

Bilfinger Berger-Siemens- CAF
Consortium

Our ref: 25.1.201/CHBB/1761

27th February 2009

BSC Consortium Office
9 Lechside Avenue
Edinburgh Park
Edinburgh
EH12 9DJ
United Kingdom

tie limited
CityPoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

Phone: 

For the attention of Steven Bell – Tram Project Director

Dear Sirs,

**Edinburgh Tram Network Infracore
Development Workshop Report: Roads**

We enclose 2 copies of document no BSC/25.1.201/DWR Issue 1 dated 27th February 2009, entitled Development Workshop: Roads. This document is the output of the Development Workshop process in respect of road pavement construction and includes the agreed instructions from tie regarding full and partial reconstruction. The report also includes the instruction to SDS to implement the necessary redesign.

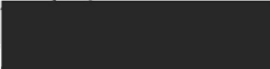

To complete the Development Workshop process, the report needs to be agreed by the parties (ref Clause 4.8 of Schedule 23, included in the report in Appendix 6.1). To this end, the Record of Agreement table on page 2A the report should be completed by tie and one copy of the report returned to BSC. We would be grateful to receive that copy as soon as convenient.




Yours faithfully,



C H B Brady
Project Director
Bilfinger Berger Siemens CAF Consortium

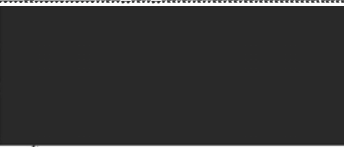
Development Workshop Report Roads

BSC Consortium		
Position	Date	Approval
BSC Project Director	27.2.09	
BSC Deputy Project Director	27.2.09	

Inter Discipline Checking Process				
	Name	Position	Date	Signatures
Checked by (Siemens)	RICHARD WILKINSON	SYSTEM ENG MANAGER	2/5/09	
Checked by (BB)				
Author	Ralf Honeck	Design Manager	27/2/09	
Document History				
Rev.	Issue Date	Description of Change	Author	
1	27/2/09	First Issue	R Honeck	

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Revision	Summary of Changes	
	Reference	Description
1		First issue

Revision	Record of Agreement (ref Schedule 23, clause 4.8)		
	Name	Party	Signature
1		Tie	
		Tie	
	<i>C BRADY</i>	BSC	
	<i>R Brueckmann</i>	BSC	
2		Tie	
		Tie	
		BSC	
		BSC	
3		Tie	
		Tie	
		BSC	
		BSC	
		BSC	

DEVELOPMENT WORKSHOP REPORT : ROADS

CONTENTS

- 1 Introduction**
- 2 Misalignments**
- 3 Conclusions**
- 4 Notes of Development Workshop**
- 5 Tie Change orders**
- 6 Appendices**
 - 6.1 Process

1 INTRODUCTION

The ETN Infraco Contract became effective on 14/5/08, at which time it was known that misalignments existed between the Base Date Design Information produced by SDS, on which the civil works price was generally based, and the Infraco Proposals for certain systems, such as trackform, on which the Systems price was based. The process for resolving such misalignments is described in Contract Schedule 23 (Novation Agreement) which requires that Development Workshops are held to determine the development of the Infraco Proposals and any consequential amendment to the design deliverables. The relevant section of Schedule 23 (clauses 4.6, 4.7 and 4.8) are contained in Appendix 5.1, Process.

The product of the Development Workshop shall be a report signed by each of the Parties (i.e tie, Infraco and SDS), to detail the conclusions in respect of each matter and payments to be made to the SDS provider in respect of the work to be carried out by the SDS provider as a result of the conclusions set out in the report.

This document, no BSC/25.1.201/DWR/RD001, is the report of the Development Workshop for Roads.

In respect of any given system, such as roads, the matters to be determined at the Development Workshop are set out in Schedule 23, Appendix 7, Part C (the Misalignment Report), together with any items to be finalised in SDS/BBS alignment workshops, in Schedule 23, Appendix 4.

In respect of any given system, such as roads, the matters to be determined at the Development Workshop are set out in Schedule 23, Appendix 7, Part C (the Misalignment Report), together with any items to be finalised in SDS/BBS alignment workshops, in Schedule 23, Appendix 4.

In the case of roads, there are no relevant items in Sch 23, App 4, so the matters to be resolved in the Development Workshop are as set out in Sch 23, App 7, pt C. The relevant section of App 7, Pt C is reproduced below :-

Roads													
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Complete Design												
Subject to survey, pavement design to be developed and finalised to minimise work scope	Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasibility of this design solution. Note This activity is an alternative to the Vertical Alignment activity above												FB cannot identify where this approach may apply. Clarification sought from tie. Any surveys to be carried out and paid for by BBS
Further pavement surveys and assessments are required	GPR and/or Pavement Condition surveys as required by xxx (above)												Clarification sought from tie

This report is structured as follows :-

- Identified misalignments are detailed in section 2

- Conclusions are scheduled in section 3
- The notes of the workshop, in minute form, are provided in section 4
- Supplementary information is provided as Appendices in section 5

2 MISALIGNMENTS

2.1 General

Misalignments arise due to differences between the Base Date Design Information and the Infraco Proposals, which are bound into the ETN Infraco Contract as Schedule 30. The Schedule of Infraco Proposals is essentially the same information for roads as is contained in Sch 23. App7, Pt C, but repeated for each relevant section of the project. Additional information is included in respect of drainage. The table of roads related misalignments for section 1A is reproduced below; the information is repeated for other sections.

1A.10	Roads			
1A.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	

			Information from BBS to SDS	Description of Design completion activities
1A.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope			Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasibility of this design solution Note This activity is an alternative to the Vertical Alignment activity above)
1A.10.3	Further pavement surveys and assessments are required			GPR and/or Pavement Condition surveys as required by 1A.10.2 (above)
1A.11	Drainage			
1A.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Complete Design
1A.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.			Review and complete design

2.2 Misalignment No 1 : Road Construction

The Base Date Design for roads is based on full depth reconstruction in all areas. The Infracore proposals, as clarified in the preceding section of this document, are based on plane and resurface (new regulating and surface course only) when survey information is available and where it confirms the feasibility of this solution.

3 CONCLUSIONS

3.1 General

Development meetings confirmed that a design solution was required to allow most economical road construction but to ensure robust and auditable design to applicable standards.

