submissions	-	829	8,431	-	-	-	9,260
This Submission Request	-	(67)	(255)	9,625	2,205	-	11,508
Future Submission Requests	-	-	-	-	10,898	36,998	47,896
<b>Total EFC</b>	-	762	8,176	9,625	13,102	36,998	68,663

5.2 The EFC at the last investment submission was £31.15m. Now that the first train has revealed additional previously unknown scope and worse condition, the revised EFC is £68.66m. The difference between the two figures is broadly summarised in the table below:

5.1 Cost Element	5.2 In £m (outturn)			5.3 Comment
	Previous	New	Variance	
Programme and project management	3.142	5.303	2.161	Increase based upon project elongation by three years. Constrained by site capacity and availability of trains
Engineering, development and support	0.883	1.802	0.972	Increase based upon additional scope and project elongation by three years
Access and logistics	0.660	0.481	(0.179)	Reduction due to increased stock transfer by rail (access post Jubilee line tunnel repairs)
TMU and tooling	19.825	44.959	25.134	Increase based upon additional scope and project elongation by three years
Enabling (Acton building and road ramp)	2.992	3.779	0.787	Increase based on additional scope. Predominantly covering increase in welding activities requiring additional power, wheel store and office fit out
Fleet staff supporting TMU carrying out urgent swan neck and sole bar repairs at SPD. Materials funded by Capital Programmes Directorate	-	1.480	1.480	Increase based upon additional scope and urgent repairs (mitigating against asset failures)
Risk	3.703	10.860	7.157	Increase based upon fleet condition discovered on train 1 and levels of uncertainty until train 3 is completed
<b>Total:</b>	<b>31.152</b>	<b>68.664</b>	<b>37.512</b>	

5.3 Appendix 3 contains a detailed breakdown of the cost increases for train one to three and the provisional cost of trains four to seven.

5.4 The project estimate has been provided by Capital Programmes Directorate and Trains Division who have extensive experience and domain knowledge of legacy fleets and have been fully involved with the development of the weld repair processes, prototypes and first train (in production). Due to the variable nature of the condition of each train, benchmarking demonstrates that Trains Division is more cost competitive than the external market.

#### **Funding strategy and Authority**

5.5 There have been three submissions to date. Following this submission, the plan is for a final submission in June 2016:

<b>Submission description</b>	<b>Additional Authority</b>	<b>Cumulative Authority</b>	<b>Approval date</b>
Seed funding	£0.248m	£0.248m	26/02/13
Interim funding	£0.581m	£0.829m	04/11/13
Ramp up and enabling	£8.431m	£9.260m	19/03/14
Implementation for trains 2 to 7	£11.51m	£20.77m	11/03/15
<i>Implementation for trains 8 to 36</i>	<i>circa £47.89m</i>	<i>circa £68.66m</i>	<i>Planned June 2016</i>

- 5.6 It is important to get further funding approved to maintain production to reduce the risk to the Bakerloo Line fleet. If the project was to be suspended, the impact would be a delay of at least three months due to the need to re-hire contract labour.

### **Operational Costs**

- 5.7 There are negligible maintenance savings to fleet opex, as only emergency or ad-hoc repairs are included in existing budgets. Any reductions will be incorporated in the usual quarterly forecasting process.
- 5.8 The enabling works in the new workshop facility building at Acton will create new assets that will require maintenance (e.g. electrical supplies, heating, air supply, etc.), estimated at approximately £10k per annum. Similarly, the new short track for the road ramp at SPD will require track inspections, estimated at £2.4k per annum. These costs have been agreed in principle with the budget owners and will be refined before the final submission. These assets will be maintained by the project until a planned handover in early 2018.

### **Commercial**

- 5.9 The repairs are to be carried out in house by Trains Division. SWIP will manage the enabling works at Acton and SPD.
- 5.10 The material quantities procured to date are only enough for the first three trains. This submission is to request funding for the procurement of materials for seven trains and up to ten trains for long lead items only; this is to ensure production is maintained. The materials will be purchased on individual framework contracts.

## **6 Assurance**

- 6.1 A TfL Programme Management Office and an Independent Investment Programme Advisory Group review was conducted with a close out meeting held on 6 January 2015. No critical issues were raised.

### **List of appendices to this paper:**

Appendix 1: Scope summary

Appendix 2: Photographs

Appendix 3: Cost breakdown explanation for trains 1 to 7



**List of background papers:**

Engineering Justification report reference: APE-RS-AM122-TR-1B

Reports from the TfL Programme Management Office and the Independent Investment Programme Advisory Group, and the management response to those reports.

