
Report on investigations into delays incurred to
certain elements of the Infraco Works

in relation to the

The Edinburgh Tram Project

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Executive Summary

1. This report has been prepared to investigate and, where possible, identify areas of culpability for delays incurred to commencement, progress and completion of certain key elements, and hence Sectional Completion Dates A, B C & D, of the Infraco Works.
2. The investigations carried out to date indicate that **both parties to the Infraco Contract bear some responsibility for the delays incurred**. There is also the potential the SDS has contributed to those delays. Our current opinion on the parties respective culpability for delay has been summarised within '**Appendix (i)**' attached to this report.
3. These investigations have identified a number of key areas of further investigation and/or audit which are required in order to more accurately establish the precise measure of each party's culpability. As a consequence, a number of **recommendations** have been made within the main body of this report in relation to matters such as (i) the reasons for delays to IFC package issue dates (both original and revised packages); (ii) the dates when the Infraco Design was issued to SDS; (iii) the INTC process; and (iv) Infraco sub-contractor procurement. Items (i) and (ii) above are key areas of uncertainty where delays have occurred but the reasons for same are uncertain.
4. We have also made further recommendations in respect of **tie** maintaining a detailed INTC Master List Schedule, a more comprehensive IFC tracker process and the contemporaneous compilation of a detailed as-built programme.
5. For each of the Sectional Completion Dates we note the following in respect of our current estimate of liability for delay:-

1	2	3	4	5	6
Sectional Completion Date	Overall Projected Delay	Estimated tie culpability		Estimated Infraco culpability	Report Section
Section A	57 weeks	Lower Limit	26 weeks	14 weeks	Section 3
		Upper Limit	43 weeks	32 weeks	
Section B	57 weeks	Lower Limit	26 weeks	14 weeks	
		Upper Limit	43 weeks	32 weeks	
Section C	61 weeks	Lower Limit	61 weeks	0 weeks	Section 4
		Upper Limit	61 weeks	0 weeks	
Section D	61 weeks	Lower Limit	61 weeks	0 weeks	
		Upper Limit	61 weeks	0 weeks	

Note: The delay periods are measured against a mitigated view of Infraco's Revision 3 Setp 4 Issue 3 programme. Agreement has yet to be reached with Infraco as to the achievability of those dates.



6. In respect of **Section A** (Depot), **tie's** liability for delay is estimated to be between **25 to 43 weeks** (out of a total delay analysed of **57 weeks**). That is likely to give rise to a liability for area specific prolongation costs. Please refer to **Section 3** of this report for further details. Regarding the **Section B** date, although the projected delay is presently noted above as corresponding to the Section A delay, this is at risk of being further delayed due to the issues arising at Gogar landfill (please refer to paragraph 3.3.2(i) below).
7. **tie** culpability for delays to the **Section C** date is in all probability estimated to be the full period of the projected delay of **61 weeks** forecast by the most recent mitigation exercise (section **4.7** refers). This assumes that the Infraco's interpretation of how extension of time for Notified Departures (late completion of MUDFA Works) is not supported by the Adjudicator in the 'MUDFA Revision 8 Estimate' dispute decision. If it is, **tie's** potential liability for delay could be much higher (potentially circa. 100 weeks.) This is also likely to give rise to a **tie** liability for **project level prolongation costs**. **Section 4** of this report refers. The measure of prolongation costs to which Infraco may be entitled however, is not necessarily inextricably linked to the period of extension of time to which it is entitled. Matters such as concurrency and causation of the particular loss claimed will feature in any analysis of entitlement to additional payment. Failures on the part of SDS where proven by further audit and analysis may also entitle **tie** to deduct sums from payments due to Infraco. Detailed analysis of the costs ultimately claimed by Infraco will be required to ensure that any sums claimed is properly due taking all of the above into consideration.
8. The measure of the delay which will actually be incurred however is dependent upon Infraco's implementation of mitigation and/or other acceleration measures which could be adopted to limit the delays actually incurred. Agreement on such measures has yet to occur.
9. In this regard, at intermediate and sub-section level in particular, there is considerable evidence of **Infraco culpability for delay** in the various elements within Sections 2¹, 5 & 7. This is highlighted within '**Appendix (i)**' attached. It is stressed that whilst this may not translate into a disallowable period of extension of time for the Section C date, it does/should preclude both Infraco and its sub-contractors' from an entitlement to recovery of the prolongation costs incurred during those periods of culpable delay. Much will depend on the nature and type of costs claimed or yet to be claimed.

¹ Section 2 does not form part of this current exercise and report; Section 2 is not considered as important in terms of overall project delays.



10. It is important to note that the assessment of estimated culpability detailed above includes matters known about up to end of April 2010. Latest predictions on completion of the MUDFA Works show further slippage from the dates used in this analysis. As matters and construction progress, culpability is likely to change as the causes of delay change or responsibility moves from one party to another. It is therefore essential that **tie** continues to closely monitor, record and analyse progress of the various elements of the Infraco Works.



Section 1 Introduction

1.1 Formal details

1.1.1 This report has been prepared by **Robert Burt** (Director) and **John Hughes** (Consultant), both of Acutus. Assistance was also provided by **Iain McAlister**, Associate Director at Acutus.

1.2 Instructions and issues to be addressed

1.2.1 On 3 March 2010 Acutus provided an initial view on potential **tie** liability for delay to the Infraco Works (Acutus email of 3 March 2010 refers). A subsequent meeting was held on 10 March 2010 between **tie** and Acutus to discuss those initial conclusions. At that meeting it was agreed that a further process of investigation would be undertaken by Acutus. Those investigations were to focus on certain 'prioritised' elements of the Infraco Works which were jointly identified as being likely to be critical to overall progress and completion. 27 'elements' were selected out of a total of 80 sections/areas which together form the Infraco Works. It was further agreed that a deadline of 12 May 2010 would be set for Acutus to report back to **tie**. A draft report was issued for discussion on that date.

1.2.2 Subsequent to the issue of that draft report, meetings were held with the **tie** personnel on 3 and 8 June 2010 to discuss issues arising from same. This final report incorporates the comments made and further information received.

1.2.3 Each element was given a priority level code² depending on the then perceived level of importance in respect of progress and delay to the relevant Sections and Sectional Completion Dates. Those prioritised elements are set out in the table below.

Priority level	Intermediate Section	Description of area / structure
1	1A4	Lindsay Road RW -W1
1	1A4	Road and Track
1	1A3	Victoria Dock Bridge - S16
1	1A3	Tower Place Bridge - S17
1	1A1	Road and Track
1	1B	Road and Track
1	1C2	Road and Track

² Priority level '1' being considered to have more relevance in terms of effect on progress and delay than level '2'



Priority level	Intermediate Section	Description of area / structure
1	1C3	Road and Track
2	5A	Russell RD RW - W3
1	5A	Russell RD RW - W4
1	5A	Murrayfield TS RW - W18
2	5A	Murrayfield TS
1	5A	Roseburn Viaduct - S21A
2	5A	Murrayfield Stadium Underpass - S21C
2	5A	Water of Leith Bridge - S21E
1	5A	Baird Drive Retaining Wall - W8
1	5A	Balgreen Road Bridge - S22A Incl. Balgreen Road Retaining Wall W9
1	5A	Balgreen Road Bridge - S22B
2	5B	Carrick Knowe Bridge - S23
2	5B	Road and Track
2	5C	Road and Track
1	5C	A8 Underpass - W28
1	5C	Depot Access Road Bridge - S32
1	6	Depot Building
1	6	Roads & Track – Depot
1	7a	Track - Section 7
1	7b	Gogarburn RW - W14/W15

1.2.4 The main objectives of this exercise were to identify, as far as possible within the time and from the records available:-

- a) the key matters which had caused or were causing delay to the elements under investigation, including delay to commencement, progress and projected completion;
- b) to identify areas of concurrent delay and express a view on the significance of same;
- c) to express our current opinion on the extent of **tie** liability in respect of delay to each element and from those elements the likely liability in respect of the Sectional Completion Dates; and
- d) to identify any areas of further investigation (including possible audits of Infraco’s files) which may be required.

1.2.5 It is anticipated that the output from this and other future exercises, undertaken by **tie** or others, will assist and inform decisions in respect of extensions of time and additional payment at Sectional Completion level. This process will also provide a platform from



which **tie** can assess, and if necessary defend, claims for additional payment from Infraco and/or its sub-contractors at Section and intermediate section level. It will also inform project risk profile considerations.

- 1.2.6 This report and the appendices attaching hereto, summarises our findings and opinion in respect of the above.

1.3 Information, data and documentation provided

1.3.1 Information and data required for the investigations, was identified and generally requested via a series of email questionnaires issued in respect of each element³. That information was subsequently provided by **tie** either by email or during discussions with **tie** personnel.

1.3.2 That said, during the investigations it became apparent that in some instances certain important data was not always / readily available. As a consequence, we have made specific recommendations within the subsequent sections (where relevant) regarding, for example, the need for further audits to be carried out by **tie** (including the type of information and documentation required to be recovered from Infraco during that process). For ease of reference any such 'recommendations' have been indicated thus "**Recommendation: ...**".

1.3.3 As noted above, a timescale for this exercise was set whereby it was agreed that Acutus would report back to **tie** on 12 May 2010. Further information was provided by **tie** personnel over the period from 1 June 2010 up to the completion of this final report. Due to the relatively short timescales, for the most part the information, data and advice upon which the current exercise and opinion is based, has been provided by **tie** personnel. That process is to be distinguished from separate interrogation and verification of the contemporaneous project evidence files by ourselves. While we have no reason to doubt the information and data provided, time has not permitted independent corroboration of the majority of that information.

³ Questions in respect of structure related questions were issued under cover of emails dated 22 March 2010, 23 March 2010, 12 April 2010, 19 April 2010, 22 April 2010, 26 April 2010 and 29 April 2020 refer. Separate emails were issued in respect of contractual questions, design processes and INTC data.



1.4 Meetings held

1.4.1 A number of meetings were held with various **tie** project management staff over the course of the investigations. In this regard, meetings and/or telephone discussions were held with the following individuals:-

- a) Malcolm Butchert and Alisdair Dickinson (in respect of intermediate section 1A);
- b) Phil Dobbin (in respect of intermediate section 1B);
- c) David Burns (in respect of intermediate section 1C);
- d) Tom Cotter (in respect of intermediate sections 5A & 5B);
- e) Andrew Scott (in respect of intermediate sections 5C, 6 & 7); and
- f) Colin Neil.

(Note: Section 2 was not included in this exercise due to the fact that it was not considered to be a priority in terms of progress and/or delay to the overall Infraco Works)

1.4.2 Further meetings and dialogue were held with Damian Sharp (in respect of design processes and data), Fiona Dunn (re commercial issues such as INTC's and sub-contractor procurement) and Tom Hickman (regarding planning and as-built data).

1.4.3 It is relevant to note that all **tie** personnel were extremely helpful and willing to assist in this process, providing whatever assistance they could (often outwith normal working hours).



Section 2 Preamble to analysis and conclusions

2.1 Generally

2.1.1 The investigations and analysis focussed on the following key headings which were highlighted as being consistently significant in terms of progress and delays. Those headings are:-

- A. The “Issue For Construction drawings” (**‘IFC’ process**) – see report section **2.2** below and Section ‘A’ of each individual appendix;
- B. The “Infraco Notice of tie Change” (**‘INTC’ process**) – see report section **2.3** below and Section ‘B’ of each individual appendix;
- C. The progress and completion of the **MUDFA Works or other utility works** – see report section **2.4** below and Section ‘C’ of each individual appendix;
- D. **‘Other’** matters such as sub-contractor procurement by Infraco, Work Package Plan (WPP) submissions by Infraco, the Infraco IDR/IDC process and other structure or area related issues arising during the investigations. See report section **2.5** below and Section ‘D’ of each individual appendix;
- E. Comparison of the **construction periods** included within Infraco’s Revision 1 and Revision 3 programmes – see report section **2.6** below and Section ‘E’ of each individual appendix; and
- F. **Availability of specific areas** (whether in whole or in part) – see Section ‘F’ of each individual appendix.

2.1.2 For consistency, progress and delays attaching to each element has been considered under each of the above headings.

2.1.3 Prior to outlining the specific findings in respect of each prioritised element it is prudent to make the following general comments in respect of each of the key headings.

2.2 IFC process

2.2.1 A key issue identified in a number of instances was the availability of design such that the works could commence or progress could be maintained. Matters such as late release of the IFC by the date identified in the Programme or a material breach by SDS in



performance of its obligations are Compensation Events under the Infraco Contract⁴. Those matters *may* give Infraco an entitlement to additional time and payment but only where they have been established as the direct cause of delay to the Works (albeit that Infraco entitlement to any additional payment is also subject to certain potential deductions as set out in Clauses 65.12.2 and 65.13). It is therefore important to identify and establish, as far as possible, whether any such Compensation Events were “... *the direct cause of a delay in achievement of the issue of a Certificate of Sectional Completion* ...” (emphasis added).

2.2.2 In addition, questions surrounding Infraco’s management⁵ (or otherwise) of SDS and the IFC process generally were also raised by **tie** during the current exercise. That, together with the provisions of Clause 19.19⁶, **tie**’s liability for delays in respect of **tie** Changes and third party approval delays, render it essential that the ‘cause’ of any delay to the IFC’s be established (as distinct from merely identifying that a delay in IFC issue has occurred).

2.2.3 As a consequence, during the current exercise we requested and were provided with, a copy of **tie**’s “*SDS Approvals tracker*”⁷. That document provided information relating to the dates on which the ‘first’ IFC packages were planned to be issued and when/if they were actually issued. From that data we were able to establish whether any delay had in fact occurred to the (first) IFC.

2.2.4 It is apparent however that certain further information is required in order to establish, with a greater degree of certainty, the culpability for any such delay in IFC issue. That further information is not presently available, as further explained below:-

a) ‘Cause’ of delays to Initial IFC: the “*SDS Approvals tracker*” monitors only the issue of, and delays in respect of, the first IFC for each ‘package’. It does not however specifically identify the ‘cause’ of that delay. Potential causes of delay may include one or more of the following:-

- i. late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);

⁴ Clause 65 and Compensation Events (t) and (u) respectively

⁵ Clauses 11.3 & 11.4 of the Infraco Contract refer

⁶ Clause 19.19 limits tie’s liability for Compensation Events in certain circumstances related to failures on the part of Infraco

⁷ Copy provided to us was the MS Excel file ref. ‘SDS Approvals tracker – download at 6 April 2010.xlsm’



- ii. a material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- iii. a failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule Part 14 (clause 19.19 refers);
- iv. a **tie** Change;
- v. A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC/NR interface); and/or
- vi. A requirement of CEC/NR for which tie will bear responsibility;

No doubt there are a number of other potential causes of delay not identified above. However, until further details are available it is not possible (in the majority of instances) to establish with any certainty the cause of and culpability for delay in the issue of the IFC's.

Recommendation: tie should (on a focussed basis) carry out an audit of identified IFC packages against which critical delays may have occurred.

Recommendation: a significant delay has been identified in respect of the design for **Roseburn Viaduct** within Intermediate Section 5A. Delay in the region of **114 weeks** is now forecast to be incurred to the IFC (incorporating the VE design) for this structure (see Appendix 11). This structure is crucial to the works in 5A which itself is key to completion of the 'off-street' works within Sectional Completion C. As a consequence, it is recommended that a detailed audit of this process of, and delays to, the design of this structure is undertaken.

- b) **Revised IFC drawings:** the current "*SDS Approvals tracker*" monitors only the first IFC issued in respect of each 'package'. It does not track either the timing of, or reasons for, the re-issue of subsequent revised IFC's for those packages.

Recommendation: tie should consider implementing a wider, more comprehensive IFC tracker capable of monitoring the subsequent revised issues of each IFC. That tracker should also endeavour to identify the reasons and culpability for the revisions made. This will more readily inform any subsequent analysis of delays.



- c) **Infraco Design:** there is no data presently available (to ourselves or **tie**) that can inform us as to when Infraco provided its design to SDS. We understand that although **tie** has requested this information from Infraco, it has refused to provide this information. This however affects, among other things, the consideration of Clause 65(t) and **tie's** ability to apply clause 19.19 where or if appropriate.

In this regard, we are advised that an audit is planned on selected areas of design which should retrieve this type of information (at least for the areas considered by the audit). We understand the proposed audit will also address (or attempt to address) retrieval of information on how, or how effectively, Infraco managed SDS. That information however is not yet available.

Recommendation: **tie** should press Infraco for the provision of data surrounding the provision of the Infraco Design to SDS.