3.2 Misalignment No 1 : Road Construction

Instruct SDS to :-

- Produce a construction methodology to define the management of testing, selection of road construction details from a "menu" of options and production of appropriate records
- provide of resources to agree testing, interpret results, provide construction details

4 DEVELOPMENT WORKSHOP NOTES

**Bilfinger Berger – Siemens – CAF Consortium : Edinburgh Tram Network
Meeting Notes**

Subject	Roads Development Workshop	Location	City Point
Date	5/1/09	Time	
Attendees	Representing	Attendees	Representing
R Bell	Tie	A Dolan	SDS
P Dobbin	Tie	J Chandler	SDS
D Sharp	Tie	S Rotthaus	BSC
D Fraser	CEC	C Brady	BSC
T Spence	Consultant		
Distribution			

		Action	Date
1	General		
	Meeting held as follow-up to Roads Development Workshop on 25/11/09		
2	CEC Issues		
2.1	<p>Design Concept</p> <p>Road design based on DMRB, which is performance based. This is acceptable in areas of cut, but in areas of fill the condition of the substructure must be verified.</p> <p>The testing regime developed by SDS as part of the redesign/construction management process must fully define testing, including use of FWD testing as well as CBR tests. Particular attention must be paid to areas where existing road substructure is left in place.</p>	SDS	
2.2	<p>Utility Works</p> <p>MUDFA Utility reinstatement has been specified to RAUC Class 1 requirements, but some of the roads are in fact subject to the heavier Class 0 loading. Some existing reinstatement is non compliant.</p> <p>During the general testing which will be defined in the redesign/construction process to be developed by SDS, additional in-situ testing may be required to establish the rigidity/capacity of existing MUDFA reinstatement works.</p>	Tie/CEC	
2.3	<p>Setts at Ocean Terminal and other Locations</p> <p>CEC drew attention to the expertise they have developed in this area.</p>		

**Bilfinger Berger – Siemens – CAF Consortium : Edinburgh Tram Network
Meeting Notes**

Subject	Roads and Trackform Development Workshop Issues	Location	Project Office
Date	5 th February 2009	Time	
Attendees	Representing	Attendees	Representing
Frank McFadden	Tie	Steve Reynolds	SDS
Robert Bell	Tie	Jason Chandler	SDS
Colin Brady	BSC	Alan Dolan	SDS
Stefan Rotthaus	BSC	Kate Shudall	SDS
Baltazar Ochoa	BSC		
Distribution	Attendees R Brueckmann M Wilken		

		Action	Date
1	General The meeting was held to review the design estimates produced in response to Tie Instructions arising from the Development Workshop process for Roads & Drainage and for Trackform (Tie letters no INF CORR 548 and INF CORR 547 respectively, both dated 18 th December 2008), and further necessary work not covered by these instructions (see section 2.4 below). The meeting resulted in agreement to proceed to issue of instructions by Tie to implement the design activities (which relate to civil works scope only), and these notes will therefore be incorporated into the relevant Development Workshop Reports.		
2	Roads & Drainage		
2.1	Status of current documentation reviewed and format explained (see attached notes.	Note	
2.2	Proposed process for road design is described on flowchart (attached). SDS to remove references to CEC on flowchart and reissue. CEC acceptance of process will be managed by Tie. Approval of detailed road design in different locations will be by discharge of conditions to existing approval, a full resubmission for approval is not required.	KSh FMcF	asap ongoing
2.3	SDS confirmed that, if instructed, roads design will be undertaken by additional resources, that resource is available to meet the likely		

	programme and that resource will not be reallocated from other tasks already in progress.	JCh	Ongoing
2.4	<p>SDS explained the basis of their estimates no DCR 0126 and DCR 0140 (attached).</p> <p>DCR 0126 covers the work described in letter no CORR INF 548, but the bulk of the design work necessary is to assess test information for each specific area, select the appropriate solutions and produce construction drawings which provide clear direction for implementation, and will be updated by the site team to reflect as-built details. This scope is detailed in estimate no DCR140.</p> <p>BSC will collate the workscope to be instructed, including any necessary clarifications, and produce a draft instruction for Tie consideration.</p> <p>Tie agreed that the overall workscope covered by DCR126 and DCR140 is required, and will issue instructions accordingly.</p>	CBr FMcF	w/c 9/2/09 w/c 9/2/09
2.5	<p>SDS will commence work on the overall scope prior to issue of formal BSC instruction, on basis of email confirmation from BSC that initial work carried out on this basis will be reimbursed in event instruction from Tie is not received.</p> <p>Initial priority is Princes Street, working eastwards from Charlotte Street junction. Assess existing rest information and advise any further testing required.</p>	JCh ADo	6/2/09 6/2/09
2.6	Testing will be carried out in accordance with scope identified by SDS, but procured and managed by BSC. Testing is not included in existing SDS estimates, and BSC to advise costs when scope known. This will require additional instruction from Tie.	CBr FMcF	asap asap
3	Trackform		
3.1	<p>SDS estimate no DCR125 comprises three distinct work streams :-</p> <ul style="list-style-type: none"> • Revision of existing drawings to incorporate Infraco trackform proposals • Production of a suite of ground improvement design solutions and Production of a construction methodology for the process of implementation of ground improvement • Analysis of vibration performance of Infraco trackform proposals 		

.../2

and Production of vibration mitigation design solutions			
3.2	Revision of Existing Drawings BSC/SDS agreed that the drawings would show all relevant details of the Siemens trackform, including any physical infrastructure provided for track drainage etc, and in particular details such as the road surface-track joint. The drawings will not be the record of EMC or stray current design, but will show relevant details (such as connection points) if any.	CBr/JCh	ongoing
	Tie agreed to instruct the drawing revision scope as contained in estimate DCR125.	FMcF	w/c 9/2/09
3.3	Ground Improvement Design		
	Design Parameters are confirmed to be 120MN/m ² on-street and 80MN/m ² off-street, as shown on relevant drawings.	Ado	ongoing
	Void spanning design criterion is confirmed as 1m span in any direction at any location, as advised by SDS.	Ado	ongoing
	It was confirmed that no reinforcement is to be provided for stray current collection/containment. All reinforcement is to be protected against stray current corrosion, in same way as any other structural reinforcement.	Ado	ongoing
		CBr	ongoing
	Tie agreed to instruct the ground improvement design scope as contained in estimate DCR125.	FMcF	w/c 9/2/09
3.4	Vibration Analysis and Mitigation Design		
	SDS confirmed that the reference design, which does not include any specific mitigation measures other than the identified rail and coating) satisfied the requirements of the Project Noise and Vibration Report.	Note	
	SDS are to analyse the Infraco Proposal for trackform, and identify any exceedences, above the requirements of the Project Noise and Vibration Report. They are then to produce construction designs to mitigate these exceedences, such that the requirements of the Report are achieved.	Ado	ongoing
	Tie agreed to instruct the ground improvement design scope as		

.../3

<p>contained in estimate DCR125.</p>	<p>FMcF</p>	<p>w/c 9/2/09</p>
<p>Tie advised that they might instruct further vibration mitigation in specific locations, to satisfy other undertakings. Tie to advise BSC when requirements are known.</p>	<p>FMcF</p>	<p>ongoing</p>

5 tie CHANGE ORDERS

Our ref: **25.1.201/JHi/1648**

18 February 2009

Parsons Brinckerhoff
CityPoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

For the attention of Jason Chandler

Dear Sirs,

Edinburgh Tram Network Infraco
INTC 271 – Road Construction Methodology
Your Reference DCR0126 and DCR0140

We refer to your Estimate Reference DCR0126 issue 2 amended 27th January 2009 and DCR0140 issue 1a amended 10 February 2009 relating to the design portion of Methodology Statement and Analysis of Roads Construction.