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**Scope (based upon train one experience to date)**

<b>Structural scope items</b>	<b>% of Fleet affected (units)</b>	<b>% of Fleet to address (units)</b>
Swan neck repair – welded and bolted assembly. Vehicle variances found on train 1, which include original build correction. Emergency repairs carried out at SPD in parallel.	99% – 3 car units are worst affected	Plan for 100%
Sole bar holes and corrosion – newly discovered on train 1. Emergency repairs carried out at SPD in parallel.	Estimated 25%	On condition – estimated 25%
Repair of bulkhead support bracket cracks doors. Extensive corrosion discovered on train 1.	70%	Plan for 100%
Car-body corner post repairs. All found fully corroded beyond repair on train 1.	Previously estimated 60% – 100%	Plan for 100%
External door pillar crack repairs. Originally planned for repairs on condition, based upon train 1, full repairs required (both single and double doors effected).	Originally 34%	Plan for 100%
Inner door pillars – similar to external doors pillar above, corrosion discovered on train 1 requires repair.	Unknown – new item	Plan for 100%
Saloon floor plate corrosion repairs (taking opportunity to fit RVAR compliant flooring design). From train 1, extensive corrosion discovered requires new floor plates to be fitted (supports production efficiency).	All units – varying condition	Plan for 100%
Roof and side panel repairs. Requires saloon vents to be removed and repaired (additional work).	10%	Estimate 90% inspected and repaired as required
Carbody side panel stiffener crack repairs. Stiffeners get removed for external door pillar repairs	Previously 12%	Plan for 80%
Tread plate replacement on saloon sliding doors. On train 1 removed as part of floor repairs and to address corrosion underneath.	Unknown – need to be removed for floor repairs	100% - Replace tread plates as part of floor repairs
Interior panels (corner plates) repairs	100%	Plan for 100%
Car body under frame bolster repair. Currently fleet only repair when the cracks reach their tolerance.	Inspect condition and repair as required	Estimate 5% - No under frame bolster should be returned with cracks

<b>Reliability and maintenance improvements scope items</b>	<b>% of Fleet affected (units)</b>	<b>% of Fleet to address (units)</b>
Auto-coupler hose manifold modification – middle cabs. Prevent air leaks which can cause trains to 'sit down'.	72 cabs	72 cabs
Replacement of Reavell Conversion (modification) with the common Westinghouse version. 5 cars out of 108 are fitted with a different compressor. Standardise the fleet for future maintenance.	5 cars	All 5 cars
Installation of cab LED dash lights – dependant on approval. To be completed later in the project.	73 cabs	73 cabs (+ car 3346)
New saloon heater panels – removal of original during swan neck and floor plate repairs. Replacement with non-asbestos versions.	Estimated 90% (note 30% defective)	Plan for 100%
New floor traps design – existing are in a poor condition and removed as part of the floor repairs. Currently 21 versions, revised to 6 (plus blank off redundant trap).	100%	Plan for 100%
Asbestos removal – Any asbestos panel removed will be replaced by a compliant version. All asbestos seat trays are to be removed and replaced.	Previously only around area affected by swan neck repairs	100% - asbestos seat trays

<b>Enabling works scope</b>	<b>Location</b>
Re-develop building AC15 for production – including purchase of lifting jacks, etc.	Acton Works
Road ramp for transporting cars by road when there is no rail access	Stonebridge Park Depot
Wheel store – to free up space for emergency weld repairs on site	Stonebridge Park Depot

Sample photos of scope items



Swan neck crack



Swan neck repair (with bracket)



