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Our ref: **25.1.201/KDR/6694**

Bilfinger Berger Civil EDI
17 SEP 2010

17 September 2010

tie limited
CityPoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

For the attention of Steven Bell – Tram Project Director

Dear Sirs,

Edinburgh Tram Network Infraco
Estimate in Respect of Notice of tie Change Number 536
Access Dates Provided by tie up to and including 31 July 2010 – Delay Resulting From Incomplete Utilities Works

We refer to Infraco Notification of tie Change No. 536, notified to tie under cover of Infraco's letter dated 22 January 2010 (Ref: 25.1.201/WIM/4470), and provide herewith the resulting Estimate pursuant to Clause 80 of the Infraco Contract.

Please confirm your receipt and pursuant to Clause 80.9, your proposals for discussion and agreement of this Estimate.

Yours faithfully,

[redacted]

M Foerder
Project Director
Bilfinger Berger Siemens CAF Consortium

cc J.Donaldson
S.Sharp
D.Gough
M.Berrozpe
A.Campos
M.Hecht
F.Wenzel
D.Steel

Enc: Estimate INTC 536

[redacted]

Summary of Estimate in Respect of Notice of tie Change Number 536

This Estimate addresses in isolation the time element of the delay arising from incomplete Utilities Works, and Infraco hereby requests an extension of time to each respective Planned Sectional Completion Date as follows:

Planned Sectional Completion Date for Section A: 241 Calendar Days
Planned Sectional Completion Date for Section B: 286 Calendar Days
Planned Sectional Completion Date for Section C: 461 Calendar Days
Planned Sectional Completion Date for Section D: 461 Calendar Days

Further, Infraco requests an extension of time in respect of Agreed Tram Commissioning Dates as detailed in Appendix J.

This Estimate also addresses the cost of these delays to each of the Planned Sectional Completion Dates, in the total sum of £39,306,971.16 and Euros 4,971,623.37 exclusive of VAT and has been calculated in accordance with the agreed mechanism set out in tie letter INF CORR 2773 dated 05 November 2009. Details of the Estimate are contained in Appendix H.

Pursuant to Clause 80.4.1, we confirm that Infraco will require relief from compliance from its obligations in respect of the completion date of 30 June 2011 (nominated in the Asset Protection Agreement) together with any other such text reflective of the agreement for extension of time whether or not specifically mentioned herein.

Pursuant to Clause 80.4.2, we confirm that we do not perceive that the subject delays will result in any detrimental impact to the ultimate performance of the system.

Pursuant to Clause 80.4.3, we confirm that the delays have had, and continue to have a significant impact on the Programme, and have addressed these impacts under Appendix A attached hereto.

Pursuant to Clause 80.4.4, we confirm that we do not perceive of any revisions to or additional consents required for which Infraco is responsible. We note for assistance only that given the quantum of delay experienced, there is potential for those rights obtained by **tie** for Infraco to occupy lands (for the purpose of construction) to have lapsed or been otherwise adversely affected. In these instances, we have assumed for the purpose of this Estimate that any such issues will be resolved so as not to impact the revised agreed Programme.

Pursuant to Clause 80.4.5, we confirm that we do not perceive that any new agreements will be required with third parties as a result of the delays.

Pursuant to Clause 80.4.6, we confirm that the planned Sectional Completion Dates, Reporting Period End Dates and Milestones in Schedule Part 5 will have to be updated to reflect the amended Programme agreed as a result of the Notified Departure to which this Estimate relates, together with any other extensions of time consequential on the amended Programme.

Further, pursuant to Clause 80.4.6 we confirm that, in the opinion of Infraco, amendments are required to the Tram Supply Agreement (Schedule 16 to the Agreement). More particularly we confirm that the Agreed Tram Delivery Dates, the Agreed Tram Commissioning Dates, and the dates for training indicated in the Tram Manufacturing and Delivery Programme will have to be extended as detailed in the TSA MUDFA 2 Programme attached herewith at Appendix J and the Agreed Tram Commissioning Dates referred to in the Infraco Contract will be updated accordingly.

At this stage it is not possible to confirm the extension to the Key Subcontracts that will be required. Infraco proposes for reasons of expedience, given the reasons referred to above that the details or any changes required to Key Subcontracts are provided to tie following agreement of the quantum of extension of time.

Pursuant to Clause 80.4.7, we confirm that the proposed method of delivery of the Infraco Works has not materially changed, save for any revisions to the sequencing of construction activities as addressed in Appendix A.

Pursuant to Clause 80.4.8, we confirm that the proposals to mitigate the delay are described in detail in Appendix A.

Pursuant to Clause 80.4.9, we again confirm that the Planned Sectional Completion Dates, Reporting Period End Dates and Milestones in Schedule Part 5 will have to be updated to reflect the amended Programme agreed as a result of the Notified Departure to which this Estimate relates, together with any other extensions of time consequential on the amended Programme. The Agreed Tram Commissioning Dates will be updated as detailed at Appendix J.

Pursuant to Clause 80.4.10, we confirm that the subject delay has caused an increase in sums due to be paid to Infraco. Infraco proposes for the reasons referred to above, in the interest of expedience that these sums be detailed, submitted and agreed with tie following the agreement of the quantum of extension of time applicable to each of the Planned Sectional Completion Dates and the Agreed Tram Commissioning Dates.

Pursuant to Clause 80.5.1.1, we confirm that it is not possible given the reasons referred to above, to confirm whether any net increase or decrease in labour resources or management time required for each affected maintenance element of the Infraco Works will be required.

Pursuant to Clause 80.5.1.2, we confirm that we do anticipate consequential increases in materials, plant or equipment, but that it is not possible at this stage to quantify such increases. These shall be detailed fully following agreement of the quantum of extension of time.

Pursuant to Clause 80.5.2.1, we confirm that we do not anticipate net increases in the scope of required renewals work or services, or the frequency of renewals, but that it is not possible at this stage to quantify such increases. These shall be detailed fully following agreement of the quantum of extension of time.

Pursuant to Clause 80.5.2.2, we confirm that we do anticipate net increases in labour resources and management time required for renewals work, but that it is not possible at this stage to quantify such increases. These shall be detailed fully following agreement of the quantum of extension of time.

Pursuant to Clause 80.5.2.3, we confirm that we do anticipate consequential increases in materials, plant or equipment required to affect renewals, but that it is not possible at this stage to quantify such increases. These shall be detailed fully following agreement of the quantum of extension of time.

Pursuant to Clause 80.7.1 Infraco has used all reasonable endeavours to minimise the increase in costs due to the tie Change by adoption of appropriate mitigation proposals as documented in Appendix A.

Pursuant to Clause 80.7.2 Infraco has, where required by **tie** and where appropriate and practicable, an obligation to seek competitive quotes from other persons other than the Infraco Parties. The Infraco has not been required by **tie** to seek such quotations, and the same would not be appropriate and practicable in regard to the costs consequent upon the **tie** Change.

Pursuant to Clause 80.7.3 we confirm that Infraco has investigated how to mitigate the impact of the tie Change. Infraco's proposals to mitigate the effect of delay are described in detail in Appendix A.

Pursuant to Clause 80.7.4 Infraco has, to the extent relevant, implemented the tie Change in the most cost effective manner by modifications to the sequence and logic in the Programme as detailed in Appendix A.