We hereby authorise you to proceed with the design works as detailed in the SDS Design Change Estimate and enclose our Design (Client) Change Order No DC0-019 and DC0-020.


Please acknowledge receipt of this Change Order and confirm the timescales to implement this additional work with specific reference to Leith Walk and Princess Street.

Yours faithfully,



C H B Brady
Project Director
Bilfinger Berger Siemens CAF Consortium

Bilfinger Berger–Siemens– CAF
Consortium

BSC Consortium Office
9 Lochside Avenue
Edinburgh Park
Edinburgh
EH12 9D
United Kingdom

Phone: +44 (0) 131 

Design (Client) Change Order

Project: Edinburgh Tram Network		Date: 17 February 2009
From: Bilfinger Berger Siemens CAF Consortium		Ref. Number: DCO-020
To: Parson Brinckerhoff - Jason Chandler		
INTC No.271	Change Estimate No.	DCR0140
Scope of Change	Analysis of Roads Construction Details.	
Reason for Change	Outcome of Roads and Drainage Development Workshop.	
Change Value (Programme Implications are Included in the Value)	Change :- 32 Packages at £9,357.50 = £299,440.00.	
Relief required from compliance with SDS obligations under the agreement:-	None	
Impact on Performance of the Services:-	None	
Impact on Master Programme and Programme:-	None	
Any additional Consents, Land Consents and/or Traffic Regulation Orders:-	None	
Any amendment required to the Agreement or the Key Subcontracts as a result of this Change:-	None	
Any new agreements with third parties:-	None	
Proposed Method of Delivery of this Change:-	Additional Design Resources	
Effect on Milestone and / or lump sum Payments:-	Lump Sum Payment	
Proposals to mitigate:-	None	
Period for Delivery of Change Order	7 Days from testing results for each section of the road	
Authorised:	Date: 17 February 2009	
Title/Name: Stefan Rotthaus - Engineering Manager	Signature: 	
Received:	Date:	
Name:	Signature:	

CM

Design (Client) Change Order

Project: Edinburgh Tram Network		Date: 17 February 2009
From: Bilfinger Berger Siemens CAF Consortium		Ref. Number: DCO-019
To: Parson Brinckerhoff - Jason Chandler		
INTC No.271	Change Estimate No.	DCR0126
Scope of Change	Produce a construction methodology statement to define management of the process of a) Testing in-situ to determine ground conditions b) Selection of Road Construction details.As tie letter dated 18 December 2008 reference INF CORR 547	
Reason for Change	Outcome of Roads and Drainage Development Workshop.	
Change Value (Programme Implications are Included in the Value)	Change £ 17,125.50	
Relief required from compliance with SDS obligations under the agreement:-	None	
Impact on Performance of the Services:-	None	
Impact on Master Programme and Programme:-	None	
Any additional Consents, Land Consents and/or Traffic Regulation Orders:-	None	
Any amendment required to the Agreement or the Key Subcontracts as a result of this Change:-	None	
Any new agreements with third parties:-	None	
Proposed Method of Delivery of this Change:-	Additional Design Resources	
Effect on Milestone and / or lump sum Payments:-	Lump Sum Payment	
Proposals to mitigate:-	None	
Period for Delivery of Change Order	TBA	
Authorised:	Date:17 February 2009	
Title/Name:Stefan Rotthaus - Engineering Manager	Signature:	
Received:	Date:	
Name:	Signature:	



Bilfinger Berger UK Limited EDI		
Date Received	16 FEB 2009	Scanned
File Name		
Action		
Distribution		

For The Attention of Colin Brady
Project Director
Bilfinger Berger Siemens CAF Consortium
9 Lochside Avenue
Edinburgh EH12 9DJ

Our Ref: INF CORR 755

Date: 13th February 2009

Dear Sirs,

**Edinburgh Tram Network – Infraco
Road Construction Methodology – Design Only
Change Order Number 19**


We refer to your letter dated 10th February 2009 reference 25.1.201/BOc/1548 enclosing your revised Estimate associated with additional works to determine the condition of existing roads, analysis and interpretation of data and the provision of detailed pavement design / specification.

In response please find attached Change Order Number 19 for gross £372540.13 (Breakdown attached).

Please acknowledge receipt of this Change Order and confirm the timescales to implement this additional work with specific reference to Leith Walk and Princess Street.

Yours faithfully


Steven Bell
Project Director – Edinburgh Tram

the CHANGE ORDER	
Project:	INFRACO
Date:	13th February 2009
Change Estimate No:	
Change Order No:	19
Change Description:	Road Construction Methodology (Design Only)
Change Value	£372640.13 (Excl VAT)
	Final value of Consortium Prelims to be reviewed on completion of the Contract Head Office Overhead and Profit to be determined in accordance with Clause 4.7.2 of Schedule Part 4
Scope of Works:-	<p>1 Produce methodology / flowchart to define the management of:- Determination of existing road condition from visual survey and available Information. Determination of existing road condition from In-situ test results (Testing by others) Analysis and Interpretation of data Provision of detailed pavement design and specification</p> <p>2 Stage 1: Determination of existing road condition from visual survey and available information</p> <p>3 Stage 2: Determination of existing road condition from In-situ test results (testing by others)</p> <p>4 Stage 3: Analysis and interpretation of data</p> <p>5 Stage 4: Provision of detailed pavement design and specification</p>
Relief required from compliance with Infraco obligations under the contract:-	None
Programme Impact and required Extension of Time:-	None
Impact on Performance:-	None
Any additional Consents, Land Consents and/or Traffic Regulation Orders:-	None Required
Any amendment or revision required to existing Consents, Land Consents and/or Traffic Regulation Orders:-	None Required
Any new agreements with third parties:-	None Required
Any amendment required to the Agreement or the Key Subcontracts as a result of this Change:-	None
Proposed Method of Delivery of this Change:-	Method Statements / Risk Assessments to be submitted for approval.
Any Changes required to the terms of the Agreement and/or the SDS Contract:-	None
Effect on Milestone Payments:-	BSC to update Milestone Schedule
Authorised:	Date: 13/2/09
Title/Name: DENNIS MURRAY	Signature: 
Received:	Date:
Name:	Signature:

Design Only - Methodology Statement and Analysis of Road Works

Item	Description	Qty	Unit	Rate	Amount
A	SDS Estimate Costs			Sum	£380.00
B	SDS Estimate Number DCR0126 Methodology Statement as attached - Appendix 3			Sum	£17,125.50
C	SDS Estimate Costs			Sum	£380.00
D	SDS Estimate Number DCR0140 Analysis of Roads Construction Details as attached - Appendix 4	32	Packages	£9,357.50	£299,440.00
	Note: Coring, CBR value testing and FWD testing Not included in this Estimate.				
	Total				£317,325.50
	Consortium Overheads Prelims			7.4%	£23,482.08
				4.20%	£13,240.46
	Sub-total				£352,865.96
	Head Office Overheads and Profit			10.00%	£35,286.59
	Total				£388,152.55

* Consortium Prelims to be reviewed on completion of the Contract

£372,540.13

* H/O overheads & Profit to be determined in accordance with clause 4.7.2 of Schedule Part 4.

Our ref: **25.1.201/BOc/1548**

10 February 2009

tie limited
CityPoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

**Bilfinger Berger–Siemens– CAF
Consortium**

BSC Consortium Office
9 Lochside Avenue
Edinburgh Park
Edinburgh
EH12 9D
United Kingdom

Phone: 

For the attention of Steven Bell – Tram Project Director

Dear Sirs,

**Edinburgh Tram Network Infraco
Infraco Contract – Infraco Notification of tie Change (INTC) No 271
Road Construction Methodology – Design Only.**

Further to our letter reference 25.1.201/BOc/1508, dated 06 February 2009, we attach a revised SDS estimate in the sum of £ 384,598.51 exclusive of V.A.T, which has been reduced in response to comments made by our engineering team.

We also attach a proposed draft instruction, which we believe incorporates the agreements reached in the Supplementary Development Workshop on 5 February 2009 and accurately describes the agreed scope of design work required. A copy of the Supplementary Development Workshop notes is also attached.

We would be grateful for your urgent issue of a Change Order to continue with this design work..

Yours faithfully,


C H B Brady
Project Director
Bilfinger Berger Siemens CAF Consortium

Design Only - Methodology Statement and Analysis of Road Works

Item	Description	Qty	Unit	Rate	Amount
A	SDS Estimate Costs			Sum	£380.00
B	SDS Estimate Number DCR0126 Methodology Statement as attached - Appendix 3			Sum	£17,125.50
C	SDS Estimate Costs			Sum	£380.00
D	SDS Estimate Number DCR0140 Analysis of Roads Construction Details as attached - Appendix 4	32	Packages	£9,357.50	£299,440.00
	Note: Coring,CBR value testing and FWD testing Not Included in this Estimate.				
Total					£317,325.50
	Consortium Overheads	11.20%		£317,325.50	£35,540.46
	Sub-total				£352,865.96
	Head Office Overheads and Profit	10.00%		£317,325.50	£31,732.55
Total					£384,598.51

CHANGE ESTIMATE

SDS CONTRACT

Project:	Edinburgh Tram Network		
Date:	23 rd January 2009 (revised 27 th January 2009)	Issue:	2
Change Estimate Number:	DCR0126		
Change Notice Number	RDC075		
Change Estimate Title:	Methodology Statement for Road works		
Change Estimate Description:			
<p>Pavement assessment includes 4 stages as shown in the attached flowchart.</p> <p>This estimate covers the production of the flowchart/ methodology and Stage 1 & Stage 4 of the flowchart.</p> <p>The <u>first stage</u> consists of existing road condition visual survey and review and collect of existing information from as build drawings, existing core information and CEC condition report. Based on this information, damage to the existing pavement caused with heavy construction loading will be assessed. The details of first stage has shown as A to G of attached flowchart. All existing information such as existing core information, as build drawings and CEC condition report need to be provided prior to visual survey.</p> <p>The <u>fourth and final stage</u> as shown in attached flowchart will include the preparing the detail pavement design and specification (e.g construction joint details, Appendix 7/1) for pavement disturbed by track construction for the generic condition.</p> <p>Stages 2 & 3 (DCR0140) will consider specific areas of design</p>			
Basis for the Change Estimate:			
RDC075 received 08 th January 2009 and tie letter dated 18 th December 2008.			
Meeting with SDS and BSC 27 th January 2009.			
Schedule Impact:			
To Be Confirmed by when instruction is received.			
Cost Impact:			
Preparing Estimate, £380.00 This amount to be paid irrespective of work being instructed			
Change Work: £17,125.50			
Other Impacts/Issues:			
This Change will not utilise any staff which are currently being utilised under Design and Construction Support.			
There are no savings incurred by SDS due to this change.			
SDS Authorisation (print name and function below)		Date:	23/1/09
Jason Chandler Project Manager		Signature:	



CHANGE ESTIMATE
SDS CONTRACT

BSC Authorisation		Date:	
Change cancelled <input type="checkbox"/>	SDS to revise Estimate <input type="checkbox"/>	Refer to tie board <input type="checkbox"/>	Prepare Change Order <input type="checkbox"/>
Colin Brady		Signature:	

CHANGE ESTIMATE DCR0126 v2

Contract Name	EDINBURGH TRAM		Bullet point 1 of change: • Produce methodology/ flowchart for Pavement design	Bullet point 1 of change: Stage 1 of flowchart: Visual Survey	Bullet point 1 of change: Stage 1 of flowchart: Assessment and review of existing information	Bullet point 1 of change: Stage 1 of flowchart: Assessment of damage to the existing pavement during construction as identified in Sections B&D of attached flowchart		
Contract No	ULE93390A							
Location								
Section	SW							
Change title	Methodology Statement for Road Works	DCR0126 v2						
Change Description	Road construction methodology and assessment							
DETAILED DESIGN STAGE								
Title	Name	Contract Rate	Hours	Cost	Hours	Cost	Hours	Cost
Technical Support	Technical Support	£ 38.00		£ -		£ -		£ -
CAD Technician	CAD Tech	£ 38.00		£ -		£ -		£ -
Graduate Designer	Graduate Designer	£ 55.00		£ -	25.00	£ 1,375.00		£ -
Principal Designer	Principal Designer	£ 95.00	9.50	£ 902.50	25.00	£ 2,375.00	45.00	£ 4,275.00
Senior CAD Technician	Senior CAD Technician	£ 49.00		£ -		£ -		£ -
Senior Designer	Senior Designer	£ 78.00		£ -		£ -		£ -
Material				£ -		£ -		£ -
			9.50	£ 902.50	50.00	£ 3,750.00	45.00	£ 4,275.00