- 2.2.5 As a consequence of the above, we have endeavoured where possible to identify the most likely causes underlying the delays. There is however some uncertainty surrounding the establishment of culpability for these delays. That uncertainty however could be addressed by the data obtained by implementation of the recommendations above.

2.3 INTC Process

- 2.3.1 A number of issues arise in respect of the INTC process. We have summarised those issues below together with notes on any interim assumptions made in respect of same.

- a) **INTC Master List: Recommendation** – **tie** may wish to consider maintaining a central master INTC schedule which monitors the various components⁸ of the INTC process. That master list is likely to save time in the future locating the relevant details surrounding individual INTC's.
- b) **INTC's included in the current analysis:** we have relied on the **tie** project managers to highlight the key INTC's which have affected commencement, progress and delays to individual structures. A separate exercise is also underway by the **tie** commercial

⁸ Those components include (but are not necessarily limited to) data concerning the relevant location / structure, date Estimate required; relevant (reasonable) extended date for provision of the Estimate; whether revised Estimate required; date Estimate(s) issued; date of tie Change Order; whether subject to 80.13 instruction (and date); whether referred to DRP; date of reference to DRP; whether 80.15 instruction issued by tie; outcome of DRP and other Comments. An example of the type of master list was provided (and used) as part of this current exercise. That data could also be compiled using a database application if that format is preferred by **tie**.



team, where the current INTC master list is being populated with the relevant data. When complete, the master list will facilitate identification of all INTC's applicable to specific individual areas or structures, thus permitting a more comprehensive analysis to be undertaken. That exercise however is not yet complete – hence our reliance on the INTC's identified by the project management personnel.

Recommendation: that the **tie** commercial team continues to compile and maintain a detailed master list of all INTC's (and related data) in either Excel or database format.

- c) **Period for provision of Estimate:** Clause 80 provides that Estimates shall be provided by Infraco within an 18 Business Day period, unless an extended period is agreed by the Parties. We understand that few extensions were agreed by the Parties. There is also no data available to inform us as to **tie**'s position on any reasonable extended period. Time has not permitted us to review the contents of each INTC in order to arrive at a view on a reasonable⁹ period for the provision of that Estimate. We have therefore, by necessity, proceeded on the basis that the 18 Business Day period applies to each INTC. It should therefore be borne in mind that this position could be subsequently challenged by Infraco and that a period longer than 18 Business Days may be held by a third party as being applicable / more reasonable.

Period for tie to review and respond to Estimates: in the current analysis we have not allowed any specific 'default' period for **tie** to review and respond to Estimates provided by Infraco. While it is accepted that this period will vary depending on the contents and nature of the Estimate, time has not permitted a review the contents of the various Estimates to establish for ourselves what we would consider to be a reasonable period. In any event it is also noted that Compensation Event (x) renders **tie** liable for the "*delay arising between the date tie is notified of a Notified Departure and the actual date on which tie issue a tie Change Order in respect of such Notified Departure*" (where that CE is the direct cause of delay).

As such, the time taken by **tie** beyond receipt of the Estimate has been attributed to **tie** as a period for which it is likely to be culpable. That position is generally in line with the advice received from DLA on 24 March 2010 (email timed at 15:44), where it was

⁹ Please refer to item 4 of the DLA advice note dated 16 January 2010.



noted that “... to avoid further delay/cost consequences, it would be open to tie to refer the Estimate for determination in accordance with DRP”.

- d) **Period taken by Infraco to issue INTC:** the recent exercises have identified a number of instances where significant periods of time have elapsed between an IFC issue date and the date on which Infraco has notified tie of an INTC. As an example, INTC 374 was notified on 26 February 2010. We are advised however that the Geotechnical IFC for this area was available to Infraco on or around 18 December 2008. That equates to a period of 62 weeks prior to notification. On the face of it that period is unreasonable and raises questions as to Infraco’s management of this process and the Works generally. Other similar examples are prevalent throughout several elements. Note: the Infraco Contract does not make specific provision for notification of INTC’s within a specific period.

Recommendation: that discussions are held with, or advice sought from, DLA to establish whether excessive time taken to notify INTC’s is a failure / breach by Infraco of its general obligations under the Contract.

- e) **Effect of 80.13 instruction:** we have been provided with a copy of tie’s letter dated 19 March 2010 issuing an 80.13 instruction in respect of a number of INTC’s. We also understand that Infraco has disputed the validity of an instruction under that clause. For present purposes we have proceeded on the premise that the tie 80.13 instruction is valid. In the event that it is found not to be valid, the conclusions concerning culpability for delay associated with those INTC’s may change. In this regard we have also proceeded on the premise that the issue of an 80.13 instruction by tie will not ‘open the door’ for Infraco to somehow argue that such an instruction could/should have been issued earlier. This is particularly relevant to circumstances where Infraco was in significant delay in the provision of Estimates for INTC’s prior to the issue of an 80.13 instruction. Whilst it is considered unlikely that Infraco would be successful in prosecuting such an argument it may be prudent to discuss this with DLA.

2.4 MUDFA and/or other utility works

- 2.4.1 Information regarding completion or projected completion of MUDFA or other utility works was obtained from two principles sources, being (i) information obtained from tie project



management personnel and (ii) the marked up photographs of the various sections produced by **tie** at periodic intervals.

Recommendation: that **tie** maintains a central database of MUDFA / utility commencement / completion dates (that information has proven difficult to extract).

2.5 Other

2.5.1 Sub-contractor procurement: data in respect of Infraco's procurement of its sub-contractor's was obtained from two principle sources, being (i) a copy of **tie**'s audit report dated February 2010; and (ii) section 4.1.2.1 and Appendix 10.6 of the Infraco Period Report 3-1 to 24 April 2010. Review of that documentation shows that Infraco has not operated the procurement process in accordance with the Infraco Contract. This could have significant commercial implications as events unfold. In terms of the effect of the procurement process on progress and delays however, the investigations focussed on gaining an understanding of whether the procurement of sub-contractors affected progress of the Infraco Works themselves. In this regard, we note that it is quite possible that the issue of letters of intent (LOI's), as opposed to formal sub-contracts, could lead to delays to either a start on site or progress on site. That is particularly so because the LOI's issued by Infraco all appear to have restricted 'authorised value limits'. It is therefore important to understand whether, and in what way, this process actually affected the sub-contracts in question. That information however is not available from the audit; nor is it available from the Infraco Period Reports. The audit itself identifies this as a further action (at page 4 "Further Audit Requirements", where, in the last two sentences 'scope' and 'timeline' is discussed).

Recommendation: that a further audit is carried out by **tie** (as planned) which goes towards establishing the timing and details of the various extensions to the sub-contractor's letters of intent. That audit should also aim to gain sight of (or retrieve copies of) relevant correspondence between Infraco and the sub-contractors. That information should in turn assist in identifying whether this process caused delays to commencement / progress. Please note however that our initial conclusions in respect of the prioritised elements indicate that sub-contractor procurement process was not a significant obstacle to commencement or progress. This is explained in detail within the relevant appendices.



2.5.2 Infraco IDR/IDC process: Following discussions with Damian Sharp at **tie**, we understand that the original intent behind the provisions of Schedule Part 14 was that SDS would have its Inter-disciplinary Design Check (IDC) in place before issue of the IFC; and that Infraco's IDR/IDC would occur after that point. That is, Infraco would 'complete' its element of the design following receipt of the first IFC from SDS. As such, the 'IDC' shown in the flow chart at paragraph 2.2.13 in Schedule Part 14, was apparently intended to relate to the SDS IDC (not Infraco's IDC). That said, it was explained that the flow chart *could* also apply to the subsequent Infraco design process but in a separate timescale (it is this separate timescale that needs to be better understood). It was also explained that it was not anticipated that SDS would update its IFC for subsequent Infraco design input or change requests. However, it is apparent that this is now occurring such that revised IFC's are being issued by SDS following integration of Infraco Design; with Infraco submitting Compensation Event notices under CE(t). We have been unable to establish where the Infraco IDR/IDC process sits in terms of the contractual timeline.

In addition, we have not yet located where or if it is explicitly stated, or impliedly included, in the Infraco Contract that the Infraco Design has to be in place before construction starts (this may however fall out of Schedule Part 14 Part A clause 7). This should be discussed further to ensure that **tie**'s position on this issue is protected. Other related contractual issues arising during our discussions with Damian Sharp include:-

- a) Does Compensation Event '(t)' relate only to the first IFC in respect of the 112 listed in the Design Delivery Programme (currently the projection is that 262 IFC's will be issued)?
- b) How should IFC's emanating from the development workshops feature in this process?
- c) How should the inclusion of Infraco's design in a subsequently revised IFC from SDS be addressed?

Recommendation: further investigation (via **tie** audit) into the provision of the Infraco Design and the subsequent timing of the integration of that Infraco Design into the SDS design.

Recommendation: clarification of the contractual issues raised above.



2.6 Comparison of the construction periods included within Infraco's Revision 1 and Revision 3 programmes

2.6.1 Within the individual analysis of each of the prioritised elements, we have undertaken a review of (i) the delay to start of the relevant structure / element; and (ii) any forecast delay to the finish of same.

2.6.2 We have also undertaken a review and comparison of the different construction periods included within the following programmes:-

- a) Infraco Revision 1 Programme;
- b) Infraco Revision 3 Step 4 Issue 3 programme; and
- c) Iain McAlister's opinion on a reasonable mitigated version of Infraco's programme Revision 3 Step 4 Issue 1^[10].

2.6.3 The latter review (of forecast delays to finish dates) necessarily includes consideration of any increased activity durations included within the Infraco Programme Revision 3 Step 4 Issue 3. Those durations have therefore been compared with the Infraco Revision 1 durations. We note however that no information has been provided by Infraco which substantiates the increased duration included in the latest programme.

Compilation of as-built programme

2.6.4 Availability of accurate as-built data is and will be essential to the successful defence, or prosecution, of any claims and/or counterclaims. While some as-built information was made available by tie's project management personnel, the absence of detailed as-built data has hindered the current exercise. As such, it is important to reinforce the value of detailed as-built records and the contemporaneous compilation of a detailed record of as-built progress (ideally in programme format).

Recommendation: that tie allocates a resource (possibly a dedicated resource) to the compilation of an accurate and detailed as-built programme together with evidence files (which support / validate the entries within the as-built programme).

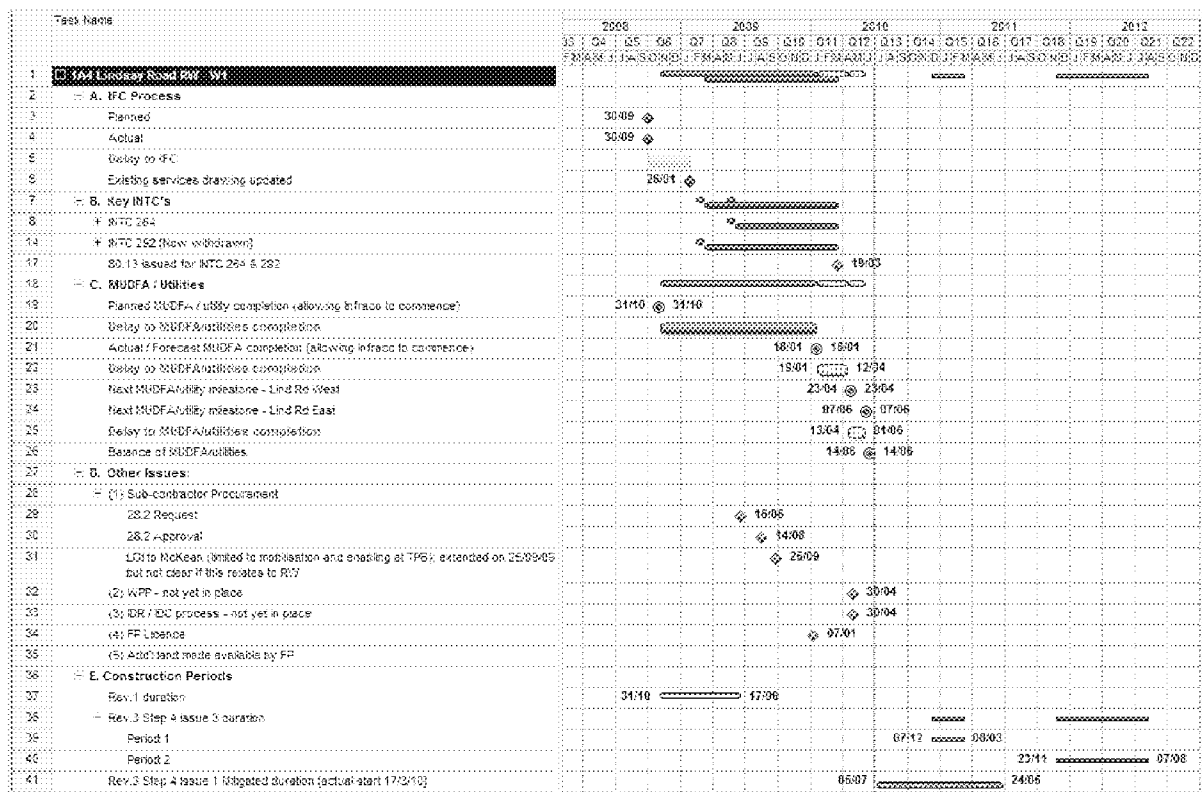
¹⁰ Note: we have used the IM view of Infraco's programme Revision 3 Step 4 Issue 1 (as distinct from Revision 3 Step 4 Issue 3) due to the fact that the Issue 3 exercise has only recently been completed. As such there may ultimately be some minor differences between those two exercises which may require to be reconciled in the future. However for present purposes use of Revision 3 Step 4 Issue 1 provides the information necessary to consider indicative comparisons.



2.7 Process of review and analysis

2.7.1 The following provides a brief overview of the analysis undertaken in respect of each of the prioritised elements.

2.7.2 Summary programme: a simple summary programme has been prepared for each prioritised element identifying key facts in relation to 'A. the IFC Process'; 'B. the INTC process'; 'C. MUDFA / Utilities'; 'D. Other issues'; and 'E. Construction periods'. Illustrating all of the above in a programme allowed us to view the inter-relationship of each of those issues graphically within the correct timeframe. See example below¹¹.



2.7.3 'A. IFC Process': planned and actual IFC issue dates were plotted in respect of the key IFC's for the relevant structure or element. Where a delay was incurred to the IFC, information was sought in respect of the cause of that delay. At this stage, and particularly in relation to the time available, we have necessarily relied upon tie personnel's interpretation of responsibility for the causes of the IFC delay (please refer to section 2.2 above). Delays were indicated by a yellow bar (indicating culpability for IFC delay has to be firmed up; in

¹¹ **Note:** it was necessary to establish a 'cut-off' date for the current exercise (in order to allow interim conclusions to be reached). For the most part a cut-off date of 30 April 2010 was selected (unless noted otherwise).



respect of 1C2, Appendix 7, however culpability for the IFC delay has been shown by a **green bar** indicating **tie** (CEC) culpability).

- 2.7.4 'B. INTC Process': information was obtained from **tie** project management personnel on the key INTC's which were thought to have affected commencement and/or progress. Information was then sought in respect of the key stages in the INTC process including notification date, date Estimate required, date Estimate submitted (if at all) and dates of any applicable 80.13 or 80.15 instruction. Culpability for delays through that process was categorised on the basis as set out at section 2.3 above. **Blue bars** indicate Infraco culpability; **Green bars** indicate **tie** culpability.
- 2.7.5 'C. MUDFA/Utilities': dates of planned and actual MUDFA and/or other utility completions were plotted. Culpability for same was indicated. Again, **blue bars** indicate Infraco culpability; **green bars** indicate **tie** culpability.
- 2.7.6 'D. Other issues': where possible the sub-contractor procurement process was tracked through the various stages including (i) clause 28.2 & 28.4 requests and approvals; and (ii) issue dates of letters of intent. Milestone dates were inserted for each.
- 2.7.7 'E. Construction Periods': where possible each chart contains details of the following constructions periods: (i) Revision 1 programme; (ii) Revision 3 Step 4 Issue 3; and (iii) IM mitigated version of Revision 3 Step 4 Issue 1^[12]. This again allowed us to present a graphical representation of the respective durations within the correct timeframes. An assessment of the delays to start and delays to finish was then undertaken – that process being informed by information provided by, and discussions with, **tie** personnel.
- 2.7.8 'F. tie position on area availability': consideration has also been given to the question of area availability. That is, when in **tie**'s opinion Infraco could / should have commenced works in certain areas. This matter was discussed with the respective tie project management personnel in order to arrive at an opinion on same.
- 2.7.9 Thereafter, within section 'G. Conclusion', we have summarised our opinion, based on the information available, as to the (i) the significant events/issues affecting commencement and/or progress; (ii) concurrent issues/events which may have occurred; and (iii)

¹² See footnote 10 on page 12 above



consideration of any events which would likely be considered to be the dominant cause of the delay to that element or area.