Please note that this Estimate is limited solely to the Notified Departure narrated in Appendix A and these impacts resulting from delays to the completion of the Utilities Works as notified by tie up to and including 31 July 2010. It does not take account any failure by tie or its agents to complete the Utilities Works in accordance with the "access dates" provided which would be subject to a further Notified Departure and process. Infraco has made tie aware of other delays to the Infraco Works resulting from events for which tie is responsible including inter alia the belated provision of the SDS Design, Utility/utility works performed by Infraco and increases to the scope of the Infraco Works. These changes have been notified under a separate cover and shall be subject to independent estimates, valuation and agreement pursuant to the relevant provisions of the Infraco Contract. Nothing in this Estimate shall prejudice any rights to entitlement to compensation or relief by Infraco under said separate processes.

APPENDIX A

Impacts on Programme Pursuant to Clause 80.4.3

Introduction to the Estimate

This Estimate notifies the analysis of the impact upon the Programme of a Notified Departure which has occurred, for the purposes of establishing changes that are required to the Planned Sectional Completion Dates. The Notified Departure and deemed tie Change in question arises in respect of incomplete Utility Diversion works based upon the information made available to Infraco as at 31 July 2010. That information confirms the falsification, as a matter of fact, of Pricing Assumptions 24 and 32 of Schedule Part 4 of the Infraco Contract.

Those Pricing Assumptions require the completion of the MUDFA works by the dates specified in the Programme and Programme Assumption 3.1. None of the MUDFA works were completed in accordance with those dates. The extent to which the facts are known by Infraco to differ from the Pricing Assumptions – that is, the extent of the MUDFA delay - has developed as tie has advised Infraco of the likely completion dates for the MUDFA works. This Estimate is based upon the information made available to Infraco on or before 31 July 2010.

As this INTC takes account of the information available to Infraco as at 31 July 2010, it supersedes INTCs 14, 15, 16, 18, 70, 131, 241, 358, 524, 556, 557, 564, 570 and 571 which addressed the information known at earlier dates.

Clause 80.4.3 requires the analysis of the impact upon the Programme of any Notified Departure for the purposes of establishing changes that are required to the Planned Sectional Completion Dates. The Employer's Requirements specify that a Programme is produced using Primavera P3e computer software. Contractually therefore the Programme and Primavera software are required to evaluate the change.

The Programme Revision 1 is the version currently accepted by tie pursuant to Clause 60.4, and as such forms the platform for the analysis here in.

The MUDFA delay (effectively a pre-commencement delay as far as Infraco's Works are concerned) is ongoing. It has not yet concluded and the full effects of it are not yet known. As such, any analysis is by its nature, prospective. The most appropriate form of evaluation is an as planned impacted approach which takes the original methodology and shows the effects of the delay.

General Approach

This Estimate takes cognisance of the Decision of Robert Howie QC in respect of INTC 429 (Delays resulting from Incomplete Utilities Work MUDFA Programme Rev 8). In particular:

1. Infraco is both bound and entitled to work to the Programme (Decision, page 8, para 4). The Programme remains in Revision 1 and this forms the basis of Infraco's analysis of critical delays.

2. It is correct to consider the impact of the Notified Departure on the Programme without a full Retrospective Delay Analysis and without consideration of other potential causes of delay (Decision, page 12 and 13).

3. Infraco is obliged to propose potential mitigation measures in its Estimate but these:

3.1 do not include acceleration measures (Decision, page 9, para. 2), or

3.2 do not require the JV to give up any of its contractual rights (Decision page 10, para 2) including, specifically, the right not to have to work alongside others (including the MUDFA contractor) within a Designated Working Area (Decision page 5, para 2), or

3.3 do not make assumptions regarding the possible relaxation of contractual restrictions (Decision page 13, para 2).

4. Mitigation seeks to limit an over-run on the Programme (a) without increase in overall resources applied to the works or (b) the abandonment of Infraco's contractual rights. (Decision p9, para 3).

5. Accelerative measures increase the rate of progress to pull back an already mitigated delay (Decision p9, para 3).

6. Designated Working Areas are not synonymous with the Intermediate Sections (Decision page 14, para 3).

The Programme

Programme Revision 1 has been compiled using Primavera Version 6.0 (P3e) software.

This and other similar software commonly used in the construction industry (Asta Power Project, Pertmaster, M.S Project etc.) have a primary function to perform what is called a critical path analysis of the works to be undertaken.

The following data is entered into the programme; the project start date; the number of working hours per day and days per week; holidays; the names of individual work activities; how long these activities will take to construct; what resources will be required to construct them; the logic links of predecessors and successors which determine the sequence of building; other constraints on the construction process.

The Primavera programme, using the above information, can then calculate the overall time duration to construct the works. It also identifies the earliest start date by which individual activities can commence and the latest by which they have to finish if the project end date is not to be affected. The normal output from the software is a bar chart which plots activity descriptions against time (although other forms are available).

Many other secondary functions can be performed and reports produced by the software if cost data, names of resources etc. are also entered.

A Work Break Down Structure (WBS) has been established to assist in organising the above data. This groups the activities into recognisable packages of works in a hierarchical structure. For ETN the works are split into geographical areas, the main divisions being the intermediate sections, namely;

1A Newhaven to Foot of the Walk
1B Foot of the Walk to McDonald Road
1C McDonald Road to Princes Street
1D Princes Street to Haymarket
2A Haymarket to Russell Road
5A Russell Road to Balgreen Road
5B Balgreen Road to Edinburgh Park Central

5C Edinburgh Park Central to Gogarburn
6A Gogarburn depot
7A Gogarburn to Edinburgh Airport

Although in general many tasks have to be performed before works commence on site, for the initial activities to be undertaken (e.g. establish traffic management) their commencement is constrained by two logic linked predecessors namely:

1. The date when construction drawings are issued ("issue for construction drawings") plus a 4 week mobilisation period.
2. Access to the worksite. Defined as the completion of the MUDFA works in the corresponding intermediate section.

The start date of the initial activity is therefore the later of the above two dates.

Subsequent activities are then linked to these initial activities by what has been termed on this contract "hard logic".

On the small scale this hard logic could be for example that a length of steel track rail cannot be put down on to the ground until a concrete support has been placed first to receive it; or that tram track cannot be built across a stream/burn before a bridge is constructed first.

On the large scale this could be, for example, that the works in Picardy Place cannot commence until the works in Princes Street are completed. This is because both the necessary traffic management schemes could not be implemented at the same time.

In Programmes Revision 0 & 1 the aforementioned hard logic actually produced surprisingly little constraint on the works. The majority of the designs and the completion of the MUDFA works were forecast by tie to be completed before the works commenced or in the first six months of the contract period.

It was therefore necessary to consider that there is a limit to the amount of resource Infraco can manage to undertake the works safely and efficiently. Moreover, there is an optimal combination of manpower with available work areas that produces high levels of productivity and quality.

Therefore the workload needed to be levelled out.

This was achieved in the Programme by focussing on activities and hence resources that were needed to construct every metre of the 18.5 km route. The activities for laying the tram rails and those for erecting and stringing out the overhead line equipment (OLE) were thus considered. By restricting the availability of these resources (three tram track laying gangs and two OLE gangs) not only slowed the pace of these operations but also reduced the speed and hence resource required for the preparatory and finishing works. Confidence could thus be gained in the resultant programme by the joint venture that the works could be adequately resourced and these resources properly supervised. With this knowledge its production rates and prices could thus be calculated. In turn the Infraco was also able to predict its risk of incurring liquidated damages.