CHANGE ESTIMATE DCR0126 v2

Contract Name	EDINBURGH TRAM		<u>Bullet point 1 of change:</u>		<u>Bullet Point 2 of change:</u>		Coordination of modifications to SDS		TOTALS	
Contract No	ULE90390A		Stage 1 of flowchart:		Stage 4 of flowchart:		design due to			
Location			Meeting		Preparing Pavement		instruction from tie			
Section	SW				strengthening design,		resulting from roads			
Change title	Methodology Statement for Road Works				specification (e.g Appendix 7.1) for different condition scenarios		development workshop			
Change Description	Road construction methodology and assessment									
DETAILED DESIGN STAGE			Total		Total		Total		Total	
Title	Name	Contract Rate	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Technical Support	Technical Support	£ 38.00		£ -		£ -		£ -	0.00	£ -
CAD Technician	CAD Tech	£ 38.00		£ -		£ -		£ -	0.00	£ -
Graduate Designer	Graduate Designer	£ 55.00		£ -		£ -		£ -	25.00	£ 1,375.00
Principal Designer	Principal Designer	£ 95.00	15.00	£ 1,425.00		£ -	20.50	£ 1,947.50	140.00	£ 13,300.00
Senior CAD Technician	Senior CAD Technician	£ 49.00		£ -	50.00	£ 2,450.00		£ -	50.00	£ 2,450.00
Senior Designer	Senior Designer	£ 78.00		£ -		£ -		£ -	0.00	£ -
Material				£ -		£ -		£ -	0.00	£ -
			15.00	£ 1,425.00	50.00	£ 2,450.00	20.50	£ 1,947.50	215.00	£ 17,125.00

Project:	Edinburgh Tram Network		
Date:	27 th January 2009 (amended 10 February 2009)	Issue:	1a
Change Estimate Number:	DCR0140		
Change Notice Number:	N/A		
Change Estimate Title:	Analysis of Roads Construction Details		

Change Estimate Description:

Pavement assessment includes 4 stages as shown in the attached flowchart.

This estimate covers the production of the flowchart/ methodology and Stage 2 & Stage 3 of the flowchart.

The second stage shown in attached flowchart details the process for assessment of pavement condition survey in areas disturbed by tram construction. Coring, CBR value testing, GPR and FWD testing to be undertaken by others. These will be based upon tests carried out for each section of road produced. The SDS scope for this section will be the determination of the by the location of tests to be carried out to inform the interpretation and analysis in Stage 3.

The third stage is the analysis of testing results as the output of stage two. The pavement assessment consists of pavement analysis, interpretation and reporting and would includes:-

- Back-analysis of all data to determine the effective stiffness and condition of the various pavement and subgrade layers;
- Assessment of the residual life of the pavement based on structural considerations and the results of the laboratory testing;
- Assessing areas of carriageway requiring overlaying or partial/full reconstruction.

The required time to complete the above tasks for each section of road will be approx. 7 days from testing results received to provision of the revised design (excluding approvals). SDS will then approach CEC to secure agreement on the solution as designed. The enclosed cost is based on preparing a design for each area of the scheme that testing is received for, not per section or sub-section. It is assumed testing will proceed in accordance with the priorities driven by the BSC construction programme.

Stages 1 & 4 are covered under DCR0126.

Basis for the Change Estimate:

RDC075 received 08th January 2009 and the letter dated 18th December 2008.

Draft instruction rev01 handed to SDS in meeting on 27th January 2009 with Colin Brady and Stefan Rottlaus.

Schedule Impact:

The required time to complete the above tasks for each section of road will be approx. 7 days from testing results received to provision of the revised design plus approval period.

Cost Impact:

Preparing Estimate: £380.00 This amount to be paid irrespective of work being instructed

Change Work: £9,357.50 per area of the scheme that testing is received for, not per section or sub-section. It is assumed testing will proceed in accordance with the priorities driven by the BSC construction programme.



CHANGE ESTIMATE SDS CONTRACT

BSC have advised that testing will take place at intervals of 250m (approx. 32 discreet packages of work for 8km of on-street running).
Therefore Change Work total based on assumption above: £299,440.00

Other Impacts/Issues:

This Change will not utilise any staff which are currently being utilised under Design and Construction Support.
There are no savings incurred by SDS due to this change.

SDS Authorisation (print name and function below)		Date:	10 Feb 09
Jason Chandler Project Manager		Signature:	
BSC Authorisation		Date:	
Change cancelled <input type="checkbox"/>	SDS to revise Estimate <input type="checkbox"/>	Refer to tie board <input type="checkbox"/>	Prepare Change Order <input type="checkbox"/>
Colin Brady		Signature:	

CHANGE ESTIMATE DCR0140

Contract Name	EDINBURGH TRAM		Stage 2 of flowchart: Site visit for each area		Stage 3 of flowchart: Analysis of testing results		Stage 3 of flowchart: Checking of data and revised design		Stage 3 of flowchart: Reporting	
Contract No	UCE90390A									
Location										
Section	SW									
Change title	Methodology Statement for Road Works		DCR0140							
Change Description	Analysis of Road construction details Stage 2 & 3 of flowchart									
DETAILED DESIGN STAGE										
Title	Name	Contract Rate	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Technical Support	Technical Support	£ 38.00		£ -		£ -		£ -		£ -
CAD Technician	CAD Tech	£ 38.00		£ -		£ -		£ -		£ -
Graduate Designer	Graduate Designer	£ 55.00	10.00	£ 550.00		£ -		£ -		£ -
Principal Designer	Principal Designer	£ 95.00	6.00	£ 570.00	19.00	£ 1,805.00		£ -	9.50	£ 902.50
Senior CAD Technician	Senior CAD Technician	£ 49.00		£ -		£ -		£ -		£ -
Senior Designer	Senior Designer	£ 78.00		£ -		£ -	5.00	£ 390.00		£ -
Material				£ -		£ -		£ -		£ -
			18.00	£ 1,310.00	19.00	£ 1,805.00	5.00	£ 390.00	9.50	£ 902.50