Section 3 'Section A & B' – Conclusions arising from current analysis

3.1 Generally

3.1.1 Section 'A' is defined within Schedule Part 1 as “means completion of the Depot (including energisation) and the first Tram delivered to the Site and assembled and the completion of all tests required by the Employer's Requirements in relation to that Section”.

3.1.2 Two prioritised elements relate to Section A, being (i) the 'Depot Building'; and (ii) 'Roads & Track – Depot'. We note the following in respect of each.

3.2 Section 6

3.2.1 **Section 6 Depot Building:** please refer to **Appendix 16** attached. The table below summarises the respective start / finish dates and activity durations within (incl. delays between) the Revision 1, Revision 3 and IM mitigated Rev.3 programmes.

6 Depot Building (taking Earthworks as start dates)					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	27/06/2008	07/04/2009	40.57 wks	07/04/2009	40.57 wks
Finish	01/06/2010	16/06/2011	54.29 wks	31/12/2010	30.43 wks
Cal. Duration	100.71 wks	114.43 wks	13.71 wks	90.57 wks	-10.14 wks

Our conclusions in respect of delay incurred to this structure can be summarised as follows:-

- (i) 'Significant' issues/events: the significant issues affecting commencement of the earthworks were (i) water main diversion; and (ii) INTC 187. The delay due to water main, causing delay to access – 01/08/08 (planned start) to 18/02/09 (when material start should have commenced). **35 week delay (tie culpability)**. INTC 187 (delay in provision of Estimate) appears to have caused a further **6 week delay to the earthworks (Infraco culpability)**. Thereafter there are questions surrounding Infraco performance in earthworks operations, commencement of foundations and steelwork – causing a **16 week delay** to foundations and steelwork. For the most part, excluding the water main, these appear to be Infraco culpability. That said, issues such as increased workscope in terms of earthworks volumes and foundation increased scope must be taken into account. For present purposes we have allocated a **Split liability for this 16 weeks period** (that is to say the liability



for this 16 week period has been split between the parties – see Appendix 16 attached and table below).

Note: the above is slightly different from previous information supplied to us. That is, previously we understood that **tie's** position was that partial access was available on or around late 2008 (i.e. prior to the completion of the water main). The above however is the explanation we have recently received. If however the earlier **tie** position is correct the balance of culpability shifts more towards Infraco as a result of a failure to commence earlier. The measure of the shift in culpability is likely to be in the region of **6-10 weeks**.

- (ii) Concurrent issues: there is a question of the completion of the water main diversion (to 05/05/09) being concurrent. This however was not seen as critical to the building. No doubt Infraco will however focus on this and the time periods taken by **tie** for issue of TCO's.
- (iii) Considerations of dominance: water main work will be difficult to argue as being anything other than dominant until 18/02/09 (but see note above). Thereafter, the delays to commencement of earthworks, foundations and steelwork are critical.
- (iv) As such, our current opinion on allocation of culpability can be summarised as follows:-

Description	Opinion on tie culpability	Opinion on Infraco culpability
Delay to Start	<i>Range of 25 to 35 weeks</i>	<i>Range of 6 to 16 weeks</i>
Delay up to Steelwork erection: further 16 week delay. This may have been caused by late procurement of steelwork (hence lower range of 0 weeks); but some allowance may also be due for increased earthworks and foundation work (need more detailed as-built data to conclude). There is also a further risk regarding Depot doors.	<i>Range of 0 weeks to 8 weeks</i>	<i>Range of 8 weeks to 16 weeks</i>
Lower limit:	25 weeks	14 weeks
Upper limit:	43 weeks	32 weeks

3.2.2 **Section 6 Roads & Track – Depot'**: please refer to **Appendix 17** attached.

Our conclusions in respect of delay incurred to this element can be summarised as follows:-



- (i) 'Significant' issues/events: There appear to be five main issues affecting this element. Those are (i) the water main delay; (ii) INTC 187; (iii) the delay to issue of the Roads IFC¹³; (iv) the delay to drainage design; and (v) delays to the OLE foundation design. The delay due to water main, delayed access to the site – from 01/08/08 (planned start) to 18/02/09 (when material start should have commenced). **35 week delay; tie culpability.** INTC 187 (delay in provision of Estimate) appears to have caused a further **6 week delay to the earthworks; Infraco culpability.** Thereafter there are questions surrounding the production of the Roads IFC and drainage design. This was not issued by SDS until 14/08/09 (52 weeks later than planned – albeit that the 41 week delay to commencement takes up the majority of that delay). This needs to be audited and analysed.
- (ii) Concurrent issues: there is a question of the final completion of the water main diversion to 05/05/09, being concurrent with other issues above. No doubt Infraco will focus on this and the time periods taken by tie for issue of TCO's. Infraco culpability in respect of the OLE foundations design may yet prove to cause further delay to progress (those delays however have yet to unfold). This should be monitored closely via as-built programme collation and other tie audits.
- (iii) Considerations of dominance: water main work will be difficult to argue as being anything other than dominant until 18/02/09 (as it restricted access to the whole site until mid February 2009). Thereafter, the delay to issue of the Roads IFC is likely to feature significantly in any delay analysis. Culpability for this delay may well rest with SDS (excusable under CE(t) or (u); but may also relate to Infraco failure to manage SDS). Risks remain that CEC was complicit in delay. Overall delay to this element and Section 'A' in particular however linked closely to completion of Depot Building (which at present is the longer more dominant string of activities).

¹³ Delay related to the IFC does not necessarily end with the initial IFC issues on 14/8/2009 given the comments made by CEC and the need to resolve those comments by SDS. However, work should have been able to commence on the roads at that point had other issues been resolved. Further investigation is needed of the subsequent IFCs to determine which issues were sorted when. This investigation would impact on the dates on which the roads could be completed. Further thought is needed about how much road was needed at which point for Sectional Completion Date – a number of outstanding issues are relevant to the ability to open the Depot Access Road to general traffic but they would not impact on the usability of the Depot Access Road formation as a construction and tram delivery route (per DS comments provided on 2 June 2010)



3.3 Conclusions in respect of Sections A & B

3.3.1 Please refer to '**Appendix (i)**' for a summary of the detail above and below.

3.3.2 In light of the above, we summarise our current opinion in respect of Sectional Completion Date 'A' as follows:-

(i) Sectional Completion Date 'A' 'time' implications: Potential **tie** liability:-

a. Lower Limit: **25 weeks**.

b. Upper Limit: **43 weeks**.

Note: in terms of Sectional Completion Date 'B' please refer to IM email of 04/03/10. That confirms the following *"The programme logic models the requirement to have the track sections 5C and 7A complete to achieve the Section B date. On that basis the late completion of the A8 Underpass and the groundworks at the Gogarburn Landfill Site project the Section B date to 15 February 2012. However, we have previously been advised, in discussions with tie's E&M and operations staff, that the actual requirements of the test track is approximately 1km of live track running from the Depot. Having discussed this with tie's PMs it would appear that a suitable length of track can be constructed by January 2011. The track section 5C running through the A8 underpass and to the south is not required for the test track. Providing the contractor makes a concerted effort to carry out the landfill site works in the Spring, Summer and Autumn of 2010, while at the same time progresses track construction in the adjacent sections of the route, there should be no impediment to having the test track ready within 28 days of the completion of the Depot."* This however is dependent on Infraco resolving the landfill site within the timescale required to suit the above. In this regard however, we were advised at the meeting on 3 June 2010 that completion of the landfill site may not be achieved until April/May 2011. Clearly this has the potential to affect the Sectional Completion Date B. This will require further consideration by **tie** as to the specific contractual and practical requirements for the test track.

(ii) Sectional 'financial' implications: in terms of site prelims it is noted that the majority of the 'time' implications above relates to delayed access to the area. As such, sub-contractor 'Sectional' time related costs should not have been incurred



by Infraco to any great extent, if at all. Infraco 'sectional' costs¹⁴ are likely to be related to Section A dedicated management resources. On that basis, we note the following:

- a. Lower Limit: Infraco costs **25 weeks**; sub-contractor costs **6-10 weeks**.
- b. Upper Limit: Infraco costs **43 weeks**; sub-contractor costs **14-18 weeks**.

3.3.3 In terms of the current projected delays to completion of this Section, we note that within the Revision 3 programme Infraco has increased the projected duration of the Depot Building works by approximately 14 weeks. No substantiation has been provided by Infraco in respect of same. In our opinion no further time should be awarded to Infraco for increased durations until such time as the relevant substantiation is provided. This is particularly relevant in light of the current views on potential mitigation and/or acceleration measures¹⁵. That said, **tie** should consider when it needs to have the Depot and Test Track complete. If, for example, Section 'C' is significantly delayed, there may be little benefit in expediting the Depot completion at additional acceleration cost.

¹⁴ Overall 'Project' related prolongation costs are reconciled

¹⁵ Iain McAlister's previous opinion on the Infraco Revision 3 Step 4 Issue 1 programme was that time (in the region of 10 weeks for the Depot Building and 23 weeks for the associated Roads & Track) could be saved. Please note, that where any of those measures are deemed to be 'acceleration' there may be costs implications for tie attaching to same.



Section 4 'Sections C & D' – Conclusions arising from current analysis

4.1 Generally

4.1.1 Section 'C' is defined within Schedule Part 1 as "... *the carrying out and completion of Phase 1a to Newhaven (including energisation) and the spur or delta at Roseburn Junction and the completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests that must be successfully completed prior to shadow running as provided for in the Employer's Requirements*". This in effect comprises Sections 1, 2, 5 & 7.

4.1.2 It is relevant to also note that we are advised that Infraco are reverting to an original tie instruction at Roseburn Delta, i.e. to construct the earthworks for the cycleway as far as the Roseburn Terrace Bridge. This means that a small stretch of the civils works in Section 3A is required.

Recommendation: Consideration should therefore be given to ensuring that the necessary CEC approvals are in place timeously such that this issue does not become an obstacle to commencement or progress of the Infraco Works in this area.

4.1.3 Section 'D' is defined within Schedule Part 1 as "... *the completion of shadow running and commencement of revenue service approval obtained and the completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests that must be successfully completed to enable Service Commencement*". This was originally planned to complete 26 weeks after the completion of Section C.

4.2 Section 1

4.2.1 **Appendices 1 to 8** attached contain the current analysis and conclusions in respect of the following Section 1 prioritised elements:-

Appendix	Section	Description of area / structure
Priority Level 1 Elements		
1	1A4	Lindsay Road RW -W1
2	1A4	Road and Track
3	1A3	Victoria Dock Bridge - S16
4	1A3	Tower Place Bridge - S17
5	1A1	Road and Track



Appendix	Section	Description of area / structure
6	1B	Road and Track
7	1C2	Road and Track
8	1C3	Road and Track

4.2.2 From the attached, it is evident that the dominant delays to commencement (and completion) on intermediate sections 1A, 1B & 1C remain with the utility completions in each of those areas. The extent of those delays renders this Section the dominant sequence of activities which continue to drive Sectional Completion Date 'C'. That position remains true whether observing the Infraco Revision 3 programme or Iain McAlister's Revision 3 Issue 1 or Issue 3 mitigation exercises.

4.2.3 In terms of delay and consequent (mitigated) completion, the latest intermediates sections are 1B and 1C2 Road & track. On 4 March 2010 the then projected mitigated dates in respect of the Issue 1 programme were June and August 2012 respectively. That said, the recent Issue 3 mitigation exercise conducted by Iain McAlister in conjunction with tie and others, indicates that completion of Section C could be achieved by **11 May 2012**.

4.2.4 Please refer to report section 4.7 for our conclusions in respect of the effect of the above on Sectional Completion Date 'C'.

4.3 Section 5

4.3.1 **Appendices 9 to 15** attached contain the current analysis and conclusions in respect of the Section 5 priority '1' elements; Priority '2' elements are contained within **Appendices 20 to 26**, as follows:-

Appendix	Section	Description of area / structure
Priority Level 1 Elements		
9	5A	Russell RD RW - W4
10	5A	Murrayfield TS RW - W18
11	5A	Roseburn Viaduct - S21A
12	5A	Baird Drive Retaining Wall - W8
13	5A	Balgreen Road Bridge - S22A Incl. Balgreen Road Retaining Wall W9; including Balgreen Road Bridge - S22B
14	5C	A8 Underpass - W28
15	5C	Depot Access Road Bridge - S32
Priority Level 2 Elements		
20	5A	Russell RD RW - W3
21	5A	Murrayfield TS
22	5A	Murrayfield Stadium Underpass - S21C



Appendix	Section	Description of area / structure
23	5A	Water of Leith Bridge - S21E
24	5B	Carrick Knowe Bridge - S23
25	5B	Road and Track
26	5C	Road and Track

4.3.2 The analysis of the above confirms that at Project level the delays incurred in this Section of the works (although significant) are subsumed by the more extensive delays incurred within Section 1. This presumes that if Section 1 works are mitigated then so are the critical parts of Section 5. It also assumes no resource requirement linkage between the two Sections.

4.3.3 That said, the analysis of those Section 5 elements, clearly identify considerable periods of concurrent delay at an intermediate section level. Infraco culpability throughout this Section is significant. **tie** culpability is also present.

4.3.4 This analysis has also raised significant questions in respect of the timing and/or management of the design process.

4.3.5 As noted at paragraph 1.2.5, maintaining this form of record and analysis will enable **tie** to properly assess, and where necessary defend, claims for additional payment from Infraco and/or its sub-contractors at Section and intermediate section level. It may also assist **tie** in informing strategy in relation to its relationship and dealings with SDS.

4.4 Section 7

4.4.1 **Appendices 18 and 19** attached contain the current analysis and conclusions in respect of the following Section 7 priority '1' elements:-

Appendix	Section	Description of area / structure
Priority Level 1 Elements		
18	7a	Track - Section 7
19	7b	Gogarburn RW - W14/W15

4.4.2 Similar comments apply here in relation to Section 7 as are made at paragraphs 4.3.2 to 4.3.5 above (re Section 5).



4.5 Consideration of position adopted in the 'MUDFA Rev.8' adjudication

4.5.1 During the 'MUDFA Rev.8' adjudication process, a report was produced by Acutus¹⁶ which concluded that "... it would appear to be possible to mitigate all of the MUDFA Revision 8 projected delays to the extent that there would be no requirement to extend any of the four Sectional Completion Dates"¹⁷.

4.5.2 It is acknowledged that, on the face of it, the comments made above in the MUDFA Rev.8 adjudication report may not appear to be consistent with our opinion on the delays to Section 1 and the culpability for same (even after mitigation). It is therefore necessary to explain how the two positions need to be reconciled.

4.5.3 The 'MUDFA Rev.8' adjudication focussed on projected delays to the completion of MUDFA works as at 28 March 2009. When compared to the Infraco Revision 1 Programme 'assumptions', the following delays to the MUDFA works were forecast to occur:-

1	2	3	4
Int. Section	Revision 1 Prog. Dates	MUDFA Rev.8 Dates	Delay (wks)
1A	31/10/2008	17/12/2009	58.86
1B	01/08/2008	24/09/2009	59.86
1C	31/10/2008	18/12/2009	59.00
1D	19/12/2008	25/09/2009	40.00

4.5.4 It was against the background of those delays (circa 59 weeks) that Iain McAlister's 'MUDFA Rev.8' report was drafted. Since that date however, the completion of the MUDFA works, within Section 1 in particular, have been further delayed, to the extent that the following delays (shown in columns 7 & 8 below) were forecast as at **April 2010** (we understand however that those dates have slipped further since April 2010):-

1	2	3	4	5	6	7	8	9
Int. Section	Revision 1 Prog. Dates	MUDFA Rev.8 Dates	Delay (wks)	Rev3Step4Issue3 Range from	to	Delay in weeks (Rev.1 to Rev3S4I3)		Increase in delay (wks)
1A	31/10/2008	17/12/2009	58.86	02/03/2010	13/12/2010	69.57	110.43	51.57
1B	01/08/2008	24/09/2009	59.86	01/07/2010		99.86		40.00
1C	31/10/2008	18/12/2009	59.00	07/05/2010	04/11/2010	79.00	104.86	45.86
1D	19/12/2008	25/09/2009	40.00	30/01/2010	08/02/2010	58.14	59.43	19.43

¹⁶ Report Ref. J086-209 dated 5 May 2010 entitled "Expert Report regarding Estimate in Respect of INTC No. 429 MUDFA programme Revision 8 Delay and Disruption Resulting from Incomplete Utility Works"

¹⁷ Paragraph 6.3.1



4.5.5 That is as at April 2010, the overall projected delays to MUDFA works in Section 1 had increased to circa **110 weeks**. That is, an increase of up to **52 weeks** beyond those forecast in the 'MUDFA Rev.8' programme are expected (see columns 8 & 9 in the table directly above). It was this Section that drove Sectional Completion Date C within the mitigated Issue 1 programme (see comments in report section 4.1 above).