In Programme Revision 1, the restriction on the tram track laying gangs and the OLE gangs was achieved by adding finish (of one activity) to the start (of the next activity) logic links between activities which required these resources. This determined the sequence in which these "levelling" activities were carried out. These links have been commonly referred to as "preferential logic links". A more correct terminology however is resource deployment logic links. These logic links were agreed by both parties and maintained when the programme was updated from Revision 0 to Revision 1.

In addition to restricting the amount of total resource required these links were also important in establishing the outputs that could be achieved. If for example a tram track laying gang could commence its work at one end of the project and continue without stoppage or interruption to the other end of the works, a high level of output could be achieved. If on the other hand the same gang could only lay a few hundred metres of track before having to stop because of an obstruction, and then have to move to another location a much lower output would be achieved. To enable rates to be established for these works, not only did the extent of the work in each work site have to be established but also its continuity through to adjacent work sites. When continuity is not available allowance is made for the time for the necessary demobilisation and then remobilisation of resources in a new location.

Incorporation of MUDFA constraint into the Programme & Analysis

To enable the Infraco Works to be constructed all service utilities that conflict with either the works to be built or with the operation of the tram need to be diverted. It was thus agreed between the parties that these diversion works were to be undertaken by the MUDFA Contractor and the Utility Companies in advance of the Infraco. The Base Case Assumptions and Infraco Programme therefore reflect the agreement that the Infraco Works could be undertaken in a manner free from disruption by the MUDFA and Utilities Works in Schedules Part 4 and 15 of the Infraco Contract respectively.

The Infraco Programme and the Pricing Assumptions, assume that the Infraco Works can be undertaken in a manner which is not disrupted by the MUDFA and Utilities Works.

This agreed logic ensures that not only would the physical Infraco and MUDFA Works not conflict, but also for the avoidance of clashes between traffic management schemes, difficulties of working around live services, access conflicts, congestion of contractors vehicles, space for storage of materials, responsibility and ownership of these sites in respect of health, safety and environmental considerations and other such factors that would either reduce productivity or suspend the works. As a result of this agreement efficiencies assumed in the Programme Revision 0 and associated cost savings were made possible.

The Programme Revision 1 is the version currently accepted by tie pursuant to Clause 60.4, and as such forms the platform for the analysis here in.

The Programme Revision 1 has 10 milestones, each representing the date for which MUDFA were assumed to be completed in each Intermediate Section. Without modification to the agreed logic in the Programme, these dates constitute the start milestones for the Infraco Works in the corresponding Intermediate Sections.

It is further noted that these dates are also listed in the Programming Assumptions document bound into Schedule Part 15 of the Infraco Contract and were not changed from Programme Revision 0 to the current Programme Revision 1.

Following the award of the contract and the commencement of the Infraco Works it has become apparent that these assumed MUDFA completion dates have not be achieved. Tie has issued revised MUDFA programmes, provided "site access maps" and other correspondence that record either when MUDFA completed their works or when they are forecast to do so. These documents form the basis of the Notified Departure. This information, received up to 31 July 2010 is compiled in Appendix B.

It is Infraco 's primary position that, in accordance with Pricing Assumptions 24 and 32, it is entitled to exclusive access to the Intermediate Sections represented in the Programme and in the Programming Assumptions bound into Schedule Part 15.

This is because it is the Programme which represents how Infraco planned the activities, work sequences, resources, activity durations, activity interrelationships and dependencies that go to make up the Programme (now Revision 1) and as such drive the sequence and timing of the Infraco Works.

This was agreed with tie at the outset of the project and as such reflects the commercial bargain reached between the Parties. The Programme provides that the MUDFA contractor would have completed all utility diversion works in their entirety, prior to commencement by Infraco of any of its Works in any Intermediate Section.

However, in Mr Howie's decision on the Impact of MUDFA Programme Revision 8 on Programme Revision 1, he states that *"the mere existence of MUDFA works in an intermediate section is not evidence of the occurrence of a Notified Departure, or even of the existence of a state of affairs which could ground one on notification thereof. Such a departure arises when works which, in the words of Programming Assumption 3.1 'would conflict with* Infraco *operations' have not been completed by the dates given in that Assumption*".

He also states:

"*A Designated Working Area has to be read as denoting so much of the land, worksite or public road as the JV requires to occupy at a given moment in order to carry out that part of the Infraco Works which, according to the Programme, it ought to be executing there. Prima facie, sub-clause 18.1.2 is therefore to be read as giving to the JV an exclusive licence to occupy so much grounds it needs to do the relevant works safely and reasonably economically without the difficulties of congestion and so forth ...*" (Decision, page 15, para 1)

Reading these paragraphs together, Mr Howie's concern would appear to be that the Intermediate Sections are geographically too large to consider the effect on the Programme of the failure of tie to complete the MUDFA work in a timely manner. He concludes that the analysis should therefore be based on the actual extent of the Designated Working Areas to which Infraco was entitled to exclusive access and on to which it was not obliged to enter whilst MUDFA Works remained to be finished there.

Despite its primary position being as stated above (that a Notified Departure occurs where the MUDFA Works are not completed in any Intermediate Section and in accordance with the Programme, this being the basis upon which the Infraco Works were planned), the Infraco accepts that the Programme represents one way of carrying out the Infraco Works and that, anticipating the likely impact of delays to the preceding MUDFA Works, there are other ways in which the works within an Intermediate Section could be broken down (that is, into smaller Designated Work Areas). To the extent therefore that Mr Howie has reached an opinion that the Infraco Works should be broken down into smaller sections (Designated Working Areas), Infraco has therefore analysed the delay to its Works as a result of MUDFA delays up to and including 31 July 2010, based on the identification of smaller Designated Work Areas, which themselves are based on the Programme.

It should be noted that in identifying these Designated Working Areas within which Infraco could have worked, Infraco is in fact seeking to mitigate the impact of the delays to the MUDFA and Utilities Works. It is considered that the Designated Working Areas identified by Infraco represent the smallest areas to which it was apparent from the Programme that Infraco required exclusive access, and specifically no conflict with MUDFA. This takes account of physical confines of space, traffic management, safety, a reasonably economical method of working. It does not envisage changes to the Programme unless these can be achieved without cost. Nor is it based upon the deployment of additional resources (or indeed any other increase in cost from that envisaged in the Programme).

In the narrative and maps produced at Appendix C, Infraco details the 142 areas of work which it considers to be Designated Working Areas having regard to the guidance in Mr Howie's decision. These are based on the work as it is described in Programme Revision 1. Against each of the Designated Working Areas, Infraco describe the factual reasons why it considers the work to be appropriately encompassed within the relevant Designated Working Area. In each Infraco considers that the presence of MUDFA works in the Designated Working Area would conflict with its operations.

To date, tie has offered no view as to what it considers to be the Designated Working Area for the purposes of the Infraco Contract. tie is invited to agree these definitions or propose alternatives. Its failure to do so will be founded upon.

Initial Analysis – the direct effect

Infraco is entitled to exclusive access of the Designated Working Areas. Therefore Infraco's analysis of the impact of the failure to complete the MUDFA works is based upon the date when exclusive access has been or will be given to each Designated Working Area.