CHANGE ESTIMATE DCR0140

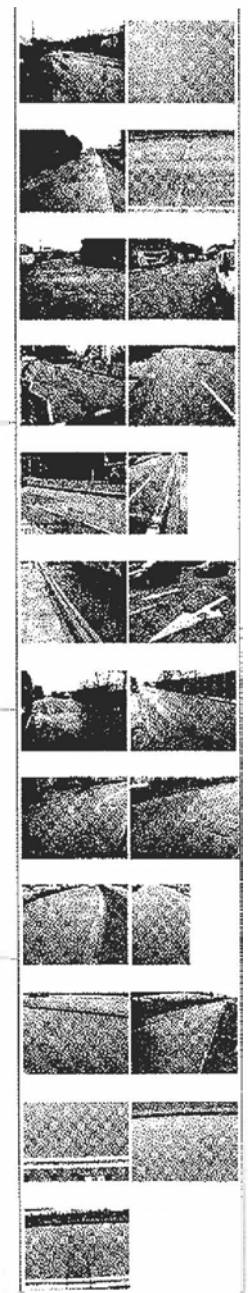
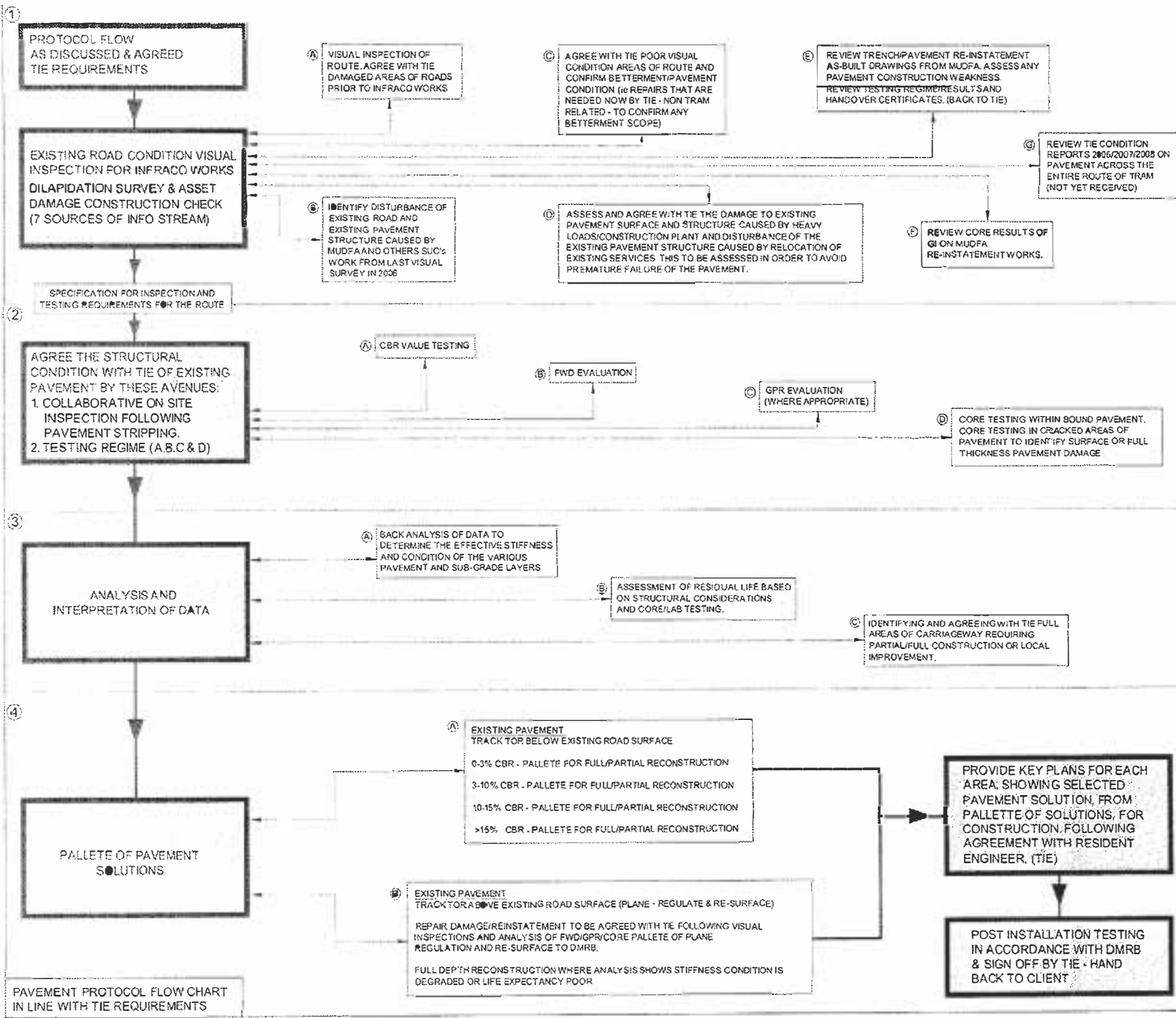
Contract Name		EDINBURGH TRAM		Stage 3 of flowchart: Pavement strengthening design and preparing construction details	Stage 3 of flowchart: CAD preparation of associated sketches and details	Stage 3 of flowchart: Additional meetings and site visit expected to discuss Technical Approvals with CEC	Stage 3 of flowchart: Design Assurance	Stage 3 of flowchart: Printing and Courier costs	TOTALS			
Contract No		UCE90390A										
Location												
Section		SW										
Change title		Methodology Statement for Road Works										
Change Description		DCR0140 Analysis of Road construction details Stage 2 & 3 of flowchart										
DETAILED DESIGN STAGE												
Title	Name	Contract Rate	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Technical Support	Technical Support	£ 38.00		£ -		£ -		£ -		£ -	0.00	£ -
CAD Technician	CAD Tech	£ 38.00		£ -		£ -		£ -		£ -		£ -
Graduate Designer	Graduate Designer	£ 55.00		£ -		£ -		£ -		£ -	10.00	£ 550.00
Principal Designer	Principal Designer	£ 95.00	19.00	£ 1,805.00		£ -	12.00	£ 1,140.00	8.00	£ 760.00	75.50	£ 7,172.50
Senior CAD Technician	Senior CAD Technician	£ 49.00		£ -	5.00	£ 245.00		£ -		£ -	5.00	£ 245.00
Senior Designer	Senior Designer	£ 78.00		£ -		£ -		£ -		£ -	5.00	£ 390.00
Material				£ -		£ -		£ -		£ 1,000.00	0.00	£ 1,000.00
			19.00	£ 1,805.00	5.00	£ 245.00	12.00	£ 1,140.00	8.00	£ 760.00	0.00	£ 1,000.00
											95.50	£ 9,357.50

ROADS AND DRAINAGE DEVELOPMENT WORKSHOP

DRAFT INSTRUCTION FOR DESIGN

1. Produce methodology / flowchart to define the management of:
 - Determination of existing road condition from visual survey and available information;
 - Determination of existing road condition from in-situ test results (testing by others);
 - Analysis and interpretation of data;
 - Provision of detailed pavement design and specification
2. Stage 1: Determination of existing road condition from visual survey and available information
3. Stage 2: Determination of existing road condition from in-situ test results (testing by others)
4. Stage 3: Analysis and interpretation of data
5. Stage 4: Provision of detailed pavement design and specification.