Revision 3 Step 4 Issue 1 mitigation exercise

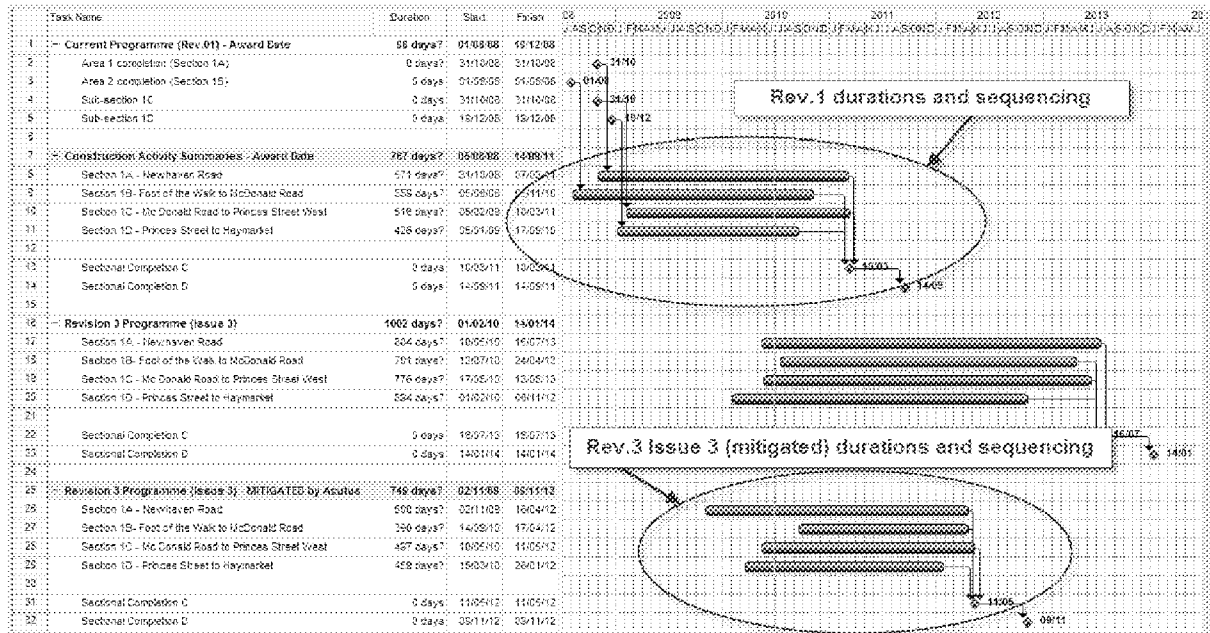
4.5.6 Iain McAlister's mitigation exercise on the Revision 3 (Step 4 Issue 1) programme¹⁸ indicated that mitigation / acceleration *could* bring the projected completion date forward to circa July / August 2012¹⁹. That equated to an overall delay in the region of 73 to 77 weeks for Sectional Completion Date C. As noted, that delay was driven by the dominant delays in Section 1 (intermediate sections 1A, 1B & 1C in particular). The difference between the increased MUDFA delays (of up to 52 weeks) and the mitigated delay to Sectional Completion Date C (of 73 to 77 weeks) appeared to have been brought about by the introduction of different Traffic Management phasing within Section 1 (together with a degree of increased workscope as a result of INTC's). This added to the critical MUDFA / utility delays in Section 1 by upwards of 21 to 25 weeks.

Revision 3 Step 4 Issue 3 mitigation exercise

4.5.7 Notwithstanding the above, as noted at paragraph 4.2.3, a further mitigation review exercise has recently been carried out, this time on the Infraco Issue 3 programme, by Iain McAlister in conjunction with tie and others. That exercise shows that a **mid May 2012** completion currently appears achievable. That however clearly requires Infraco's cooperation / engagement in adopting the relevant mitigation measures. This equates to an approximate overall delay to 'Section C' of **61 weeks**. This is driven by on-street intermediate **section 1B** (intermediate sections 1A & 1C are however projected to complete within a similar 'window'). This is demonstrated within the following summary chart (prepared from information extracted from the current 'Issue 3' mitigation exercise). That chart shows similar overall durations for the 'on-street' work between the Rev.1 and Rev.3 Issue 3 (mitigated) programmes.

¹⁸ Including the joint 'mitigation' review with Blair Anderson. That review maintains the criticality of intermediate sections 1A, 1B & 1C. That exercise still indicates as a forecast completion of summer 2012.

¹⁹ Email from Acutus (IM) of 4 March 2010 timed at 19:17hrs refers. That mitigation exercise did not allow for full depth construction i.e. it had been removed from the activity durations as directed by tie.



4.5.8 On the basis of the above, in our opinion the risk for this overall period of delay (of circa 61 weeks) appears to remain with tie²⁰. A report on the 'Issue 3' mitigation exercise is expected to be issued during mid July 2010.

4.6 Consideration of tie position re lack of early progress on 'off-street' works by Infraco

4.6.1 At a meeting held on 5 May 2010 tie reiterated its concern that the focus on dominant delays to MUDFA / utility works in the 'on-street' Section 1, would mask the effect that Infraco's lack of early progress on the 'off-street' Sections has on the programme for the 'on-street' sections when they become available. In particular, tie noted that had Infraco progressed the 'off-street' sections earlier, resources which now remain engaged on those delayed 'off-street' works, could/would have been applied to the 'on-street works' as those workfaces became available. Had that occurred, tie would have expected the 'on-street' sections to be completed earlier than currently planned by Infraco.

4.6.2 This has been discussed with Iain McAlister in order to understand what effect the above has/had on the collective discussions on potential mitigation which has been developed by

²⁰ Unless it can be proven that BSC's phasing and durations shown in the Rev.0 and Rev.1 programmes were always unachievable and that this is therefore an Infraco error. That however may be a difficult argument to prove and it may be the case that a third party determiner would consider it unreasonable to hold the Infraco liable for such a delay while at the same time tie benefits from mitigation of the MUDFA delay through the reduction of activity durations used in the original Rev. 01 and Rev. 1 (through increased productivity / increased resourcing / consumption of float).



lain, Blair Anderson and **tie** over recent weeks. In particular, we discussed the assumptions and constraints considered and applied when carrying out the mitigation exercise(s) on the Infraco Rev.3 programme(s).

4.6.3 Initial indications are that any resource constraints previously applied by Infraco on the 'on-street' sections were removed during the mitigation exercise, to the extent that resources are no longer driving the mitigated programme(s). As such, the degree to which this particular **tie** concern affects the overall Sectional Completion Date C is thought to be minimal.

4.6.4 That said, this matter can be further considered during the completion of the current mitigation review of the Infraco Revision 3 Step 4 Issue 3 programme.

4.7 Conclusions in respect of Section C & D

Questions of 'criticality', 'dominance' and 'significance'

4.7.1 One of the key issues which we have had to consider when arriving at our opinion on respective culpability for delay to Sectional Completion Date 'C' is what effect the delays to the constituent elements have had on this sectional date. In particular, we considered how a third party tribunal would analyse same. In so doing, matters such as criticality, dominance, significance and the like are of paramount relevance.

4.7.2 In the present circumstances, we consider that the magnitude of the early and ongoing delays to the MUDFA and utility works renders arguments about concurrent (critical) delay more difficult to prosecute. This is particularly relevant to the respective delays evident in and between Section 1 and Sections 5 & 7. Whilst there is clearly Infraco culpable delay within Sections 5 & 7, the project critical path remains firmly fixed within Section 1 (intermediate sections 1A, 1B & 1C in particular are currently seen to be driving the Sectional Completion Date to 11 May 2012). Please refer to 'Appendix (i)' for details on our current opinion on respective culpability for delay in respect of each element.

4.7.3 Previous discussions have focussed on recent case law²¹ which lends support in certain circumstances to a process of apportionment when considering culpability for delay and extension of time. The difficulty, which in our opinion will be faced in **tie** presenting a case on the basis of 'apportionment' however, is that the particular judgement in question

²¹ City Inn Ltd v Shepherd Construction Ltd [2007] ScotCS CSOH_190 (30 November 2007)



focuses firstly on a test of dominance²². When considering the application of apportionment (if appropriate), the court went on to note that “*length of delay*” and the causative “*significance of the events for the Works as a whole*”²³ were factors which must be considered. Each of these three factors²⁴ pose significant hurdles for **tie** to overcome.

4.7.4 As a consequence, at Sectional Completion Date level it remains our opinion that Infraco will be excused for delays incurred up to circa **61** weeks (for Sectional Completion Date C) – please refer to paragraph 4.5.7 above. This assumes that the Infraco’s interpretation of how extension of time for Notified Departures (late completion of MUDFA Works) is not supported by the Adjudicator in the MUDFA Revision 8 Estimate dispute decision. If it is the upper limit will be higher (potentially up to circa. 100 weeks). The measure of the delay which will actually be incurred however is dependent upon Infraco’s implementation of mitigation and/or other acceleration measures which could be adopted to limit the delays actually incurred. Agreement on such measures has yet to occur.

4.7.5 For the most part the recent mitigation exercise on the ‘Issue 3’ programme has produced overall ‘on-street’ intermediate section durations similar to those programmed within the Rev.1 programme²⁵. The exception to this is intermediate section 1B where the overall duration is approximately 70% of the Rev.1 programme duration (see programme extract at paragraph 4.5.7 above). The extent of mitigation thought to be “achievable” on 1B is considerable (circa 30%) and therefore even allowing for potential Infraco liability for a late start on that interim section, it seems unlikely that the projected mitigated date would be much better than currently assessed. Interim sections 1A and 1C follow very closely behind completion of 1B, therefore even if Infraco are held responsible for some of 1B slippage, 1A and 1C will take over and still dictate that a delay to completion of circa 61 weeks will result. BDDI – IFC issues are likely to also allow Infraco some time. Taking all of

²² Paragraphs 21 and 157 of the ‘City Inns’ judgement refer

²³ Paragraph 158 of the ‘City Inns’ judgement refer

²⁴ i.e. dominance, length of delay and causative significance

²⁵ Previously interim findings from the ‘Issue 3’ mitigation exercise indicated that increased activity durations and different TM phasing inserted by Infraco into the ‘Issue 3’ programme may have contributed to this mitigated 61 week forecast of delay. Further analysis and investigation has shown that these issues do appear to be material factors. That said, if this additional delay is the result of the Infraco correcting an error or shortcoming in the Rev. 01 programme then it could be considered unreasonable for **tie** to claim, for its own benefit, delay mitigation from reducing activity durations, when the benefit of such measures are required by the Infraco to accommodate a risk that it carries. On that basis it would appear sensible not to further reduce **tie**’s potential liability from 61 weeks as it is likely to prove very difficult if not impossible to secure support for such a reduction from a third party tribunal.



the above into consideration, it is likely that the lower limit will remain in the region of a period not too much less than the 61 weeks.

4.7.6 As a consequence, it is thought that the majority, if not all, of the period of delay is attributable to the late MUDFA/utility diversions. In light of the above in our opinion the risk for this overall period of delay (of circa 61 weeks) appears to remain with **tie** and is summarised as follows:-

Description	Opinion on tie culpability	Opinion on Infraco culpability
Lower limit:	61 weeks	0 weeks
Upper limit:	61 weeks	0 weeks

4.7.7 Those delays could also give rise to project level prolongation costs. The measure of prolongation costs to which Infraco may be entitled however, is not necessarily inextricably linked to the period of extension of time to which it is entitled. Matters such as concurrency and causation of the particular loss claimed will feature in any analysis of entitlement to additional payment.

4.7.8 In this regard, at Section and intermediate section level in particular, there is considerable evidence of Infraco culpability for delay in the various elements within Sections 2, 5 & 7 (and in certain elements of section 1). This is highlighted (for elements within Sections 1, 5 & 7) within '**Appendix (i)**' attached. Whilst this may not translate into a disallowable period of extension of time, it does/should preclude both Infraco and its sub-contractors' from an entitlement to recovery of the prolongation costs incurred during those periods of culpable delay. Much will depend on the nature and type of costs claimed or yet to be claimed.

4.7.9 In relation to Sectional Completion Date 'D' we have assumed for present purposes that this will be 6 months after the Sectional Completion Date 'C' (acknowledging that **tie** may wish to take a view on whether this 6 month period can be reduced²⁶).

.....
Robert Burt

.....
John Hughes

Dated: 25 June 2010

²⁶ Particularly if the off-street section can be completed significantly earlier to allow driver training and system testing to begin earlier



LIST OF APPENDICES

Appendix	Section	Description of area / structure
(i)		Summary table of current view on respective party culpability for delay
Priority Level 1 Elements		
1	1A4	Lindsay Road RW -W1
2	1A4	Road and Track
3	1A3	Victoria Dock Bridge - S16
4	1A3	Tower Place Bridge - S17
5	1A1	Road and Track
6	1B	Road and Track
7	1C2	Road and Track
8	1C3	Road and Track
9	5A	Russell RD RW - W4
10	5A	Murrayfield TS RW - W18
11	5A	Roseburn Viaduct - S21A
12	5A	Baird Drive Retaining Wall - W8
13	5A	Balgreen Road Bridge - S22A Incl. Balgreen Road Retaining Wall W9; including Balgreen Road Bridge - S22B
14	5C	A8 Underpass - W28
15	5C	Depot Access Road Bridge - S32
16	6	Depot Building
17	6	Roads & Track – Depot
18	7a	Track - Section 7
19	7b	Gogarburn RW - W14/W15
Priority Level 2 Elements		
20	5A	Russell RD RW - W3
21	5A	Murrayfield TS
22	5A	Murrayfield Stadium Underpass - S21C
23	5A	Water of Leith Bridge - S21E
24	5B	Carrick Knowe Bridge - S23
25	5B	Road and Track
26	5C	Road and Track

Possibly SDS

Current view on respective party culpability

App. Section	Description of area / structure	ANALYSIS OF LATE START					ANALYSIS OF LATE FINISH			
		Late Start	Upper/Lower Liability	tie culpability	Infraco culpability	Poss. SDS culpability	IM Mitigated Period		Infraco Rev.3 Period	
							tie	Infraco	tie	Infraco

SECTIONAL COMPLETION DATE A		Lower Limit	25 weeks	14 weeks					
		Upper Limit	43 weeks	32 weeks					

Section 6		As depot building and Sectional Completion Date A								
16	6	Depot Building	41 weeks	Lower Limit	25 weeks	6 weeks	Audit/Review	0 weeks	8 weeks	Assumes IM mitigated
				Upper Limit	35 weeks	16 weeks	Audit/Review	8 weeks	16 weeks	Assumes IM mitigated
17	6	Roads & Track - Depot	89 weeks	Lower Limit	See chart for details		52 weeks	See above	Driven by Depot Building	
				Upper Limit	See chart for details		81 weeks	See above	Driven by Depot Building	