Instead of assuming that the whole of an Intermediate Section commences upon the completion of all MUDFA work in that Section, the analysis assumes that each Designated Working Area can commence when all of the MUDFA work is complete within that Designated Working Area only. Until that date, any MUDFA works in the Designated Working Area would conflict with the operations of Infraco.

Infraco has had very limited visibility on the availability of any part of the works after completion of the MUDFA works. It has received intimation of potential completion dates for MUDFA works through a variety of sources including marked-up plans, copies of MUDFA programmes, correspondence and site meetings. At Appendix B, it has sought to identify the best evidence as to when MUDFA works are likely to be complete in each Designated Working Area based upon these sources. Infraco reserves the right to submit further INTCs in respect of further intimated MUDFA completion dates to the extent that these vary from those intimated on or before 31 July 2010.

A new work break down structure has been added to Programme Revision 1 which incorporates start milestones for each of the Designated Working Areas. The milestone dates are extracted from the analysis found at Appendix B. Each milestone is linked to the initial activity in each of the Designated Working Areas.

In this initial analysis and pursuant to Clause 80.4.3, the agreed logic and sequences have been maintained.

This revised directly impacted programme has been run to schedule with a data date of 27 September 2007 (the same as Programme Revision 1). The resulting effect on each milestone is as follows.

	Revision 1	Directly Impacted
Section A	01 June 2010	28 January 2011
Section B	01 July 2010	02 October 2012
Section C	10 March 2011	27 June 2013
Section D	06 September 2011	24 December 2013

A copy of this programme analysis can be found in Appendix E.

NOTE – the substantial delay impacted on the works by the late completion of MUDFA and the Utilities requires the Programme calendars to be extended into 2012 and 2013. Non-working days have been defined to follow the same pattern as for 2008, 2009, 2010 and 2011. See Appendix D for further details of all revisions to Programme Revision 1.

Mitigated programme analysis

Infraco has considered potential mitigation measures in accordance with clause 80.4.8's requirements and having regard to the principles determined in Mr Howie's decision, noted above. As Mr Howie

noted, clause 80.7.4 imposes no additional requirements upon Infraco (Decision page 10, para 1). Infraco has adopted the following mitigation measures:

Removing Resource Constraints

As stated above Programme Revision 1 is constrained by the track laying and OHLE resources. To maintain this restraint the activities for each gang are linked by finish start relationships. The reason for this preferred logic (as it has been termed) is that the production levels are based upon the resources having continuity of work. If this continuity is broken, by an obstruction to progress and the resource has to be moved elsewhere on the project, a demobilisation / remobilisation time is experienced and production lost. Additional activities have been inserted into the Programme Revision 1 to allow for this disruption to production. The inability of the Primavera software to make allowance for this disruption has resulted in manual resource levelling being the preferred analysis option.

In the Mitigated Programme analysis of all links that dictate construction sequence brought about by consideration of the deployment of resource have been removed. (see Appendix D)

Instructed Acceleration

In three sections of the project, tie have recognised the impact of the delays to critical areas and instructed Infraco pursuant to Clause 80 to enter into the Designated Work Areas in advance of the completion of the Utility Works. These instructions for both the Leith Walk (Intermediate Section 1B) and Princes Street (Intermediate Section 1D) have resulted in reduced production on site. In the case of Princes Street, the overall quantum of delay has been reduced by the performance of some of the Infraco Works concurrently with the Utility Works.

Intermediate Section 1B

In the instance of Intermediate Section 1B – Leith Walk, Infraco commenced their programmed works on 13 October 2008 despite the on-going MUDFA works. At that time only partial possession within the section of works (Ch 100 to 350) which corresponds to DWA 30, was granted by tie due to the on-going presence of the MUDFA contractor. Infraco was instructed to work alongside MUDFA on smaller sections within the 250 meter work area. Little progress was achieved due to the disruption caused by MUDFA and the discovery of numerous live services that conflicted with the permanent works. The Infraco Works were suspended under further instruction for a Christmas Embargo from 12 December 2008 through 16 February 2009. Following this embargo, it was agreed by tie that given the quantum of incomplete MUDFA Works and the loss of production experienced during the aborted acceleration attempt, Infraco would not remobilise until the MUDFA works were completed.

The programme analysis assumes that the programmed Infraco Works for Intermediate Section 1B will commence in full following the completion of the MUDFA Works.

Intermediate Section 1D - Princes Street

In the instance of Intermediate Section 1D – Princes Street, acceleration measures were instructed by tie whereby Infraco would work alongside MUDFA. Despite the works proceeding on a cost reimbursable basis the time effect of this disruption still has to be accounted for.

The Mitigated programme analysis assumes the Princes Street works were unaffected by MUDFA. The implications of the time effect of the Princes Street Supplemental Agreement will be analysed in a separate application.

Intermediate Section 7A – Edinburgh Airport to Gogarburn

Following the discovery of a clash between the foundations to the Gogarburn Bridge and a sewer in Intermediate Section 7A tie instructed Infraco to perform the diversion upon completion of a suitable design solution,

The date of this instruction has been used as the time when the conflict was removed in this analysis. The time effect of the additional works will be analysed under a separate Infraco Notice of Tie Change.

Revised Logic to the Programme Revision 1

Programme Revision 1 is critically driven by resource constraints. However, 'hard' logic also drives the start dates of many programme activities e.g. the installation of traffic management. During the development of Programme Revision 1 it was found that traffic management establishments were scheduled too far in advance of when they were required. Hence logic was introduced into the programme that delayed the establishment of traffic management until it was required by the availability of track laying resource.

However in the mitigated programme analysis, it is the hard logic that drives the programme and not the resource constraints. Therefore this logic to overcome premature traffic management establishment must be removed to avoid distorting the analysis. (see Appendix D)

This revised mitigated programme analysis has again been run to schedule with a data date of 27 September 2007 (the same as Programme Revision 1). The resulting effect on each milestone is as follows.

	Revision 1	Directly Impacted	Mitigated (ignoring resource constraints)
Section A	01 June 2010	28 January 2011	28 January 2011
Section B	01 July 2010	02 October 2012	13 April 2011
Section C	10 March 2011	27 June 2013	7 June 2012
Section D	06 September 2011	24 December 2013	4 December 2012

A copy of this programme analysis can be found in Appendix F

Resource Levelling

Following both the removal of the resource constraints and the introduction of the instructed acceleration measures detailed above, this proposed mitigated programme required resource levelling

The depot and Test Track facilities are required in advance of other areas of the project for the purpose of allowing sufficient time for the commissioning of the trams ahead of active service. Accordingly all track and OHLE activities associated with the test track and the depot have been given a *"high activity levelling"* priority.

As a function of re-sequencing, the demobilisation and remobilisation activities had no links to correctly position themselves in the programme logic. Programme Revision 1 had 1195 days associated with track laying and 78 associated with demob / remobilisation (6.5%). By increasing the track laying

activity durations by this percentage effectively corrects the outputs for the degree of disruption in Programme Revision 1.

As an additional mitigation measure the programme logic which dictates the relationship between the civil engineering works and the E & M works has been changed in the now critical intermediate section 1C to allow the E & M works to commence sooner than if the Programme Revision 1 logic had been retained (see Appendix D for details).