All as detailed in attached SDS Estimates DCR0126 and DCR0140 and the notes of the Supplementary Development Workshop (tie/BSC/SDS) held on 5 February 2009.



**Bilfinger Berger – Siemens – CAF Consortium : Edinburgh Tram Network
Meeting Notes**

Subject	Rodas & Drainage and Trackform Development Workshop Issues	Location	Project Office
Date	5 th February 2009	Time	
Attendees	Representing	Attendees	Representing
Frank McFadden	Tie	Steve Reynolds	SDS
Robert Bell	Tie	Jason Chandler	SDS
Colin Brady	BSC	Alan Dolan	SDS
Stefan Rotthaus	BSC	Kate Shudall	SDS
Baltazar Ochoa	BSC		
Distribution	Attendees R Brueckmann M Wilken		

		Action	Date
1	<p>General</p> <p>The meeting was held to review the design estimates produced in response to Tie Instructions arising from the Development Workshop process for Roads & Drainage and for Trackform (Tie letters no INF CORR 548 and INF CORR 547 respectively, both dated 18th December 2008), and further necessary work not covered by these instructions (see section 2.4 below).</p> <p>The meeting resulted in agreement to proceed to issue of instructions by Tie to implement the design activities (which relate to civil works scope only), and these notes will therefore be incorporated into the relevant Development Workshop Reports.</p>		
2	<p>Roads & Drainage</p>		
2.1	Status of current documentation reviewed and format explained (see attached notes).	Note	
2.2	<p>Proposed process for road design is described on flowchart (attached). SDS to remove references to CEC on flowchart and reissue.</p> <p>CEC acceptance of process will be managed by Tie. Approval of detailed road design in different locations will be by discharge of conditions to existing approval, a full resubmission for approval is not required.</p>	KSh	asap
		FMcF	ongoing
2.3	SDS confirmed that, if instructed, roads design will be undertaken by additional resources, that resource is available to meet the likely		

	programme and that resource will not be reallocated from other tasks already in progress.	JCh	Ongoing
2.4	<p>SDS explained the basis of their estimates no DCR 0126 and DCR 0140 (attached).</p> <p>DCR 0126 covers the work described in letter no CORR INF 548, but the bulk of the design work necessary is to assess test information for each specific area, select the appropriate solutions and produce construction drawings which provide clear direction for implementation, and will be updated by the site team to reflect as-built details. This scope is detailed in estimate no DCR140.</p> <p>BSC will collate the workscope to be instructed, including any necessary clarifications, and produce a draft instruction for Tie consideration.</p> <p>Tie agreed that the overall workscope covered by DCR126 and DCR140 is required, and will issue instructions accordingly.</p>	CBr FMcF	w/c 9/2/09 w/c 9/2/09
2.5	<p>SDS will commence work on the overall scope prior to issue of formal BSC instruction, on basis of email confirmation from BSC that initial work carried out on this basis will be reimbursed in event instruction from Tie is not received.</p> <p>Initial priority is Princes Street, working eastwards from Charlotte Street junction. Assess existing test information and advise any further testing required.</p>	JCh ADo	6/2/09 6/2/09
2.6	Testing will be carried out in accordance with scope identified by SDS, but procured and managed by BSC. Testing is not included in existing SDS estimates, and BSC to advise costs when scope known. This will require additional instruction from Tie.	CBr FMcF	asap asap
3	Trackform		
3.1	<p>SDS estimate no DCR125 comprises three distinct work streams :-</p> <ul style="list-style-type: none"> • Revision of existing drawings to incorporate Infracore trackform proposals • Production of a suite of ground improvement design solutions and Production of a construction methodology for the process of implementation of ground improvement • Analysis of vibration performance of Infracore trackform proposals 		

.../2

and Production of vibration mitigation design solutions			
3.2	<p>Revision of Existing Drawings</p> <p>BSC/SDS agreed that the drawings would show all relevant details of the Siemens trackform, including any physical infrastructure provided for track drainage etc, and in particular details such as the road surface-track joint. The drawings will not be the record of EMC or stray current design, but will show relevant details (such as connection points) if any.</p> <p>Tie agreed to instruct the drawing revision scope as contained in estimate DCR125.</p>	<p>CBR/JCh</p> <p>ongoing</p> <p>FMcF</p> <p>w/c 9/2/09</p>	
3.3	<p>Ground Improvement Design</p> <p>Design Parameters are confirmed to be 120MN/m² on-street and 80MN/m² off-street, as shown on relevant drawings.</p> <p>Void spanning design criterion is confirmed as 1m span in any direction at any location, as advised by SDS.</p> <p>It was confirmed that no reinforcement is to be provided for stray current collection/containment. All reinforcement is to be protected against stray current corrosion, in same way as any other structural reinforcement.</p> <p>Tie agreed to instruct the ground improvement design scope as contained in estimate DCR125.</p>	<p>Ado</p> <p>ongoing</p> <p>Ado</p> <p>ongoing</p> <p>Ado</p> <p>ongoing</p> <p>CBR</p> <p>ongoing</p> <p>FMcF</p> <p>w/c 9/2/09</p>	
3.4	<p>Vibration Analysis and Mitigation Design</p> <p>SDS confirmed that the reference design, which does not include any specific mitigation measures other than the identified rail and coating) satisfied the requirements of the Project Noise and Vibration Report.</p> <p>SDS are to analyse the Infracore Proposal for trackform, and identify any exceedences, above the requirements of the Project Noise and Vibration Report. They are then to produce construction designs to mitigate these exceedences, such that the requirements of the Report are achieved.</p> <p>Tie agreed to instruct the ground improvement design scope as</p>	<p>Note</p> <p>Ado</p> <p>ongoing</p>	

contained in estimate DCR125.

FMcF w/c 9/2/09

Tie advised that they might instruct further vibration mitigation in specific locations, to satisfy other undertakings. Tie to advise BSC when requirements are known.

FMcF ongoing

APPENDIX 2



Bilfinger Berger UK Limited EDI	
Date Received	18 Dec 2008
File Number	CI-01309
Action	see Bill
Distribution	

For The Attention of Colin Brady
Project Director
Bilfinger Berger Siemens CAF Consortium
9 Lochside Avenue,
Edinburgh Park,
Edinburgh EH12 9DJ

Our Ref: INF CORR 547

Date: 18th December 2008

Dear Sirs,

Edinburgh Tram Network
"Infraco – Instructions arising from Roads and Drainage Development Workshop"

Following our recent Roads and Drainage Development Workshop, we hereby instruct you to carry out the following;

1 Road Construction Details

Based on latest IFC drawings produce a construction methodology statement to define management of the process of:-

- testing in-situ to determine ground conditions;
- selection of road construction details from Design Schedule ULE90130-SW-SPN00139, Appendix 7.1 : Permitted Pavement Options, or as otherwise applicable where reduced depth construction is feasible;

Please forward an Estimate for these works in accordance with clause 80.4 and on receipt we will review and issue a change order.