SECTIONAL COMPLETION DATE B		See comments in Report at Paragraph 3.3.2								
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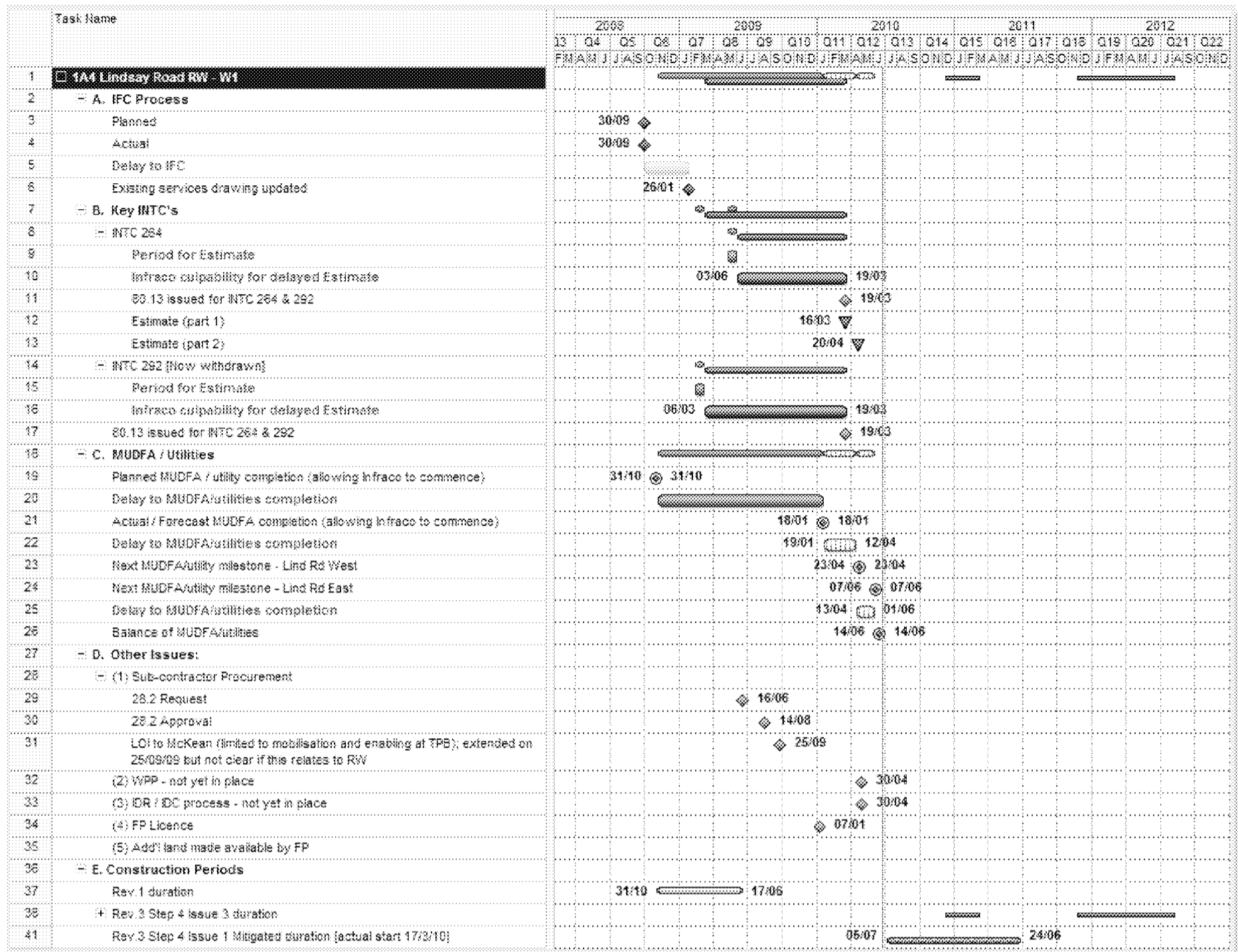
SECTIONAL COMPLETION DATE C		Lower Limit	61 weeks	0 weeks					
		Upper Limit	61 weeks	0 weeks					

SECTION 1			Lower Limit	Upper Limit	tie	Infraco	Poss. SDS	tie	Infraco	tie	Infraco
1	1A4	Lindsay Road RW - W1	72 weeks	Lower Limit	63 weeks	0 weeks	17 weeks	0 weeks	0 weeks	0 weeks	36 weeks
				Upper Limit	72 weeks	8 weeks	62 weeks	18 weeks	18 weeks	18 weeks	54 weeks
2	1A4	Road and Track	88 weeks	Lower Limit	77 weeks	4 weeks	28 weeks	-2 weeks	-2 weeks	-2 weeks	50 weeks
				Upper Limit	84 weeks	41 weeks	61 weeks	0 weeks	0 weeks	0 weeks	52 weeks
3	1A3	Victoria Dock Bridge - S16	79 weeks	Lower Limit	11 weeks	22 weeks	0 weeks	2 weeks	0 weeks	0 weeks	0 weeks
				Upper Limit	61 weeks	72 weeks	50 weeks	17 weeks	15 weeks	15 weeks	15 weeks
4	1A3	Tower Place Bridge - S17	61 weeks	Lower Limit	11 weeks	1 weeks	0 weeks	-29 weeks	-29 weeks	-29 weeks	-16 weeks
				Upper Limit	61 weeks	50 weeks	50 weeks	0 weeks	0 weeks	-13 weeks	0 weeks
5	1A1	Road and Track	54 weeks	Lower Limit	54 weeks	0 weeks	19 weeks	0 weeks	0 weeks	0 weeks	29 weeks
				Upper Limit	54 weeks	0 weeks	0 weeks	22 weeks	22 weeks	22 weeks	51 weeks
6	1B	Road and Track	100 weeks	Lower Limit	31 weeks	0 weeks	9 weeks	-6 weeks	-6 weeks	-6 weeks	32 weeks
				Upper Limit	100 weeks	69 weeks	63 weeks	0 weeks	0 weeks	0 weeks	38 weeks
7	1C2	Road and Track	30 weeks	Lower Limit	30 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	32 weeks
				Upper Limit	30 weeks	0 weeks	0 weeks	16 weeks	16 weeks	16 weeks	48 weeks
8	1C3	Road and Track	41 weeks	Lower Limit	41 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	32 weeks
				Upper Limit	41 weeks	0 weeks	15 weeks	46 weeks	46 weeks	46 weeks	78 weeks
SECTION 5											
20	5A	Russell RD RW - W3	107 weeks	Lower Limit	21 weeks	86 weeks	0 weeks	-16 weeks	-16 weeks	-16 weeks	-5 weeks
				Upper Limit	21 weeks	86 weeks	46 weeks	0 weeks	0 weeks	-11 weeks	0 weeks
9	5A	Russell RD RW - W4	44 weeks	Lower Limit	17 weeks	22 weeks	0 weeks	-6 weeks	3 weeks	-6 weeks	3 weeks
				Upper Limit	22 weeks	27 weeks	66 weeks	0 weeks	0 weeks	0 weeks	0 weeks
10	5A	Murrayfield TS RW - W18 [Directly affected by RV VE - audit req'd]	87 weeks	Lower Limit	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks	22 weeks
				Upper Limit	113 weeks	113 weeks	113 weeks	5 weeks	5 weeks	5 weeks	27 weeks
21	5A	Murrayfield TS [Directly affected by RV VE - audit req'd]	83 weeks	Lower Limit	0 weeks	0 weeks	0 weeks	-17 weeks	-17 weeks	-17 weeks	-12 weeks
				Upper Limit	83 weeks	83 weeks	63 weeks	0 weeks	0 weeks	0 weeks	5 weeks
11	5A	Roseburn Viaduct - S21A [Commencement delayed by VE exercise - audit]	59 weeks	Lower Limit	0 weeks	0 weeks	0 weeks	-16 weeks	-16 weeks	-16 weeks	-6 weeks
				Upper Limit	78 weeks	78 weeks	78 weeks	0 weeks	0 weeks	-10 weeks	0 weeks
22	5A	Murrayfield Stadium Underpass - S21C	106 weeks	Lower Limit	47 weeks	22 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks
				Upper Limit	84 weeks	59 weeks	0 weeks	4 weeks	4 weeks	4 weeks	4 weeks
23	5A	Water of Leith Bridge - S21E	46 weeks	Lower Limit	0 weeks	31 weeks	0 weeks	0 weeks	0 weeks	0 weeks	0 weeks
				Upper Limit	15 weeks	46 weeks	0 weeks	0 weeks	0 weeks	0 weeks	21 weeks
12	5A	Baird Drive Retaining Wall - W8	105 weeks	Lower Limit	27 weeks	77 weeks	0 weeks	13 weeks	0 weeks	0 weeks	0 weeks
				Upper Limit	29 weeks	78 weeks	0 weeks	34 weeks	21 weeks	21 weeks	21 weeks
13	5A	Balgreen Road Bridge - S22A Incl. Balgreen Road Ret.Walls W9 [incl. Balgreen Road Bridge - S22B]	94 weeks	Lower Limit	0 weeks	94 weeks	45 weeks	0 weeks	0 weeks	0 weeks	16 weeks
				Upper Limit	0 weeks	94 weeks	45 weeks	1 weeks	1 weeks	1 weeks	17 weeks
24	5B	Carrick Knowe Bridge - S23	10 weeks	Lower Limit	0 weeks	8 weeks	0 weeks	18 weeks	11 weeks	18 weeks	11 weeks
				Upper Limit	3 weeks	10 weeks	0 weeks	40 weeks	33 weeks	40 weeks	33 weeks
25	5B	Road and Track	39 weeks	Lower Limit	0 weeks	5 weeks	9 weeks	39 weeks	0 weeks	39 weeks	10 weeks
				Upper Limit	34 weeks	39 weeks	33 weeks	67 weeks	28 weeks	67 weeks	38 weeks
26	5C	Road and Track	88 weeks	Lower Limit	9 weeks	16 weeks	21 weeks	-26 weeks	-26 weeks	-26 weeks	-14 weeks
				Upper Limit	72 weeks	79 weeks	21 weeks	0 weeks	0 weeks	-12 weeks	0 weeks
14	5C	A8 Underpass - W28	7 weeks	Lower Limit	7 weeks	0 weeks	0 weeks	24 weeks	30 weeks	24 weeks	46 weeks
				Upper Limit	7 weeks	0 weeks	0 weeks	61 weeks	67 weeks	61 weeks	83 weeks
15	5C	Depot Access Road Bridge - S32	32 weeks	Lower Limit	17 weeks	14 weeks	0 weeks	0 weeks	0 weeks	0 weeks	24 weeks
				Upper Limit	17 weeks	14 weeks	0 weeks	7 weeks	7 weeks	7 weeks	31 weeks
SECTION 7											
18	7a	Track - Section 7	57 weeks	Lower Limit	22 weeks	18 weeks	15 weeks	-14 weeks	-14 weeks	-14 weeks	-9 weeks
				Upper Limit	39 weeks	35 weeks	15 weeks	0 weeks	0 weeks	0 weeks	5 weeks
19	7b	Gogarburn RW - W14/W15	62 weeks	Lower Limit	0 weeks	45 weeks	21 weeks	Data not yet available			
				Upper Limit	17 weeks	62 weeks	95 weeks				

SECTIONAL COMPLETION DATE D		See comments in Report at Paragraph 4.7.9 (assumed 6 months after Sectional Completion Date C)								
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Caution: Needs to be read in conjunction with individual Appendices. Allocation of costs claimed should not be based on simplistic analysis of the above

1A4 Lindsay Road RW – W1



- A. **IFC Process:** Initial IFC issued on time (planned 30/09/08; actual 30/09/08). Subsequent IFC's issued as follows:-
 - (i) 'Existing services drawing' updated 26/01/09 to include services in relation to a section of the wall / earthworks package that had not been included in the original drawing. This does not appear in the Approvals Tracker provided; it is still not clear if this is a formal IFC. Although there is no information presently available to inform culpability for delay DS contends that this requirement to update the original IFC is evidence which points towards the position that the original IFC was incomplete (see Preamble). Potential reasons include:-
 - a. Late issue by SDS (CE(t));
 - b. A material breach by SDS (CE (u));
 - c. A tie Change;
 - d. A failure of Infraco in respect of its management of SDS or another breach by Infraco;
 - e. A requirement of FP for which tie will bear responsibility;

Potential delay by SDS/tie; Infraco [This may have influenced delay to commencement; much depends on the contemporaneous knowledge about MUDFA/utility works in this area. It is not clear why no services information was provided for that area by SDS. DS advises however, that "...this may be an (SDS / BSC) omission but it may also be the case that tie was carrying out diversions in that area and only provided services information after the original IFC. Allocation of culpability is clearly dependent on the factual backdrop to this issue". Further investigation required.

Note: recently (on 23/04/10) 2 new drawing's issued (sewer protection drawings Rev.2), not in previous IFC package. Rev.1 was issued on 21/05/09 for external approval. Effect not yet clear.
- B. **Key INTC's:** From the information provided it appears that Infraco issued 4 no. INTC's against this structure. INTC's 129, 292, 085 & 264 refer [Complete data on INTC's awaited]. Of the aforementioned it appears likely that **INTC 292** (Additional Ramp / Steps at Lindsay Road RTW) & **INTC 264** (Section 1A4 – groundworks) materially affected Infraco's ability to commence works in accordance with the Rev 01 programme. Both were the subject of an **80.13 instruction on 19/03/10**. Details as follows:-
 - (i) **INTC 264:** issued 07/05/09; Estimate due 02/06/09; Infraco issued this estimate in two parts. The first estimate was received on 16/03/10 and the second (part of the) estimate on or around 20 April 2010 (the exact date to be checked). Delay by tie in response to later estimate received in April 2010. (First part of the estimate was addressed by 80.13 Notice issued on 19/03/10)
 - (ii) **INTC 292:** issued 09/02/09; Estimate due 05/03/09; No Estimate provided by Infraco. **Delay by Infraco.** MB advises that this INTC has now been withdrawn and therefore has negligible impact.
- C. **MUDFA / Utilities:** Planned completion 31/10/08. MUDFA / utilities works in association with Lindsay Road RTW's were partially completed to allow commencement at chainage 0-230 as at 18/01/10. MUDFA / utilities work beyond that date were / are forecast to complete as follows:-

- a. Lindsay Road West (**23/04/10**) – access to chainage 0-500 on westbound lane works;
- b. Lindsay Road East (**07/06/10**);
- c. Balance of MUDFA / Utilities works (**14/06/10** albeit that part was made available as of 07/01/10).

We understand that an actual start on RW1a and RW1c was achieved on or around 17/03/10. This start was not dependent on any of the foregoing utility diversions. We are advised that a start of those structures could have been made on or around 07/01/10 (upon execution of the FP agreement). It appears therefore that the delay from circa 01/02/10 (allowing a reasonable period for mobilisation) to the actual start of 17/03/10 would be to Infraco's account. **Delay by Infraco.**

Delay by tie; tie culpability Note: **tie** restricting Infraco access to this area pending resolution of the Infraco IDC certification process (see below). A further point of note is that MB advises that "Lindsay Road lowering occurring before the RW1a works could start restraint was removed by tie from the programme criticality by use of an alternative route by ADM, BSC were advised in January 2010 of this opportunity". Any benefit from this opportunity of course relies on Infraco's acceptance and subsequent implementation of same. It is our understanding that Infraco has not acted on this suggestion to date.

D. Other Issues:

- (i) **Sub-Contractor Procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. LOI to McKean of 04/08/08 does not appear to cover 1A4 Lindsay Road RW; extended LOI issued 25/9/09 but scope not clear [subject to future tie audit]. **Delay by Infraco. Infraco culpability.**
- (ii) **WPP Process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.**
- (iii) **IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 does not contain details for this structure. Infraco delay. We understand that **tie** was restricting Infraco access to this area pending resolution of the Infraco IDC certification process. **Contractual position not yet resolved – see Preamble.**
- (iv) **FPA Licence:** Not in place until 07/01/10. This would have been an obstacle to commencement. Advised that delay arose from failure of SDS (or a failure of Infraco to manage SDS?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to suitability of design. This would have been an obstacle to commencement. It is understood that execution of this agreement on 07/01/10 allowed Infraco access to commence RW 1A & RW 1C. MB has since advised that this could have been applied for at anytime, and did not need to be influenced by Tower Bridge. TPB became the dominant factor simply because it was anticipated to come about first. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

E. Construction Periods (covering walls 1A to 1D):

1A4 Lindsay Road RW - W1					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.7	Delay
Start	31/10/2008	07/12/2010	109.57 wks	05/07/2010	87.43 wks
Finish	17/06/2009	07/08/2012	163.86 wks	24/05/2011	105.29 wks
Cal. Duration	32.86 wks	87.14 wks	54.29 wks	50.71 wks	17.86 wks

Note: MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A4 as 01/03/10 to 05/07/11 respectively. That equates to a period of **70 weeks**. No specific identification of RW.