Running the software to level resources (with *late finish* dates as the priority secondary to the depot and test track facilities) produced the following Sectional Completion dates;

	Revision 1	Fully Mitigated (Resource Levelled)
Section A	01 June 2010	28 January 2011
Section B	01 July 2010	14 April 2011
Section C	10 March 2011	13 June 2012
Section D	06 September 2011	10 December 2012

A copy of this programme can be found in Appendix G.

However, because of the change in method of analysis, no account of the increased disruption brought about by the re-sequencing has been accounted for.

Critical Path

The Planned Sectional Completion Date for Section D calculated by the programme analysis is 10 December 2012. The critical path driving this end date is lengthened by resource levelling and is as follows:

- Completion of Utility works in Intermediate Section 1C between CH 0 & 375.
- Road works Leith Walk Ch 0 to 375
- Road works Leith Walk Ch 375 to 450
- Track works Ch 0 to 375
- Track works Ch 375 to 450
- Intermediate Section 1C E & M Installations.

With prescribed Liquidated and Ascertained Damages (LADs) applicable to the completion of Sections A and B under this Agreement, it is axiomatic that an additional critical path exists through the completion of Intermediate Sections 6 and 7A. The critical path to the Planned Sectional Completion Date for Section A is as follows:

- MUDFA completion of water main diversion at Depot;
- Depot earthworks;
- Foundations;
- Building Envelope;
- Building Services;
- Fit out & Finishes;
- Install workshop equipment;
- Inspection & Testing;

The critical path to the Planned Sectional Completion Date for Section B is as follows.

- MUDFA completion in Intermediate Section 7A (conflict with Gogar Burn Retaining Walls)
- Gogarburn Retaining Wall W14.
- Earthworks / Sub base / Drainage / Ducts / OHLE foundations Sub Section Ingliston to Airport.
- Track work sub section Ingliston to Airport
- E & M Works Intermediate Section 7A
- Commissioning of 5 Trams

Conclusion

The effect of incorporating the revised information received from tie in respect of MUDFA directly into the Programme Revision 1 is a resulting Planned Section D Completion Date of 24 December 2013 using the agreed logic prior to mitigation. This programme is provided as Appendix E hereto.

In anticipation of Infraco's obligations pursuant to Clause 60.2 and 60.3, we further provide a proposed mitigated programme as Appendix G hereto incorporating those mitigation measures as detailed above and required by Clause 80.4.8 for acceptance by tie.

A summary of each of the unmitigated and mitigated programmes and resulting Planned Sectional Completion Dates are provided in the table below

	Revision 1	Directly Impacted	Fully Mitigated
Section A	01 Jun 2010	28 January 2011	28 January 2011
Section B	01 Jul 2010	02 October 2012	14 April 2011
Section C	10 Mar 2011	27 June 2013	13 June 2012
Section D	06 Sep 2011	24 December 2013	10 December 2012

Infraco reiterates that the extension of time associated herewith will be subject to subsequent adjustment in the event any of the dates advised by tie for completion of the MUDFA Works are not met.

The analysis remains devoid of any consideration for the other forms of delay incurred on the project to date. It is understood and accepted that the impacts associated therewith shall be treated under separate process and that nothing in this Estimate shall prejudice Infraco's right to entitlement to compensation for extension of time, relief and/ or cost associated therewith.

Impact on CAF Programme

In order to calculate the impact of the delays to the Infraco Programme caused by the late completion of the MUDFA / Utilities Works on the CAF Tram Supply Agreement, we have incorporated two milestones into the programmes used in this analysis.

The first milestone recognises the point at which Infraco are able to received tram deliveries at the depot. This date corresponds to the completion of the depot OLE works.

The second milestone is the date when the test track becomes available for use. This date corresponds to the completion of the OLE works in the appropriate lengths of Intermediate Sections 5C, 6A and 7A.

A programme produced by CAF, which incorporates these milestones, is included in Appendix J.

This programme shows the impact of the delay in the completion of the MUDFA / Utilities Works on the CAF Tram Supply Agreement.

APPENDIX B

Schedule of Documents that provide actual and forecast access dates to the Designated Working Areas up to and including 31 July 2010

The Employer's Requirements provide a geographical work break down structure (WBS) that is to be incorporated into all contract programming. This structure splits the works into large geographic Sections (numbers 1 to 7) smaller Intermediate Sections (1A, 1B, 1C, 1D, 2A, 3A to C, 5A to C, 6A & 7A) and 34 Sub Sections which generally run between tram stop locations. This provides a sensible structure from which to plan & programme the works especially considering that much of the E& M line side equipment runs between tram stops.

During the tender period tie provided Infraco with information on the programme constraints brought about by the MUDFA Works through providing completion dates for MUDFA in each Intermediate Section. The planning and programming of the works in reliance on such information therefore followed the start constraint that no works could commence in an Intermediate Section until after the respective MUDFA completion date.

After contract award in May 2008 tie provided a revised set of MUDFA completion dates in October 2008 in the form of MUDFA programme revision 7.9. This outline programme provided 34 bar lines detailing the remaining MUDFA work over the 10 Intermediate Sections and forecast significant slippage to the originally advised dates upon which the original and agreed planning and programming of the Infraco Works was based.

Seven months later in May 2009 Infraco received from tie MUDFA programme revision 8 which provided a further update of forecast MUDFA completions, again showing substantial slippage to the originally advised dates upon which the original and agreed planning and programming of the Infraco Works was based. This programme provided details of the MUDFA Works considering the on street works in 100m sections for some of the utilities (with Intermediate Section summary bars for the critical remaining utility works) and the off street works by Intermediate Section.

It was not until February 2010 that tie provided on a regular (monthly) basis a series of access maps that show where Infraco has access to areas of the site and also forecasting dates when Infraco will be granted possession of the remaining areas of the site. These maps do not follow any recognised Intermediate or Sub Section boundaries as originally intended and upon which the original and agreed planning and programming of the Infraco Works was based.

The attached spread sheet provides a summary of the documents provided by tie (programmes, maps, Change Orders, correspondence etc.) which evidence conflict between the incomplete utility works and the Infraco's newly defined Designated Working Areas (DWA).

Plotted against each newly defined Designated Work Area (see Appendix C) is a list of dates, provided by tie at various times, when the conflict between the existing utilities and the DWA was either forecast to be removed or had been completed.

As revealed by the schedule, tie has failed to consistently notify Infraco of the anticipated and actual completion of the MUDFA and Utilities works. To ascertain when Infraco had or will be able to access areas of the works it is therefore necessary to trawl a number of letters / programmes / tie change orders.

In addition to the on-going substantial slippage to the MUDFA programme and the significant effect it has on the ability of Infraco to undertake its works in accordance with the original and agreed plan, tie has failed to instigate any procedure that regularly and accurately forecasts the completion of the MUDFA Works and then subsequently officially hands over these areas to Infraco. The result is that Infraco has not only been unable to undertake its works in accordance with the original and agreed plan, but has subsequently not been able to efficiently plan and programme its works and opportunities to mitigate these delays.

The attached schedule lists this often conflicting information. Dates highlighted in green in the schedule have been chosen by Infraco to be used in the Estimate as the date when the conflict is

removed (or when it is forecast to be removed). The areas marked in blue correspond to the issue of site access maps where tie believe Infraco to have exclusive access.

In general the dates **highlighted in green** in the spreadsheet, are taken in the Estimate to be the dates when exclusive access to the DWA is gained and hence when the Infraco works can commence in an unimpeded manner.