Car body corner post corrosion



New car body corner post repair



New sole bar holes and corrosion



Sole bar repair





Internal door pillar corrosion



Internal door pillar repair



External door pillar crack



Failed car body side stiffener bracket



Kick plate corrosion



Saloon floor plate corrosion

## Cost breakdown explanation for trains 1 to 7

TMU	Trains 1 to 3			Description	Trains 4 to 7	Trains 1 to 7
Title	Original Authority	New proposal	Variance		Total	Total
				(1) Summary: The increase in workload/scope is calculated at 2.6 times original estimate (ref: TMU Labour Spreadsheet). This is based upon the additional scope (ref: 72TS Carbody Structural Justification Report, APE-RS-AM122-TR-1-B1)		
Management - TMU	£198,000	£561,354	£363,354	(2) A full time Manufacturing Support Engineer and Procurement Agent are required, also an extra Assurance Engineer is required for 9 months	£214,122	£775,476
Labour - TMU Train 1 to 3	£1,678,000	£3,567,597	£1,889,597	(3) The time to complete train one has increased by approx 27 wks (due to car condition and extra activities required). This includes the learning curve and ramp up period to be completed by train 3	£0	£3,567,597
Labour - TMU Train 4 to 7	£0	£0	£0	(4) Costs based upon improvement in efficiency of turn around times from train 3.	£2,619,290	£2,619,290
Train 1 to 3 Materials subcontractor - Excluding tools	£600,000	£784,060	£184,060	(5) The additional material cost is based on 66% of "actual" costs to date, the 34% is against future known costs. These additional costs are comprised of: £47K extra for Heater Panels, £17K extra for Paints and Sealants and £17K extra on Wooden Floors offset by savings on floor traps -£12K and Seat Trays -£12K. Some of the larger materials orders for trains 1 to 3 have been amended to align with the funding available.		£784,060
Train 4-10 Materials & subcontractor - Excluding tools	£0	£0	£0	Materials estimate for Train 4. Longest lead time forecast at 12-16 wks. Used trains 1-3 prices + inflation @3.5%p.a	£1,921,904	£1,921,904
Tools and equipment - Inc Jacks and Vacuum Grit Blaster	£504,850	£895,372	£390,522	New estimate now includes: £367K to purchase for 4 sets of 10 tonnes lifting jacks and refurbish and retrofit 1 set of 20 tonnes jacks. These replace the mobile scissor lifts & stands @ £255k (rejected due to risk of derailment). Additional 2 vacuum grit blasters (£51K) required to remove hazardous materials plus scaffolding for accessing the roof and top side (£106K). Also extra welding equipment, training and consumables (£150K) for additional scope.	£131,329	£1,026,701
COO Engineering Management	£20,020	£56,782	£36,762	Increase in cost reflects increase on scope and activities based upon experience	£33,486	£90,268
Non Destructive Testing (NDT)		£36,789	£36,789	Increase in NDT inspection to cover the additional weld repair activities.	£51,454	£88,243
Compressor Conversion				Forecast one conversion during trains 4 to 7	£15,094	£15,094
Emergency repairs (UNDM at STPK)		£111,963	£111,963	The repair work carried out at SPD is covered by a PCN. This is to mitigate trains being withdrawn from service due to Swan neck cracks beyond acceptable limits. Additional funds are required to cover further potential repairs at the depot.	£135,000	£246,963
<b>TMU Total</b>	<b>£3,000,870</b>	<b>£6,013,917</b>	<b>£3,013,047</b>		<b>£5,121,679</b>	<b>£11,135,596</b>
<b>Project (non-TMU)</b>	<b>Trains 1 to 3</b>			<b>Description</b>	<b>Trains 4 to 7</b>	<b>Trains 1 to 7</b>
<b>Title</b>	<b>Original Authority</b>	<b>New proposal</b>	<b>Variance</b>		<b>Total</b>	<b>Total</b>
				As per comment (1)		
Lino development	£102,940	£105,942	£3,002	Deferred development of Lino until trains 1 to 3 are tested	£0	£105,942
LED development	£92,940	£95,943	£3,003	LED development deferred as not required on first 3 trains	£0	£95,943
PC's and Office furniture in AC15	£0	£86,345	£86,345	Fit out of new office in AC15 was an omission from the original estimate	£0	£86,345
SWIP enabling work	£2,895,218	£3,692,173	£796,955	The increase in scope (predominately welding) and the use of lifting jacks has resulted in the need to increase power capacity £530K. Changing & mess facilities extended to support up to 55 shop floor staff £230K (increase of 15 staff). £150K extra for a new wheel store facility at Stonebridge Park (supporting on site repairs), offset by savings from roof replacement and cleaning facility works.	£0	£3,692,173
PM & ENGRS - Feasibility & Seed Funding	£711,960	£498,001	(213,959)	Savings from initial feasibility stage due to earlier commencement of delivery	£0	£498,001
MANAGEMENT TEAM	£539,295	£955,305	£416,010	The additional costs are due to the extended duration and include an extra full time commercial support from Jan14 (original estimate was until March14).	£407,010	£1,362,315
ENGINEERING	£182,756	£314,462	£131,706	The additional costs are due to the extended duration and activities (original estimate was until until March14).	£133,196	£447,658
PROTOTYPE & CRS - APE / TMU	£191,621	£84,892	(106,729)	Reduction in cost estimate based upon less prototypes required than originally envisaged	£0	£84,892
ENABLING WORKS FUEL	£40,000	£41,400	£1,400	Maintenance fuel charges deferred with inflationary uplift as none incurred to date	£0	£41,400
ACCESS	£30,400	£36,840	£6,440	Increase of original haulage estimate; costs are based upon haulage contractors delivering a full train from Acton before new train pick up from depot (to support service).	£50,390	£87,230
Sole bar Repairs at SPD		£280,000	£280,000	New sole bar cracks discovered on train 1 have resulted in emergency repairs necessary at Acton and SPD (covered by risk draw down). Additional funds are required to cover further potential repairs at the depot.	£160,000	£440,000
<b>Subtotal Project (non-TMU)</b>	<b>£4,787,130</b>	<b>£6,191,303</b>	<b>£1,404,173</b>		<b>£750,596</b>	<b>£6,941,899</b>
<b>Total (without risk)</b>	<b>£7,788,000</b>	<b>£12,205,220</b>	<b>£4,417,220</b>		<b>£5,872,275</b>	<b>£18,077,495</b>
Risk (pending risk workshop)	£1,472,000	£1,480,000	8,000	The original risk authority (fully allocated to expenditure) is: £415K for extra material costs & £760K SWIP (inc new power feed), £72K AC15 office kit out, £112K Emergency Swan Necks, £120K Emergency Sole bar works.	£1,211,000	£2,691,000
<b>Total (with risk)</b>	<b>£9,260,000</b>	<b>£13,685,220</b>	<b>£4,425,220</b>		<b>£7,083,275</b>	<b>£20,768,495</b>