- (i) **Delay to Start:** The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 3, MB mitigated programme and MUDFA / Utility dates listed above. **Delay to start** was forecast to be a range between 87 weeks (05/07/10) and 109 weeks (07/12/10). Note however that the RW commenced on **17/03/10** (a delay to start of **72 weeks**). Primary causes of delay to start as follows:-
 - A. **IFC process:** The initial IFC **was on time**; planned date was **30/09/08**; the actual was **30/09/08**. Subsequent IFC dated 26/01/09 was **17 weeks late**. It is unclear as to whether this would have been material. There is no information presently available to inform culpability for delay to this subsequent IFC. Unless there is proof of Infraco breach, **it may be a CE under either 65(t) or (u)** (but uncertain).
 - B. **INTC's: Delays by Infraco** in the submission of Estimates. Delay up to 19/03/10 when tie issued clause 80.13 instruction against first part estimate for INTC 264 (note tie responsible for standard 18 day Estimate period – see CE(x). Second part of estimate for INTC 264 issued in April 2010 has yet to be addressed by tie. **Delay by tie; tie culpability** (for delay in response).
 - C. **MUDFA / Utilities:** Planned completion **31/10/08**. Partial completion at Lindsay Road RTW's as at **18/01/10**; further release of areas as at **23/04/10, 07/06/10 and 14/06/10. Delay by tie; tie culpability.**
 - D. **Other:**
 - **Sub-Contractor procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability.** Effect of this is not clear – it could be a hindrance to progress – but details not available to establish scope of work under McKean LOI;
 - **WPP process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;
 - **IDR/IDC process:** IDC not yet in place. **tie** restricting Infraco access to this area pending resolution of the Infraco IDC certification process.
 - **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

Delay to Finish: Issue 3 programme shows an **increase of circa 54 weeks** over the timescale in Rev.1 programme (majority of increase understood to be as a result of change in scope / design of wall construction and possibly Lindsay Road lowering). We are advised that the scope of the final retaining wall design is very different from the original scope. MB considers that the Infraco 1A retaining wall timescale is not unreasonable. IM mitigated view of Issue 3 also shows an increased duration of **18 weeks** to the Rev.1 programme (albeit **36 weeks** shorter than Infraco's proposed Issue 3 programme). That increase appears to relate to additional TM phasing. MB mitigation proposal also has shorter overall duration for 1 than

Issue 3 (but RW not separately identified). Again, any benefit from this mitigation relies on Infraco's acceptance and subsequent implementation of same. It is our understanding that Infraco has not acted on this suggestion to date.

F. tie position on area availability:

- (i) We are advised that access for commencement of RW 1A & 1C was available as at 07/01/10 (following execution of FP agreement). That allowed Infraco access (unhindered by utilities) for those elements. Allowing for mobilisation it is reasonable to consider that Infraco could have commenced on or around 01/02/10. Also refer to section (C) above re MUDFA dates (available from January 2010 although in terms of RW construction this does not appear to have been the obstacle to commencement). It is notable however, that the remainder of works attaching to this structure cannot be undertaken until utilities are relocated. Expected date for completion of utilities works being 14 June 2010.

G. Conclusion:

- (i) **'Significant' issues/events:** In our opinion there were four main contributory factors, being (a) the IFC process; (b) the INTC process in respect of INTC 264 (we understand that INTC 292 has been withdrawn); (c) late completion of MUDFA/utilities; and (d) the late execution of the FP licence. Taking those events in chronological order:-

The initial IFC was issued on time on **30/09/08**; but a revision appears to have been issued on **26/01/09 (17 weeks later than planned)**. **MUDFA/utilities diversions** were supposed to be completed on **31/10/08** (to facilitate a start on 1A4 Lindsay Road RW 31/10/08). Those diversions however were not actually completed suffice to allow commencement until circa **18/01/10, with subsequent phased completions forecast to complete up to 14/06/10**. This is tie's culpability. Running concurrently with this was the **late provision by Infraco of the Estimates** for INTC 264 (292 now withdrawn). Infraco issued this estimate in two parts. The first estimate was received on 16/03/10 and the second estimate in April 2010 (check exact date). **Delay measured to 19/03/10** (when clause 80.13 instruction issued (against INTC 264 first part only)); but may not have been an obstacle to actual commencement). This event could have delayed commencement in this area. It is notable that tie has yet to respond to the later estimate received in April 2010. Delay in response to receipt of same is a matter for which tie is responsible. In addition, the execution of the **FP licence** is understood to have been delayed by SDS such that it was not in place until **07/01/10**. This is either an SDS breach (which would excuse Infraco of the time) or if caused by a failure on the part of Infraco to manage SDS, it is a matter for which Infraco bears responsibility.

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.

- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability will have more causative significance. In relative terms however Infraco will certainly argue that the late completion of MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than a delay in either the design issue or the INTC Estimate process which would / could have been overcome in accordance with the original programme had it been necessary.

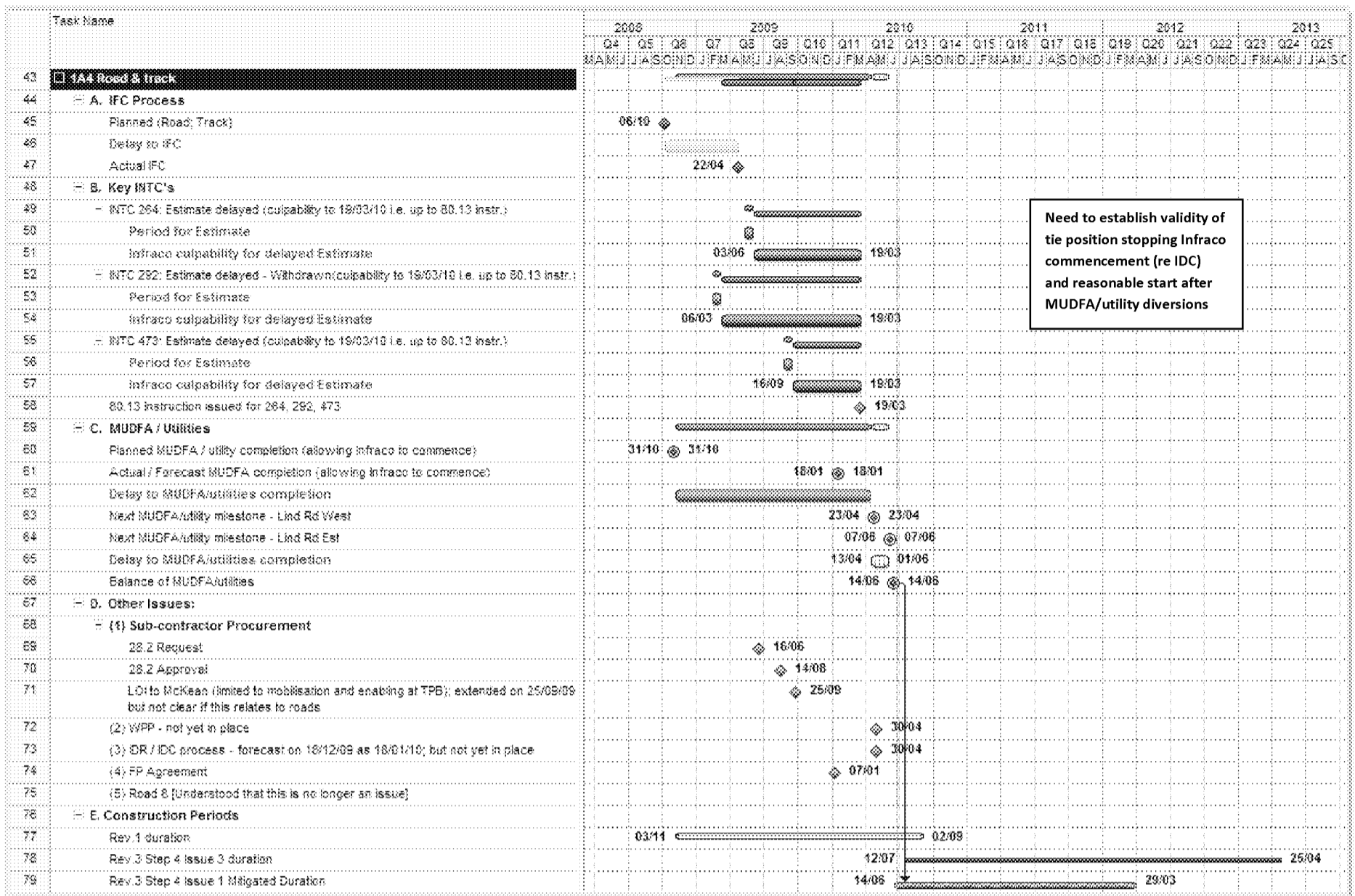
Bearing in mind however that commencement of RW 1A & 1C were not dependent on completion of utility diversions, those works could have commenced on or around execution of the FP licence. That is, it appears they could have commenced on or around 01/02/10 (allowing for mobilisation). Delays up to that point relate to the late execution of the FP licence (a matter for which SDS is responsible; possibly Infraco if breach of its obligation to manage SDS can be established).

As such, from the information available it appears that the key issue to commencement of the RW was the execution of the FP licence. It would be wrong however at this stage to entirely dismiss the potential (earlier) impact of MUDFA/utility diversions on commencement of these structures. This point may require further investigation.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]																	
<i>Used Actual Start of 17/3/10</i>																	
		tie culpability				Infraco culpability				Poss. SDS culpability							
		From	to	Days	Weeks	Cause	From	to	Days	Weeks	Cause	From	to	Days	Weeks		
1. LOWER LIMIT																	
MUDFA / Utility diversions		31/10/08	18/01/10	444	63.43				0	-	IFC	30/09/08	26/01/09	118	16.86		
				0	-				0	-				0	-		
					63.43										16.86		
2. UPPER LIMIT																	
MUDFA / Utility diversions		31/10/08	17/03/10	502	71.71	Late start	18/01/10	17/03/10	58	8.29	FP TPB to 7/1	31/10/08	07/01/10	433	61.86		
				0	-				0	-				0	-		
					71.71					8.29					61.86		
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]																	
IM Mitigated Period = +18 wks		IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period +18wks: this is likely to be BDD/IFC issues and TM revised phasing. Culpability not clear; range of possibilities - upper / lower limits recognize extremes of liability.											
Infraco Rev.3 Period = +54 wks		tie		Infraco		tie		Infraco		Infraco Rev.3 period +54 wks: On the basis that Infraco can mitigate to 18 weeks per IM analysis then Infraco lower limit restricted to anything in excess of 18wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations							
Lower Limit		0.00		0.00		0.00		36.00									
Upper Limit		18.00		18.00		18.00		54.00									

1A4 Road & Track



A. **IFC Process:** The initial IFC was **198 days (or 28 weeks) late**; planned date was **06/10/08**; the actual was **22/04/09¹**. There is no information presently available to inform culpability for delay (see Preamble). Potential reasons include:-

- Late issue by SDS (at its simplest a CE under 65(t));
- A material breach by SDS (again at its simplest form a CE under 65(u));
- A failure of Infraco to provide the Infraco Design to SDS (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC/NR interface);
- A requirement of CEC for which tie will bear responsibility.

Note: DS advised that "late submission of TAA package followed by length of time needed to incorporate CEC comments because so many needed to be made on design". DS has further advised that on the basis of further IFC availability and approval dates – delay by SDS exists but in his opinion it is due to Infraco failing to manage the process. In our opinion this would clearly have an impact on culpability for this issue (needs to be established by audit or further investigation). Potentially a **delay by SDS, SDS /tie or Infraco?**

See also INTC 129 re CEC request for extension of time to Prior Approvals process.

Note: Further revision to IFC likely. DS advised "Full reasons not available but will have included incorporation of comments that weren't included in the first IFC - as discussed last week original IFC might have been a sensible mitigation but might have been deficient". MB advises that in his opinion MUDFA delays were exacerbated awaiting issue of IFC. MB considers this to be a failure on the part of Infraco to manage the SDS provider. It is our opinion that this may well be possible (needs to be established by audit or further investigation).

B. **Key INTC's:** From information provided it appears that Infraco issued 12 no. INTC's against this area. INTC's 093, 129, 166, 165, 257, 276, 287, 289, 292, 469, 473 & 264 refer. Of the aforementioned it appears likely that **INTC 264** (Lindsay Road Groundworks), **INTC 292** (Additional Ramp / Steps at Lindsay Road RTW) & **INTC 473** (Construction of 3no. sewer protection slabs & new chamber – Lindsay Road Schedule Part 2: - undefined prov. sum item 8) materially affected Infraco's ability to commence works in accordance with the Rev 01 programme. All of the foregoing were the subject of an **80.13 instruction on 19/03/10**. Details as follows:-

- (i) **INTC 264:** issued 07/05/09; Estimate due 02/06/09; Infraco issued this estimate in two parts. The first estimate was received on 16/03/10 and the second estimate on or around 20 April 2010 (exact date to be confirmed). **Delay by Infraco.**
Delay by tie in response to later estimate received in April 2010. First estimate was addressed by 80.13 Notice issued on 19/03/10.
- (ii) **INTC 292:** issued 09/02/09; Estimate due 05/03/09; No Estimate provided by Infraco. MB advises that this INTC has now been withdrawn and therefore has negligible impact. **Delay by Infraco.**
- (iii) **INTC 473:** issued 20/08/09; Estimate due 15/09/09; No Estimate provided by Infraco. **Delay by Infraco.**

tie issued an 80.13 instruction on 19/03/10 covering all of the above.

See also INTC 129 re CEC request for extension of time to Prior Approvals process. Also note that more recent INTC re Ocean Terminal tramstop and finish may become an obstacle to progress.

¹ Note: 1 week after IFC issue geotechnical drawings were issued by SDS on 29/04/09. It is likely that these drawings triggered issue of INTC 264 on 07/05/09. These drawings are not listed in V31 of programme.(i.e. not part of original list of IFC's). These drawings were issued for external approval on 19/02/09. Question – did SDS provide to Infraco or did Infraco fail to notify?

- C. **MUDFA / Utilities:** Planned completion **31/10/08**. MUDFA / utilities works in association with Lindsay Road RTW's were partially completed to allow commencement at chainage 0-230 as at **18/01/10**. MUDFA / utilities work beyond that date are forecast to complete as follows:-
- Lindsay Road West (**23/04/10**) – access to chainage 0-500 on westbound lane works;
 - Lindsay Road East (**07/06/10**);
 - Balance of MUDFA / Utilities works (**14/06/10**).
 - MB further advises that MUDFA works at Ocean Terminal will not be completed until 28/06/10.

D. **Other Issues:**

- Sub-Contractor Procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. LOI to McKean of 04/08/08 does not appear to cover 1A4 Road & track; extended LOI issued 25/09/09 but scope not clear [subject to future tie audit]. **Delay by Infraco. Infraco culpability.**
- WPP Process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.**
- IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 shows this as being forecast to be in place by 18/01/10. But not yet in place. Infraco delay. **tie** restricting Infraco access to this area pending resolution of the Infraco IDC certification process. See Preamble.
- FPA Licence:** Not in place until 07/01/10. This would have been an obstacle to commencement. Advised that delay arose from failure of SDS (or failure of Infraco to manage SDS?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to suitability of design. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

E. **Construction Periods:**

1A4 Road & Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.1	Delay
Start	03/11/2008	12/07/2010	88.00 wks	14/06/2010	84.00 wks
Finish	02/09/2010	25/04/2013	138.00 wks	29/03/2012	82.00 wks
Cal. Duration	95.57 wks	145.57 wks	50.00 wks	93.57 wks	-2.00 wks

Note: MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A4 as 01/03/10 to 05/07/11 respectively. That equates to a period of **70 weeks**.

- Delay to Start:** The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 3, MB mitigated programme and MUDFA / Utility dates listed above.

Delay to start is therefore forecast to be a **range between 84 weeks (14/06/10) and 88 weeks (12/07/10)**. MB mitigation exercise shows **immediate commencement** [albeit that exercise is now outdated in terms of commencement dates].

Primary causes of delay to start as follows:-

- IFC process:** The initial IFC was **198 days (or 28 weeks) late**; planned date was **06/10/08**; the actual was **22/04/09**. There is no information presently available to inform culpability for delay. Unless there is proof of Infraco breach, **it may be a CE under either 65(t) or (u)** (but uncertain).
 - INTC's:** Delays by Infraco in the submission of Estimates. Delay up to 19/03/10 when tie issued clause 80.13 instruction. Infraco culpability. Tie culpability also extant for delay in response to second part estimate attaching to INTC 264.
 - MUDFA / Utilities:** Planned completion **31/10/08**. Partial completion at Lindsay Road RTW's as at **07 or 18/01/10**; further release of areas as at 23/04/10, 07/06/10 and 14/06/10. **Delay by tie; tie culpability.**
 - Other:**
 - **Sub-Contractor procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability.** Effect of this is not clear – it could be a hindrance to progress – but details not available to establish scope of work under McKean LOI;
 - **WPP process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;
 - **IDR/IDC process:** IDC not yet in place. **tie** restricting Infraco access to this area pending resolution of the Infraco IDC certification process.
 - **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**
- Delay to Finish:** Issue 3 programme shows an **increase of circa 50 weeks** over timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 1 however has slightly shorter duration than Rev.1 programme. MB mitigation proposal also has shorter duration than Issue 3 (70 weeks duration i.e. 10 weeks less than Issue 3). This mitigation is achieved by re-phasing the works (and is therefore only achievable if this mitigation is accepted / agreed by Infraco). Presently, increase in duration not justified by Infraco.