Where tie has not provided information on access, Infraco has provided documentation (photographs, programmes etc.) to demonstrate the on-going MUDFA / Utility Company's activities.

Also included in this appendix (B) are copies of the correspondence, Change Orders etc. which are referenced.

APPENDIX C

Designated Working Areas (DWA)

When compiling the Programmes Revision 0 and Revision 1, tie provided information to Infraco on the MUDFA constraint by providing MUDFA completion dates for each of the Intermediate Sections. In reliance on this information the Designated Working Areas were thus taken to coincide with the Intermediate Sections.

Even following Contract Award the information provided by tie that updated these MUDFA completion dates was often only detailed down to Intermediate Section level.

In Mr Howie's decision on the Impact of MUDFA programme revision 8 on Programme Revision 1 he states that the Intermediate sections are geographically too large to consider the effect on the Programme of the failure of tie to complete the MUDFA work in a timely manner. He suggests a smaller Designated Work Area based on the Programme is analysed.

He goes on to say:

"A Designated Working Area has to be read as denoting so much land, worksite or public road as the JV requires to occupy at a given moment in order to carry out that part of the Infraco Works which, according to the Programme, it ought to be executing there. Prima facie, sub clause 18.1.2 is therefore to be read as giving to the JV an exclusive licence to occupy so much grounds it needs to do the relevant works safely and reasonably economically without the difficulties of congestion and so forth."

This analysis considers a Designated Working Area which is defined as the smallest areas to which it was apparent from the Programme that Infraco required exclusive access, and specifically no conflict with MUDFA. This takes account of physical confines of space, traffic management, safety, a reasonably economical method of working. It does not envisage changes to the Programme unless these can be achieved without cost. Nor is it based upon the deployment of additional resources (or indeed any other increase in cost from that envisaged in the Programme).

The DWAs chosen are therefore the smallest work sites identified in the Programme. The size of these work sites have been used in determining the productivity that will be achieved and hence the cost of undertaking the works. Smaller worksites will result in lower levels of production and hence are not cost effective.

As stated in Appendix A to enable rates to be established for the works, not only did the extent of the work in each work site have to be established but also its continuity through to adjacent work sites. Moreover, there is an optimal combination of manpower with available work areas that produces high levels of productivity and quality.

It should be noted that where the basic pricing and programme assumption (and contractual right) of exclusive access to DWA has been ignored, or the DWA reduced in size (in an effort to expedite the works) e.g. Leith Walk and Princes Street considerable cost and time penalties have been incurred.

As revealed by the schedule in Appendix B tie has failed to consistently notify Infraco of the anticipated and actual completion of the MUDFA and Utilities Works. To ascertain when Infraco had or will be able to access the works it is therefore necessary to trawl a number of letters / programmes / tie change orders. It is however now possible in the light of more contemporary correspondence to consider smaller DWA's than Intermediate Sections as Mr Howie directs without significantly changing the original overall base assumptions and approach to the planning and programming of the works; ie it is an alternative approach to the planning and programming of the works in light of the actual and anticipated delayed completion of the MUDFA and Utilities Works. That being said, and for the avoidance of doubt, the consideration of such smaller DWAs is restricted in so far as Infraco has taken account of physical confines of space, traffic management, safety, a reasonably economical method of working; it does not envisage changes to the Programme unless these can be achieved

without cost; nor is it based upon the deployment of additional resources (or indeed any other increase in cost from that envisaged in the Programme).

The following Appendix lists the new DWAs (i.e. the smallest and most cost effective Programme work sites), the basic programme logic that links these DWAs and the conflict with the Utilities that the slippage to the MUDFA programme presents.