Yours faithfully,

Steven Bell
Project Director – Edinburgh Tram

tie limited

Citypoint, 65 Haymarket Terrace, Edinburgh EH12 5HD

with www.tie.ltd.uk

CEC00999080_0040

6 APPENDICES

6.1 Development Workshop Process

Extract from Schedule 23, clauses 4.6, 4.7. 4.8

4.6 tie warrants that it has received a report from the SDS Provider (annexed at Part B of Appendix Part 7) setting out the misalignments between the Deliverables completed prior to the date of this Agreement and the Employer's Requirements and that it has issued initial instructions (in the form of the letter annexed at Part A of Appendix Part 7) to the SDS Provider in relation to addressing all such misalignments. Upon completion of the work entailed to resolve the misalignments, the SDS Provider confirms to tie and the Infraco that such Deliverables shall be consistent with the Employer's Requirements.

4.7 As soon as reasonably practicable, the Parties shall commence and expeditiously conduct a series of meetings to determine the development of the Infraco Proposals and any consequential amendment to the Deliverables (the "**Development Workshops**"). The matters to be determined at the Development Workshops shall be those set out in the report annexed at Part C of Appendix Part 7 (the "**Misalignment Report**"), together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4 to be dealt with in the following order of priority and objective unless otherwise agreed:

- 1 Roads and associated drainage and vertical alignment with the objective of minimising the extent of full depth reconstruction for roads thus minimising cost and construction programme duration
2. Structures value engineering, including track fixings to structures with the objective of enabling BBS to realise the Value Engineering savings for the structures identified in Schedules 4 and 30 of the Infraco Contract (Pricing and Infraco Proposals respectively)
3. OLE Design with the objective of identifying and agreeing the actions, responsibilities and programme to enable Infraco to implement their proposals for OLE as identified in the Infraco Proposals
4. Trackform with the objective of completing an integrated design to enable BBS to implement their proposals for trackform
5. Sub-station buildings with the objective of resolving the misalignment between Infraco Proposals and SDS Design with the minimum of changes to accommodate the Infraco Proposals for substations.

The following to be reviewed at the end of the Development Workshop to identify any issues arising from the above items:

1. Earthworks

2. Landscaping
3. OLE Foundations
4. Alignment
5. Site Clearance
6. Tramstops
7. all other items in the Misalignment Report together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4.

At the Development Workshop, the Parties shall also develop a strategy for co-operation between the SDS Provider and the Infraco to manage design development and the necessary interface between the Infraco's design and the design developed by the SDS Provider.

- 4.8 The product of the Development Workshops shall be a report signed by each of the Parties to detail the conclusions in respect of each matter and the payments to be made to the SDS provider in respect of the work to be carried out by the SDS Provider as a result of the conclusions set out in the report. Any consequential **tie** Change Orders or instructions shall be appended to such report as and when the same are issued. **tie** shall pay the SDS Provider for the work required for the Development Workshop on an hourly rate basis in accordance with the hourly rates set out in Appendix Part 8 and the SDS Provider agrees that the Infraco shall not be liable to make such payments to the SDS Provider. For the avoidance of doubt, the Infraco and **tie** agree that any amendment to the Deliverables completed prior to the date of this Agreement as set out in this report will be a Mandatory **tie** Change under the Infraco Contract, and a Client Change under the SDS Agreement.

6 APPENDICES

6.1 Development Workshop Process

Extract from Schedule 23, clauses 4.6, 4.7. 4.8

4.6 tie warrants that it has received a report from the SDS Provider (annexed at Part B of Appendix Part 7) setting out the misalignments between the Deliverables completed prior to the date of this Agreement and the Employer's Requirements and that it has issued initial instructions (in the form of the letter annexed at Part A of Appendix Part 7) to the SDS Provider in relation to addressing all such misalignments. Upon completion of the work entailed to resolve the misalignments, the SDS Provider confirms to tie and the Infraco that such Deliverables shall be consistent with the Employer's Requirements.

4.7 As soon as reasonably practicable, the Parties shall commence and expeditiously conduct a series of meetings to determine the development of the Infraco Proposals and any consequential amendment to the Deliverables (the "**Development Workshops**"). The matters to be determined at the Development Workshops shall be those set out in the report annexed at Part C of Appendix Part 7 (the "**Misalignment Report**"), together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4 to be dealt with in the following order of priority and objective unless otherwise agreed:

- 1 Roads and associated drainage and vertical alignment with the objective of minimising the extent of full depth reconstruction for roads thus minimising cost and construction programme duration
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3. OLE Design with the objective of identifying and agreeing the actions, responsibilities and programme to enable Infraco to implement their proposals for OLE as identified in the Infraco Proposals
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5. Sub-station buildings with the objective of resolving the misalignment between Infraco Proposals and SDS Design with the minimum of changes to accommodate the Infraco Proposals for substations.

The following to be reviewed at the end of the Development Workshop to identify any issues arising from the above items:

1. Earthworks

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3. OLE Foundations
4. Alignment
5. Site Clearance
6. Tramstops
7. all other items in the Misalignment Report together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4.

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6 APPENDICES

6.1 Development Workshop Process

Extract from Schedule 23, clauses 4.6, 4.7. 4.8

4.6 tie warrants that it has received a report from the SDS Provider (annexed at Part B of Appendix Part 7) setting out the misalignments between the Deliverables completed prior to the date of this Agreement and the Employer's Requirements and that it has issued initial instructions (in the form of the letter annexed at Part A of Appendix Part 7) to the SDS Provider in relation to addressing all such misalignments. Upon completion of the work entailed to resolve the misalignments, the SDS Provider confirms to tie and the Infraco that such Deliverables shall be consistent with the Employer's Requirements.

4.7 As soon as reasonably practicable, the Parties shall commence and expeditiously conduct a series of meetings to determine the development of the Infraco Proposals and any consequential amendment to the Deliverables (the "**Development Workshops**"). The matters to be determined at the Development Workshops shall be those set out in the report annexed at Part C of Appendix Part 7 (the "**Misalignment Report**"), together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4 to be dealt with in the following order of priority and objective unless otherwise agreed:

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2. Structures value engineering, including track fixings to structures with the objective of enabling BBS to realise the Value Engineering savings for the structures identified in Schedules 4 and 30 of the Infraco Contract (Pricing and Infraco Proposals respectively)
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At the Development Workshop, the Parties shall also develop a strategy for co-operation between the SDS Provider and the Infraco to manage design development and the necessary interface between the Infraco's design and the design developed by the SDS Provider.

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