			source of information	contract dates	MUDFA 7.9	MUDFA 8	Site Access Maps		Rev3 Input	Site Access Maps								tie Change Order	Correspondence	Commence Works	Notes
			date issued	15/05/2008	31/08/2008	28/03/2009	04-Feb-10	05-Mar-10	19-Mar-10	26-Mar-10	02-Apr-10	16-Apr-10	10-May-10	25-May-10	15-Jun-10	18-Jun-10	30-Jul-10	see notes	see notes		
			date information received	15/05/2008	03/10/2008	05/05/2009	05-Feb-10	11-Mar-10	19-Mar-10	06-Apr-10	06-Apr-10	21-Apr-10	13-May-10	27-May-10	17-Jun-10	24-Jun-10	30-Jul-10	see notes	see notes		
			received via	contract	INF CORR 205	INF CORR 1371	INF CORR 4031	INF CORR 4358	e-mail re EH10	INF CORR 4558	INF CORR 4624	INF CORR 4773	INF CORR 5035	INF CORR 5167	INF CORR 5365	INF CORR 5463	INF CORR 5713	see notes	see notes		
DWA		Designated Work Areas (DWA)	Notes on DWA																		
78		E & M Installation 5A	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
79		Russel Road Bridge (S20)				No information			No information												
80		Russel Road Retaining Wall (W3 & W4)		05/11/2007	21/09/2007	No information			No information									02/12/2008 & 03/12/2010			tco 6 via INF CORR 454 dated 03/12/08 & BSC notified 22/02/10 tco 139 via INF CORR 4160 (we can start however,but not finish)
81		Murrayfield Tram Stop Retaining Walls (W18)				No information			No information												
82		Murrayfield Tram Stop	Successor to W18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
83		Trackwork Roseburn to Murrayfield (CH 0 to 470)	Successor to S20, W3 & W4, W18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
84		Roseburn Street Viaduct (S21A)			21/09/2007	No information			No information									02/12/2008			tco 6 via INF CORR 454 dated 03/12/08
85		Murrayfield Stadium Retaining Walls (S21B)			No information	No information			No information												
86		Murrayfield Underpass (S21C)			No information	No information			No information									05/05/2009			BSC notified on 05/05/09 tco 55 via INF CORR 1557
87		Murrayfield Training Pitches Retaining Wall (S21D)		05/11/2007	No information	No information			No information												
88		Water of Leith Bridge (S21E) (centre pier)			No information	No information			No information									04/05/2010			BSC notified on 04/05/10 tco 153 via INF CORR 5184
89		Water of Leith Bridge (S21E) (end supports)			No information	No information			No information												
90		Baird Drive Retaining Wall (W8)			No information	No information			No information												
91		Balgreen Road Bridge (S22) and Retaining Walls (W9)				No information			No information									02/12/2008			tco 7 via INF CORR 453 dated 03/12/08
92		Trackwork Murrayfield to Balgreen (CH 470 to 1476)	Successor to S21 A, B, C, D, E, W8, S22 and W9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
93		Jonners Substation		05/11/2007	No information	No information			No information												
		Intermediate Section 5B																			
94		E & M Installation 5B	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12/12/INF/Construction Front
95		Carrick Knowe Bridge (S23)	Abutments planned to be built simultaneously	11/04/2008	No information	No information			No information												
96		Trackwork Balgreen to Saughton (CH 0 to 1160)	Successor to Carrick Knowe	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
97		Trackwork Balgreen to Saughton (CH 1160 to 1650)	Successor to Carrick Knowe	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
98		Balgreen Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
99		Saughton Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
100		South Gyle Access Bridge (S26)				No information	Conflict	Conflict	No information	Conflict	Conflict	Conflict	Conflict	31/10/2010	31/10/2010		31/10/2010				
101		Bankhead Drive Retaining Wall (W11)	can not be completed until S26 west abutment is completed	11/04/2008	06/11/2008	No information			No information										30/04/2009		INF CORR 841 dated 08/03/09
102		Bankhead Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
103		Trackwork Saughton to Bankhead (CH 1650 to 2650)	Guided Busway, track laying successor to S26 decks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
104		Trackwork Bankhead to Edinburgh Park Station (CH 2650 to 3740)	can not be completed until S26 west abutment is completed	11/04/2008	06/11/2008	No information	PPA	PPA	No information	PPA	PPA	PPA	PPA	PPA	PPA	PPA	PPA		15/03/2009		INF CORR 841 dated 08/03/09
105		Edinburgh Park Station Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
106		Edinburgh Park Viaduct (S27)		11/04/2008	No information	No information			No information											16/04/2009	Cable clash with South Abutment tco 52 via INF CORR 1368 dated 01/05/09 recognized after start, not considered in programme
107		Trackwork Edinburgh Park Station to Central (CH 3740 to 4594)			06/11/2008	No information			No information										20/05/2010		INF CORR 5150 received 27 May 10
108		Edinburgh Park Central Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
109		Bankhead Sub Station		11/04/2008	No information	No information	No information	No information		No information	No information	No information	No information	No information	No information	No information	No information				
		Intermediate Section 5C																			
110		E & M Installation 5C Edinburgh Park to Depot	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
111		E & M Installation 5C Depot to Gogarburn	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
112		Gyle Retaining Wall (W19)		16/05/2008	No information	No information	01/06/2010	01/06/2010	No information										26/05/2010		INF CORR 5151 received 27 May 10
113		Trackwork Edinburgh Park to Gyle (CH 0 to 760)			No information	No information	26/04/2010	26/04/2010	No information	26/04/2010	26/04/2010	26/04/2010							20/05/2010		INF CORR 5150 received 27 May 10
114		Gyle Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
115		A8 Underpass (W28) Phase 1	Phasing potentially interchangeable but only one phase at any one time. Phase 1 started after TCO 3	16/05/2008	No information	No information			No information									01/10/2010 & 10/10/2008			tco 3 via INF CORR 211 dated 10/10/08 tco 133 via INF CORR 3263 dated 01/02/10 (provisional phase 1 completion)
116		A8 Underpass (W28) Phase 2			No information	No information			No information									13-10-2009			BSC notified on 8 Jul 09 tco 108 via INF CORR 2614 1500 Sewer
117		A8 Underpass (W28) Phase 3			27/03/2009	17/04/2009			No information												
118		A8 Underpass (W28) Phase 4			No information	No information			No information												
119		Trackwork Gyle to Depot (CH 760 to 1322)			18/12/2008	17/04/2009	01/06/2010	01/06/2010		01/06/2010	01/06/2010	01/06/2010	15/06/2010	15/06/2010	15/06/2010			31/03/2010			
120		Depot Access Bridge (S32)			No information	No information			No information												
121		A8 Retaining Walls (W16)	design change, not applicable	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
122		Trackwork Depot to Gogarburn (CH 1322 to 1884)		16/05/2008	18/12/2008	No information			No information												
123		Gogarburn Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		Intermediate Section 6A																			
124		E & M Installation 6A	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
125		Earthworks		30/05/2008	No information	No information			No information										30/04/2009		INF CORR 1472 received 18 May 09
126		Depot Building	Successor to Earthworks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
127		Depot Substation	Successor to Earthworks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
128		Trackwork	Successor to Earthworks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		Intermediate Section 7A																			
129		E & M Installation 7A	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
130		Access Roads			21/12/2007	No information			No information												
131		Gogar Landfill (Contaminated Land)			21/12/2007	No information			No information											24/07/2008	start instruction by INF CORR 053 further impact via tco 146
132		Gogarburn Bridge (S29)			No information	No information			No information												
133		Gogar Culvert No.1 (S30)		16/05/2008	No information	No information			No information											05/12/2009	tco 30 via INF CORR 1319
134		Gogar Culvert No.2 (S31)			No information	No information			No information												
135		Gogar Culvert No.3 (S34)			No information	No information			No information												
136		Gogarburn Retaining Walls (W14)			27/03/2009	No information	14/02/2010		No information												
137		Trackwork Gogarburn To Ingliston (CH 0 to 1750)			21/12/2007	No information			No information												Gogar Farm Road 7
138		Ingliston Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
139		Trackworks Ingliston to Airport (CH 1750 to 2583)		16/05/2008	27/03/2009	No information	14/02/2010		No information												
140		Airport Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
141		Ingliston Sub Station		16/05/2008	No information	No information			No information												

date selected in the programme

marked available by tie

PPA — marked as Partial Possession Available by tie

			source of information	contract dates	MUDFA 7.3	MUDFA 8	Site Access Maps		Rev.3 Input	Site Access Maps									tie Change Order	Correspondence	Commence Works	Notes
			date data	15/05/2008	31/08/2008	28/03/2009	04-Feb-10	05-Mar-10	13-Mar-10	26-Mar-10	02-Apr-10	16-Apr-10	10-May-10	25-May-10	15-Jun-10	18-Jun-10	30-Jul-10		see notes	see notes		
			date information received	15/05/2008	03/10/2008	06/05/2009	05-Feb-10	11-Mar-10	13-Mar-10	06-Apr-10	09-Apr-10	23-Apr-10	13-May-10	27-May-10	17-Jun-10	24-Jun-10	30-Jul-10		see notes	see notes		
			received via	contract	INF CORR 205	INF CORR 1271	INF CORR 4031	INF CORR 4303	e-mail re (1)(3)	INF CORR 4115	INF CORR 4574	INF CORR 4726	INF CORR 5022	INF CORR 5109	INF CORR 5335	INF CORR 5408	INF CORR 5713		see notes			
DWA		Designated Work Areas (DWA)	Notes on DWA																			
		Intermediate Section 1A																				
1		E & M Installation 1A (Newhaven to Ocean Terminal)	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
2		E & M Installation 1A (Ocean Terminal to Foot of the Walk))	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	07/07/2010	Photograph
3		Lindsay Road Retaining Walls Wall B (W1)		31/10/2008	27/03/2009	14/09/2009	08/03/2010	02/04/2010	01/06/2010	02/05/2010	02/06/2010	17/06/2010	17/06/2010								07/07/2010	Photograph
4		Lindsay Road Retaining Walls Wall A (W1)																				
		Road Works																				
5		CH 0700 to 0850		31/10/2008	27/03/2009	24/11/2009	11/05/2010	10/05/2010	01/07/2010	01/06/2010	01/06/2010	01/06/2010	14/07/2010	26/07/2010	27/07/2010	27/07/2010	PPA					
6		CH 0300 to 0700							01/06/2010	06/04/2010	12/04/2010											
7		CH 0000 to 0300					08/03/2010															
		Track Works																				
8		CH 0 to 265		31/10/2008	27/03/2009	24/11/2009	08/03/2010	10/05/2010	01/06/2010	01/06/2010	01/06/2010	01/06/2010	14/06/2010	28/06/2010	21/06/2010	21/06/2010	05/07/2010					
9		CH 265 to 425					11/05/2010															
10		CH 425 to 475																				
11		CH 475 to 600											14/07/2010	26/07/2010	27/07/2010	27/07/2010	PPA					
12		CH 600 to 700																				
13		CH 700 to 850							01/07/2010													
14		Newhaven Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
15		Leith Sands Sub Station		31/10/2008	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information					
		Road & Track Works																				26/07/2010 (Photograph)
16		CH 850 to 1050		31/10/2008	30/01/2009	24/11/2009	11/05/2010	31/05/2010	01/07/2010	01/07/2010	01/07/2010	01/06/2010	14/07/2010	26/07/2010	27/07/2010	27/07/2010	PPA					
17		CH 1050 to 1410					01/06/2010					01/07/2010	01/07/2010		23/06/2010	23/06/2010	23/06/2010					
18		CH 1410 to 1860			12/10/2007			01/11/2010	31/07/2010	29/11/2010	06/12/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010					including working space
19		Victoria Dock Access Bridge (S161) (CH 1210 to 1430) ?			30/01/2009	25/09/2009																including working space
20		Tower Place Bridge (S171 (CH 1430 to 1650)			12/10/2007	14/09/2009																
21		Ocean Terminal Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Road & Track Works																				
22		CH 1850 to 1880		31/10/2008	12/10/2007	24/11/2009	01/06/2010	01/11/2010	01/10/2010	29/11/2010	06/12/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010					
23		CH 1880 to 2110			27/03/2009	16/12/2009						30/11/2010	30/11/2010	30/11/2010	30/11/2010	30/11/2010	30/11/2010					
24		Port of Leith Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Road & Track Works																				
25		CH 2110 to 2340		31/10/2008	27/03/2009	16/12/2009	01/06/2010	01/11/2010	01/12/2010	29/11/2010	06/12/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010	30/09/2010						05/07/2010 (Photograph)
26		CH 2340 to 2730			No information		01/06/2010			31/05/2010	31/05/2010	31/05/2010	01/07/2010	01/07/2010	01/07/2010	01/07/2010						
27		Bernard Street Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Intermediate Section 1B																				
28		E & M Installation 1B	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Road & Track Works																				
29		CH 0 to 100		01/08/2008	19/12/2008	31/07/2009	19/07/2010	31/03/2010	01/04/2010	30/04/2010	30/04/2010	30/04/2010	21/05/2010	30/07/2010	30/07/2010	30/07/2010						
30		CH 100 to 350	Traffic management constraints dictates that road widening needs to be constructed first to create sufficient road width to construct the trackwork in the centre of the road whilst still maintaining two way traffic on Leith Walk			23/09/2009																
31		CH 350 to 600																				
32		CH 600 to 850																				
33		CH 850 to 950																				
34		CH 950 to 1250																				
35		Foot of the Walk Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
36		Leith Walk Sub Station		01/08/2008	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information					
37		Balfour Street Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Intermediate Section 1C																				
38		IE & M Installation 1C	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Road & Track Works																				
39		CH 0 to 375		31/10/2008	25/11/2008	21/10/2009	01/09/2010	27/09/2010	16/07/2010	14/08/2010	14/08/2010	14/08/2010	14/08/2010	29/08/2010	01/02/2011	30/09/2010	No information					
40		CH 375 to 450														07/09/2010	No information					
41		CH 450 to 700 Phase 1	Possible to undertake some phases in a different sequence to Programme Revision 1 and therefore can create separate DWA			17/11/2009			10/09/2010	25/08/2010	25/09/2010	25/09/2010	25/09/2010	10/10/2010	01/02/2011	No information	No information					
42		CH 450 to 700 Phase 2													01/02/2011	No information	No information					
43		CH 450 to 700 Phase 3													01/02/2011	No information	No information					
44		CH 450 to 700 Phase 4													01/02/2011	No information	No information					
45		CH 450 to 700 Phase 5													01/02/2011	No information	No information					
46		CH 450 to 700 Phase 6													01/02/2011	No information	No information					
47		CH 700 to 850	As a result of the large difference in road levels between actual and proposed DWA needs to be full road width to maintain two lanes of		08/03/2009	15/12/2009		23/06/2010	09/07/2010	18/07/2010	18/07/2010	20/07/2010	20/07/2010	16/08/2010	10/05/2010	10/09/2010	01/10/2010					
48		CH 850 to 1000				17/12/2009		05/10/2010	04/11/2010	24/10/2010	24/10/2010	26/10/2010	30/10/2010	30/10/2010	06/12/2010	15/11/2010	05/11/2010					
48a		CH 1000 to 1360				01/11/2009																
49		McDonald Road Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
50		Picardy Place Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
51		Cathedral Sub Station		31/10/2008	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information	No information		N/A	N/A	N/A	N/A	
52		St Andrews Square Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
		Intermediate Section 1D																	N/A	N/A	N/A	
53		IE & M Installation 1D	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
		Road & Track Works																				
53		CH 1360 to 1560 & 0 to 280		16/12/2008	27/03/2009	17/07/2009	Subject to PSSA (18/10/2009)															07/08/2009 As Built
54		CH 280 to 440 Phase 1			21/11/2008	24/09/2009			No information													07/08/2009 As Built
55		CH 280 to 440 Phase 2							No information													07/08/2009 As Built
56		CH 280 to 440 Phase 3							No information													07/08/2009 As Built
57		CH 280 to 440 Phase 4							No information													24/6/2010 (Photograph)
58		CH 440 to 850			28/11/2008	05/09/2009	08/02/2010		15/09/2010						05/08/2010	05/08/2010						24/6/2010 (Photograph)
59		CH 850 to 940 Phase 1			15/12/2008	10/08/2009										05/08/2010						24/6/2010 (Photograph)
60		CH 850 to 940 Phase 2 & 3							16/06/2010							05/08/2010						28/05/2010 (Photograph)
61		CH 940 to 1125 Phase 1														05/08/2010						28/05/2010 (Photograph)
62		CH 940 to 1125 Phase 2														05/08/2010						28/05/2010 (Photograph)
63		CH 940 to 1125 Phase 3														05/08/2010						28/05/2010 (Photograph)
64		CH 1125 to 1250 Phase 1			27/03/2009	21/08/2009	07/04/2010	02/06/2010		04/06/2010	04/06/2010	22/06/2010	28/06/2010	13/07/2010	09/08/2010	05/08/2010						28/05/2010 (Photograph)
65		CH 1125 to 1250 Phase 2														05/08/2010						28/05/2010 (Photograph)
66		CH 1125 to 1250 Phase 3														05/08/2010						28/05/2010 (Photograph)
67		CH 1125 to 1250 Phase 4							12/10/2010							05/08/2010						28/05/2010 (Photograph)
68		CH 1125 to 1250 Phase 5														05/08/2010						28/05/2010 (Photograph)
69		CH 1125 to 1250 Phase 6														05/08/2010						28/05/2010 (Photograph)
70		CH 1125 to 1250 Phase 7														05/08/2010						28/05/2010 (Photograph)
71		Princes Street West Tram Stop	Successor to road & track works	N/A	N/A	N/A	Subject to PSSA (18/10/2009)															
72		Shandwick Place Tram Stop	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
		Intermediate Section 2A																				
73		IE & M Installation 2A	Successor to road & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
74		Haymarket Viaduct (S19)		15/04/2008	No information	12/03/2009			No information	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
75		Haymarket Tram Stop	Successor to S16 & track works	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	
76		Haymarket Substation	Successor to S19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
77		Trackwork Haymarket to Roseburn (CH 0 to 780)		15/04/2008	04/12/2008	18/05/2009			No information													
		Intermediate Section 5A																				