F. **tie position on area availability:**

- Refer to section (C) above re MUDFA dates (available from January 2010 - but in limited area ch.0-230). Thereafter **23/04/10** is next availability date (for Lindsay Road West). See however IDR/IDC comments at D above. **tie** presently of the opinion that Infraco are not able to commence due to incomplete IDC process.

G. **Conclusion:**

- 'Significant' issues/events:** In our opinion there were four main contributory factors, being (a) the IFC process; (b) the INTC process in respect of INTC's 264 & 473; (c) late completion of MUDFA/utilities; and (d) the late execution of the FP licence. Taking those events in chronological order:-

The IFC was planned to be issued on **06/10/08**; it was actually issued on **22/04/09 (198 days late)**. MUDFA/utilities diversions were programmed to be completed on **31/10/08** (to facilitate a start on 1A4 Road & track 03/11/08). Those diversions however were not actually completed in phases during the period from **18/01/10 to 14/06/10**. This is likely to be tie's culpability². Running concurrently with this was the **late provision by Infraco of the Estimates** for INTC's 264 & 473. This is a matter for which Infraco is responsible. . It is notable however, that Infraco issued this estimate in two parts for INTC 264. The first estimate was received on 16/03/10 and the second estimate in April 2010. (the exact date is not currently available). **Delay measured to 19/03/10** (when clause 80.13 instruction issued (against INTC 264 first part only and INTC 473). Delay in response to the second part of INTC 264 is a matter for which tie is responsible. Each of those events would have delayed commencement in this area. In addition, the execution of the **FP licence** is understood to have been delayed by SDS such that it was not in place until **07/01/10**. This is either an SDS breach (which would excuse Infraco of the time) or if caused by a failure on the part of Infraco to manage SDS, it is a matter for which Infraco bears responsibility.

The **IDR/IDC process** may also be a contributing factor affecting commencement from either **18/01/10 or 23/04/10** (but tie's ability to stop work from commencing on this basis is not clear).

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above. They will however increase in significance as matters progress if they do pose an obstacle to work on the ground. **Discuss position being taken by tie.**
- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability will have more causative significance. See previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

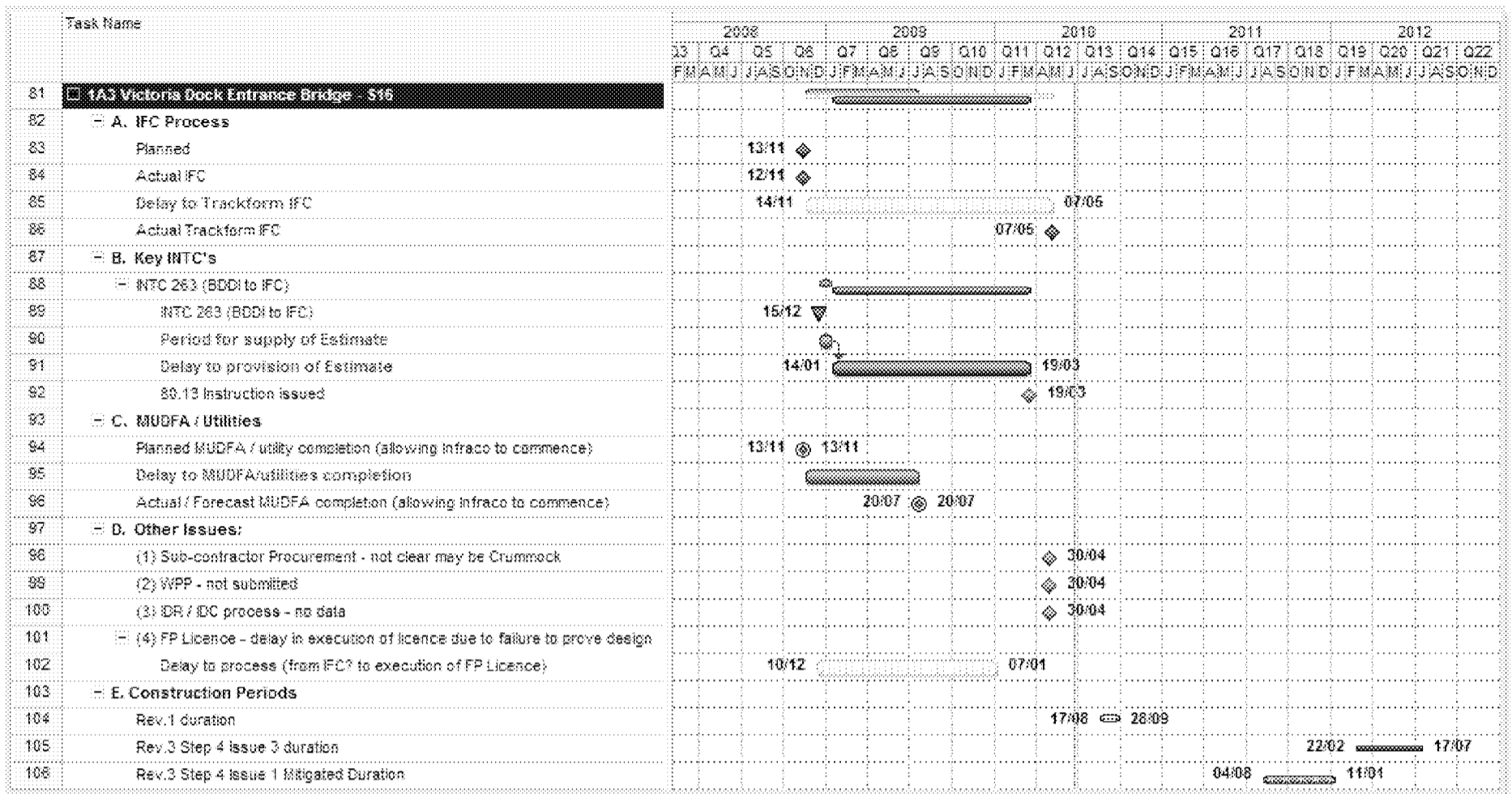
As such, from the information available it appears that the two key issues to commencement of the road & trackworks in 1A4 are (i) the completion of the MUDFA / utility works; and (ii) the execution of the FP licence. There would appear to be equal causative potency of both issues up to January 2010; thereafter, the late completion of the utility diversions becomes the dominant issue.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Tie culpability					Infraco culpability					Poss. SDS culpability			
	From	To	Days	Weeks	Cause	From	To	Days	Weeks	Cause	From	To	Days	Weeks
1. LOWER LIMIT														
MUDFA / Utility diversions	03/11/08	23/04/10	536	76.57	Late start	14/06/10	12/07/10	28	4.00	Delay to IFC	06/10/08	22/04/09	198	28.29
			0	-				0	-				0	-
				76.57					4.00					28.29
2. UPPER LIMIT														
MUDFA / Utility diversions	03/11/08	14/06/10	588	84.00	INTC's	03/06/09	19/03/10	289	41.29	FP TPB to 7/1	03/11/08	07/01/10	430	61.43
			0	-				0	-				0	-
				84.00					41.29					61.43
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -2 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period -2wks: notwithstanding MUDFA / Utilities issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period +50 wks: On the basis that Infraco can mitigate to -2 wks per IM analysis then Infraco lower limit restricted to anything in excess of -2 wks. Tie liability remains at lower limit of -2 wks if Infraco responsible for all increased durations									
Infraco Rev.3 Period = +50 wks	tie	Infraco	tie	Infraco										
Lower Limit	-2.00	-2.00	-2.00	50.00										
Upper Limit	0.00	0.00	0.00	52.00										

² Note: this was discussed on 3 June 2010. It was noted that while there may have been an issue about an SDS failure to perform; there was also the question of agreement between tie and SDS re prioritisation of design packages.

1A3 Victoria Dock Entrance Bridge



- A. **IFC Process:** Initial IFC issued on time (planned 13/11/08; actual 12/11/08). Subsequent IFC's issued as follows:-
- (i) Trackform 07/05/10 in SDS v58. There is no information presently available to inform culpability for delay (see Preamble). It is notable however, that the IFC issue date is still in advance of the works to this area. It of itself is unlikely to have been the direct cause of the delay in this area (or to the achievement of a Certificate of Sectional Completion for this Section). It should also be noted that this particular Trackform IFC would not have been an obstacle to Infraco's commencement or early progress of bridge works (this has been confirmed by MB). **Potential delay by SDS/tie; Infraco – but only to the area (not the Section)** [DS advises that integration of BSC trackform proposals into structures is entirely a matter for which Infraco is responsible. This however, is unlikely to have influenced delay to commencement of bridge or trackworks in this area.
- B. **Key INTC's:** From information provided it appears that the Infraco issued 1 no. INTC in relation to this structure; **INTC 263**. We are further advised that **INTC 263 (IFC Drawing Changes – Victoria Dock Entrance Bridge – Section 1A)** appears to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-
- (i) INTC 263: issued by Infraco on **15/12/08** (33 days after IFC issue). Estimate should have been submitted on or around 13/01/09. Estimate has not yet been submitted by Infraco. As at 30/04/10 this is **472 days** later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 230.** However, an **80.13 Instruction was issued by tie on 19/03/10** instructing Infraco to proceed with the works covered by that INTC. **Delay by Infraco; Infraco culpability for the protracted time taken to produce an Estimate** (which in effect precipitated the need for tie to issue the 80.13 in an attempt to maintain progress – see Preamble).
- C. **MUDFA / Utilities:** Planned completion **13/11/08**; actual **18/07/09**, **247 days late. Delay by tie; tie culpability.** Note: We are advised that service diversions are not yet fully complete. Nevertheless we understand that works are sufficiently complete to enable commencement. These issues are however subsumed with delays on and construction periods required for TPB.
- D. **Other Issues:**
- (i) Sub-Contractor Procurement: No formal sub-contract has been put in place for this structure. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability** (but due to start date for this structure it will not be critical at present) [Note: no details as to sub-contractor in place. Understood that Crummock may be appointed by Infraco for 1A3 – see Infraco Period Report No.3-1 report to 24/04/10].
 - (ii) WPP Process: Not yet submitted (as advised by MB) as no sub-contractor appointed. This could be an obstacle to commencement (but unlikely at present). **Delay by Infraco. Infraco culpability.**
 - (iii) IDR/IDC process: IDC not yet in place. Infraco programme of 18/12/09 does not contain details of the IDR / IDC process for this structure. **Infraco delay** (at present not affecting commencement because this is dependent on TPB). **tie** may restrict Infraco access to this area pending resolution of the Infraco IDC certification process.
 - (iv) FPA Licence: Not in place until **07/01/10**. We are advised that this delay arose from a failure of SDS (possibly Infraco to manage SDS?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to the suitability of its original design. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.** Critical nature of this issue is seen in Tower Place Bridge.

E. Construction Periods:

1A3 Victoria Dock Bridge - 516					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.1	Delay
Start	17/02/2010	22/02/2012	79.14 wks	04/02/2011	50.29 wks
Finish	28/09/2010	17/07/2012	94.00 wks	11/01/2012	67.14 wks
Cal. Duration	6.14 wks	21.00 wks	14.86 wks	23.00 wks	15.86 wks

Note: MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A4 as 01/03/10 to 05/07/11 respectively. That equates to a period of **70 weeks**.

- (i) Delay to Start: The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 3, MB mitigated programme and MUDFA / Utility dates listed above.

Delay to start is therefore forecast to be a **range between 50 weeks (to 04/08/11) and 79 weeks (to 22/02/12)**.

Primary causes of delay to start as follows:-

- A. IFC process: no material impact;
- B. INTC's: Delay by Infraco in the submission of Estimate - (delay of **430 days** up to 19/03/10 when tie issued clause 80.13 instruction). **Delay by Infraco; Infraco culpability.** No material impact on commencement;
- C. MUDFA / Utilities: Planned completion **13/11/08**; actual completion **18/07/09, 247 days late. Delay by tie; tie culpability.** no material impact – dependent on TPB;
- D. Other:
 - **Sub-Contractor procurement:** No formal sub-contract in place. Not clear whether any informal (LOI) is in place for works in this section. **Delay by Infraco. Infraco culpability** (but due to start date for this structure it will not be critical at present)
 - **WPP process:** Not yet submitted (as advised by MB). Could be an obstacle to commencement in future. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;
 - **IDR/IDC process:** IDC not yet in place. This was clearly not an obstacle to commencement on Tower Place Bridge. **If not resolved prior to programmed commencement of VDEB, this may well prove an obstacle given current tie policy of** restricting Infraco access area pending resolution of the Infraco IDC certification process site wide.
 - **FPA Licence:** Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.** No evidence available as to SDS/Infraco performance or management of process (subject to future audit).

- (ii) Delay to Finish: Issue 3 programme shows an increase of circa **15 weeks** over the timescale in Rev.1 programme. Current Infraco Rev.3 programme period (working period) considered reasonable by IM. The original Rev.1 programme duration was inserted in respect of a 'dummy' activity'.

F. tie position on area availability:

- (i) We are advised that the temporary diversion works required for VDEB were substantively complete on 18/07/09. It is notable however, that this work (although substantively complete) remains incomplete as at 30/04/10. (These incomplete works will not be critical until such times as the works to Tower Place Bridge are complete).

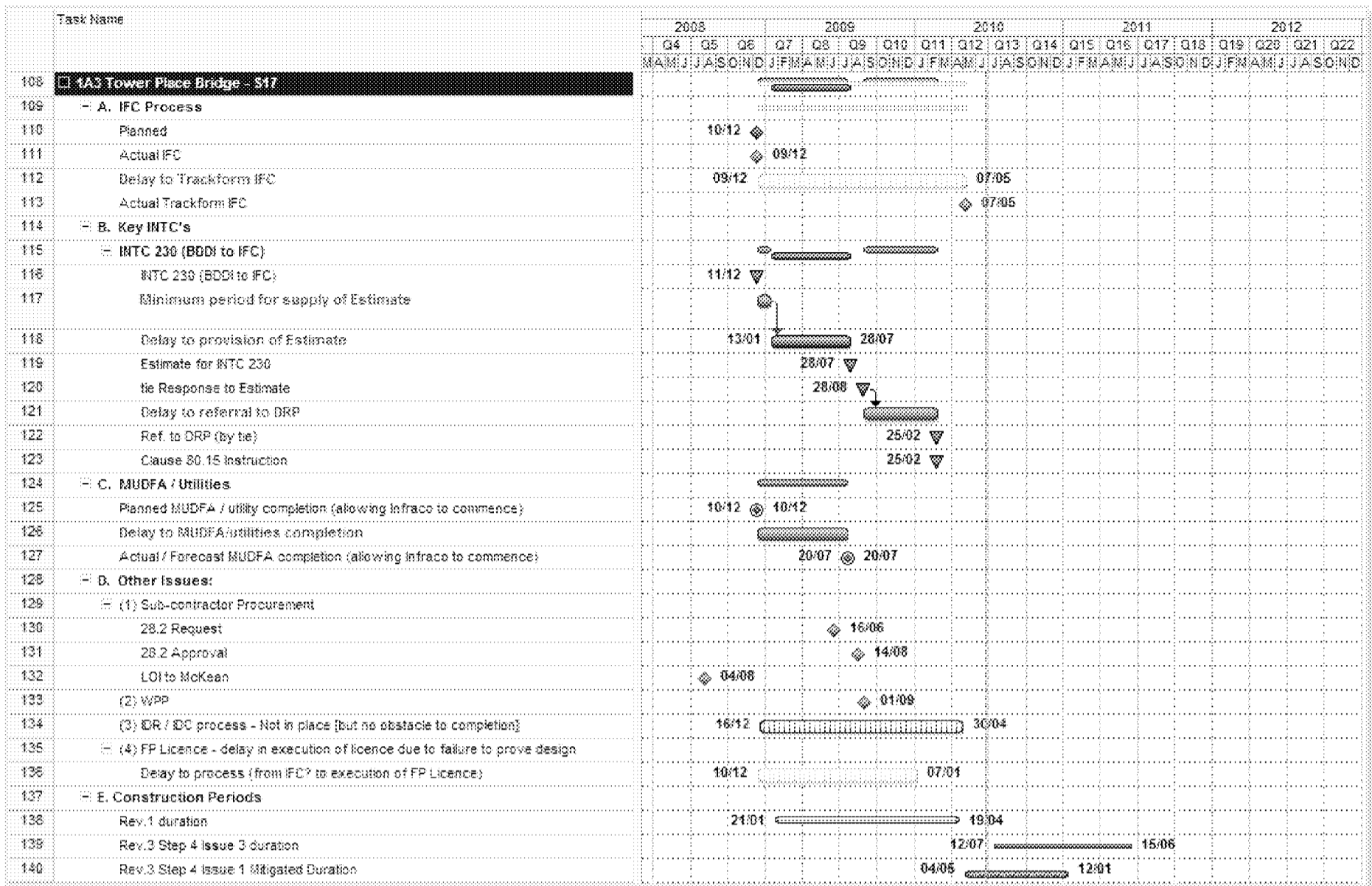
G. Conclusion:

- (i) **'Significant' issues/events:** This structure is dependent on the commencement and completion of TPB. Delay to actual start is forecast to be between 50 and 79 weeks (see table above). In our opinion the main factor was and is the delays to TPB. Running concurrent with TPB delays are (a) the INTC process in respect of INTC 263; (b) late completion of MUDFA/utilities; and (c) the late execution of the FP licence. However due to the delay on TPB, those matters are not critical to commencement of this structure. Increase in duration of 15 weeks appears to be considered reasonable by both IM & MB mitigation exercises.
- (ii) **Other concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing; the WPP process & the IDR/IDC process) have less of a bearing on the late commencement of this structure. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.
- (iii) **Considerations of dominance:** It is the effect of the delays to TPB which materially affects the commencement of this structure. The other issues whilst running concurrently occur (at present) sufficiently in advance of the delayed start date such that they do not (presently) pose a obstacle to commencement.
- (iv) **Criticality:** Notwithstanding the above noted commentary on "Considerations of dominance", it does appear however, that issues attaching to VDEB are not of themselves critical to Section 1 completion. Clearly, the commencement of VDEB is dependent on the completion of works to Tower Place Bridge.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	In culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
Delay; timescale from FP to 80.15 instruction for INTC 230 (TPB)	07/01/10	22/03/10	74	10.57	Delay; from 80.13 instruction to Rev 3 commencement date	19/03/10	17/02/10	151	21.57	IFC on time	10/12/08	10/12/08	0	-
			0	-				0	-				0	-
				10.57					21.57					-
2. UPPER LIMIT														
MUDFA / Utilities (still not 100% complete on VDEB)	21/01/09	20/07/09	180	25.71	FP Licence	21/01/09	07/01/10	351	50.14	FP Licence	21/01/09	07/01/10	351	50.14
Delay; from INTC 230 estimate to 80.15 instruction (TPB)	20/07/09	25/02/10	220	31.43	Delay; from 80.13 instruction to Rev 3 commencement date	19/03/10	17/02/10	151	21.57				0	-
Infraco Mobilisation (TPB)	25/02/10	22/03/10	25	3.57				0	-				0	-
				60.71					71.71					50.14
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +17 wks	IM Mitigated Period		Infraco Rev.3 Period				IM mitigated period +17wks: this is likely to be BDD/IFC issues, TM revised phasing or resequencing by infraco. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. (Very much dependent on issues attaching to TPB which is the predecessor to commencement of VDEB). Infraco Rev.3 period +15 wks: On the basis that infraco can mitigate to 15 weeks per it's analysis then infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of 2 wks. if infraco responsible for all increased durations							
Infraco Rev.3 Period = +15 wks	Infraco	Infraco	Infraco	Infraco	Infraco	Infraco								
Lower Limit	2.00	0.00	0.00	0.00	0.00	0.00								
Upper Limit	17.00	15.00	15.00	15.00	15.00	15.00								

1A3 Tower Place Bridge – S17



- A. **IFC Process:** Initial IFC issued on time (planned 10/12/08; actual 09/12/08). Subsequent IFC's issued as follows:-
- (i) Trackform 07/05/10 in SDS v58. There is no information presently available to inform culpability for delay (see Preamble). It is notable however, that as Trackform requires the further integration of Infracore design there is a responsibility on Infracore to provide information to SDS for incorporation on time. Notwithstanding, it is likely that the late issue of this IFC flows from one or more of the following reasons:-
 - a. Late issue by SDS (CE under 65(t));
 - b. A material breach by SDS (a CE under 65(u));
 - c. A failure of Infracore to timeously provide the Infracore Design to SDS (clause 19.19);
 - d. A failure of Infracore in respect of its management of SDS or another breach by Infracore.
 It should be noted however, that this particular Trackform IFC would not have been an obstacle to Infracore's commencement or early progress of bridge works (this has been confirmed by MB). An issue date of 11/01/10 although late would not appear to have affected the trackwork activities in this area, which were due to commence in the Rev.1 programme during June 2010 (this proceeds on the assumption that the Trackform IFC does not require amendments to the TPB IFC).

Potential delay by SDS/tie; Infracore – but only to the area (not the Section) [As noted at VDEB above, DS advises that integration of trackform proposals into structures is entirely a matter for which Infracore is responsible. This however, is unlikely to have influenced delay to commencement of bridge or trackworks in this area]
- B. **Key INTC's:** From information provided it appears that the Infracore issued 3 no. INTC's in relation to this structure; INTC's 139, 230 & 405. We are advised that only **INTC 230 (Tower Bridge Structure IFC Drawings)** appears to have materially / critically affected Infracore's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-
- (i) INTC 230: issued by Infracore on **11/12/08** (2 days after IFC issue). Estimate should have been submitted on or around **12/01/09**. Estimate actually submitted by Infracore on **28/07/09** i.e. **197 days** later than permitted by the Contract. **Delay by Infracore. Infracore culpability for time taken to produce Estimate for INTC 230.** (MB advises that tie responded with what can now be considered a fairly accurate estimate in September '09).

80.15 Instruction issued by tie on 25/02/10. 184 days following receipt of Estimate (less 28 days for review & discussion of same). **Delay by tie; tie culpability for time taken to issue 80.15 instruction following receipt of Estimate dated 28/07/09.**
- C. **MUDFA / Utilities:** Planned completion **10/12/08**; actual completion **18/07/09, 220 days late. Delay by tie; tie culpability.**
- D. **Other Issues:**
- (i) Sub-Contractor Procurement: **28.2 approval process:** request submitted 16/06/09; approval granted 14/08/09. Note that this is much later than Rev.1 commencement date (21/1/09). However, first LOI (for mobilisation and enabling works) issued by Infracore on 04/08/08 (i.e. well in advance of Rev.1 commencement). **Delay by Infracore. Infracore culpability.** At best likely to be administrative delay by Infracore in terms of Rev.1 dates; however, it would be known post 04/08/08 that delay incurred to Bridge due to MUDFA works. Unlikely to have critical / dominant effect.
 - (ii) WPP Process: Submitted September 2009 in place for December 2009. This could have been an obstacle to commencement. **Delay by Infracore. Infracore culpability.**

- (iii) IDR/IDC process: **IDC not yet in place**. This was clearly not an obstacle to commencement as commencement took place on 22/03/10 in advance of IDC. See Preamble.
- (iv) FPA Licence: Not in place until 07/01/10. Advised that delay arose from failure of SDS (Infraco?) to provide 'Category 2' design calculations for ramp at TPB. SDS subsequently revised design to remove ramps as it could not satisfy FP as to suitability of design. This would have been an obstacle to commencement. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

E. Construction Periods:

1A3 Tower Place Bridge - S17					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	21/01/2009	12/07/2010	76.71 wks	04/05/2010	66.86 wks
Finish	19/04/2010	15/06/2011	60.29 wks	12/01/2011	38.29 wks
Cal. Duration	64.86 wks	48.43 wks	-16.43 wks	36.29 wks	-28.57 wks

- (i) Delay to [Actual] Start: The table above refers to various programme dates. Actual start however was **22/03/09**. This is **16 weeks** earlier than Infraco's Issue 3 programme; and **6 weeks** earlier than IM mitigated Issue 3 programme.

Delay to actual start is therefore 61 weeks (21/01/09 to 22/03/10).

Primary causes of delay to start as follows:-

- A. IFC process: no material impact;
- B. INTC 230: INTC issued on time; significant **Infraco delay to provision of Estimate (197 days late); tie delay (184 days) in dealing with Estimate through to 80.15 instruction on 25/2/10**. This is the last issue affecting commencement.

Note: as discussed there may be a hypothetical argument concerning the effect of 'removing' the delay in the provision of the Estimate (such that an earlier 80.15 instruction and hence start could have been achieved). However, this does not sit well with the actions of tie in relation to the actual date of issue of the 80.15 instruction. **To discuss further.**

- C. MUDFA / Utilities: Planned completion **10/12/08**; actual completion **18/07/09, 220 days late. Delay by tie; tie culpability.**

D. Other:

- **Sub-Contractor procurement**: First LOI issued in advance of IFC and planned start (although 28.2 process later). Appears to have limited impact;
- **WPP process**: Submitted September 2009 in place for December 2009. This could have been an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Appears to have limited impact;
- **IDR/IDC process**: IDC not yet in place. This was clearly not an obstacle to commencement as commencement took place on 22/03/10 in advance of IDC.
- **FPA Licence**: Not in place until 07/01/10. Delay arose from failure of SDS (Infraco?) to provide. This would have been an obstacle to commencement. MB advises that this delay flows from two issues. The first being SDS / Infraco failure in the provision of 'Category 2' design calculations for TPB; and secondly SDS / Infraco failure to provide sufficient design information for retaining walls. **Delay by SDS (possible material breach – excusable under 65(u)); but possibly Infraco in failing to manage SDS (no evidence). SDS or Infraco culpability.**

- (ii) Delay to Finish: No further delay; in fact delay to finish is less than delay to start. That is, duration has been reduced which in turn reduces delay to completion of structure. Understood to be contributed to by a reduction in workscope.

Note: IM mitigated version of Rev.3 Issue 1 programme shows shorter duration than Infraco Issue 3 programme.

If earlier actual start of 22/03/09 is factored in, the delay to this structure and this area will be mitigated. The extent of that mitigation however will depend on the measures actually adopted by Infraco. The overall delay to Sectional Completion Date 'C' however remains as previously forecast (as delays to 1B & 1C maintain the critical delay to summer 2010 minimum).

F. tie position on area availability:

- (i) We are advised that the temporary diversion works required for Tower Place Bridge were completed on **18/07/09**. This was followed by the removal of fibre optic cables which we understand took a further 6 weeks (approx). This should have facilitated an early September 2009 commencement date for Infraco works.

G. Conclusion:

- (i) **'Significant' issues/events**: Delay to actual start was 61 weeks. In our opinion there were three main contributory factors, being (a) the INTC process in respect of INTC 230; (b) late completion of MUDFA/utilities; and (c) the late execution of the FP licence. Taking those events in chronological order:-

MUDFA/utilities diversions were supposed to be completed on **10/12/08** (to facilitate a start on TPB by 21/01/09). Those diversions however were not actually completed until circa **18/07/09**. This is tie's culpability. Running concurrently with this was the late provision by Infraco of the Estimate for INTC 230. That should have been provided by 12/01/09 (earliest) but was actually provided on **28/07/09**. This is a matter for which Infraco is responsible. Both events would have delayed commencement of the structure. Beyond 28/07/09 however, tie's review and inaction on the Estimate for INTC 230 ran until 25/02/10 (when the 80.15 instruction was issued). In light of the advice from DLA dated 24 March 2010, this is a period for which tie bears the responsibility. In addition, the execution of the FP licence is understood to have been delayed by SDS such that it was not in place until **07/01/10**. This is either an SDS breach (which would excuse Infraco of the time) or if caused by a failure on the part of Infraco to manage SDS, it is a matter for which Infraco bears responsibility.

- (ii) **Concurrent issues**: In our opinion the other events detailed above (i.e. the sub-contractor procurement timing; the WPP process & the IDR/IDC process) have less of a bearing on the late commencement of this structure. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.

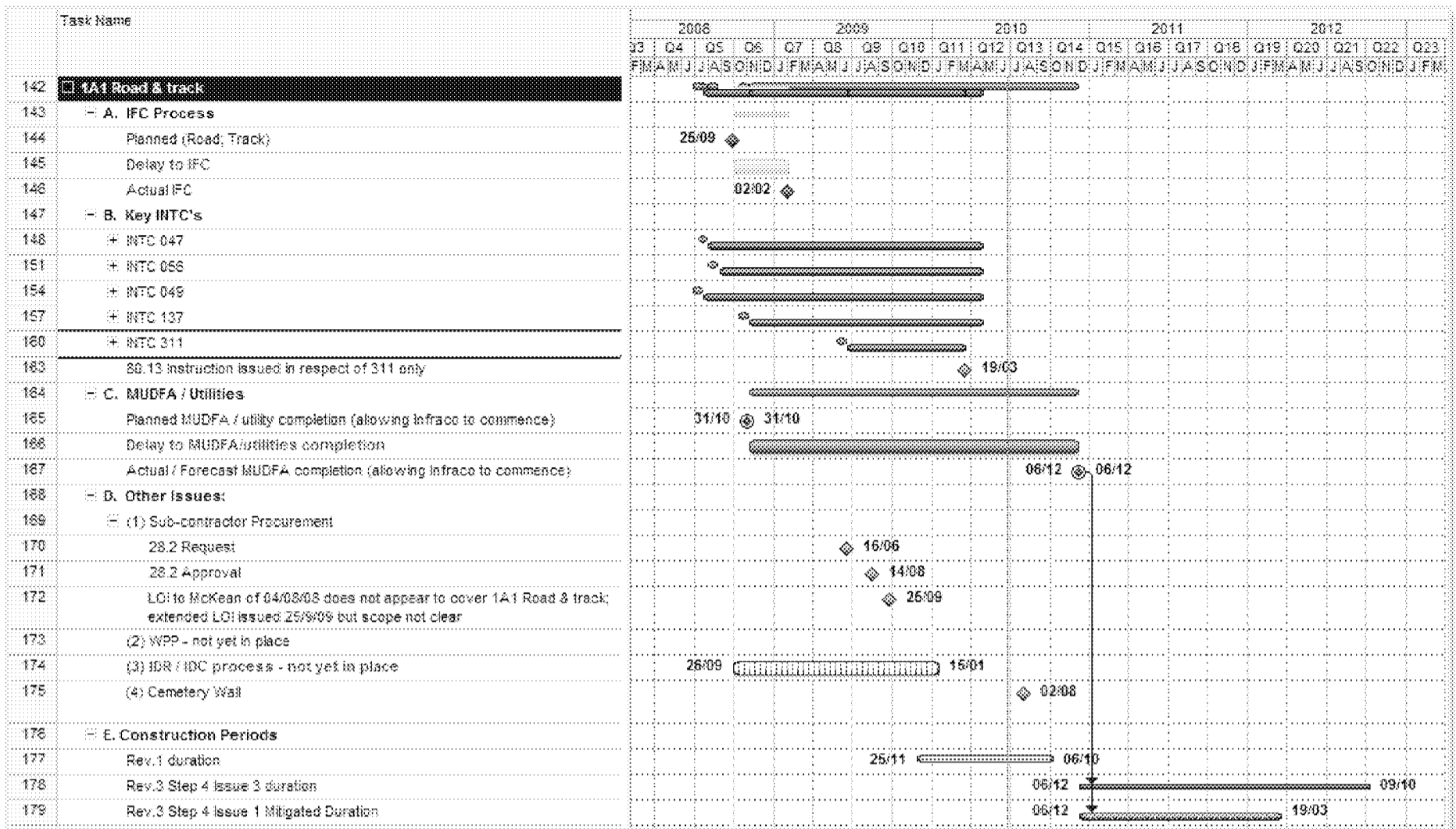
(iii) **Considerations of dominance:** Of the three significant events highlighted above, in our opinion neither can be said to be 'the' truly dominant delay affecting commencement for the entirety of the period. In relative terms however Infraco will certainly argue that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delay in the INTC Estimate process. They will also point to the tie delay in respect of INTC 230 – which runs beyond MUDFA / utilities completion. tie however may be able to reply by stating that 'but-for' the late submission of the Estimate, the 80.15 instruction could have been issued prior to the late completion of MUDFA (even allowing for their delay beyond receipt of the Estimate). That position would render more 'importance' to the late provision of the Estimate. That however is rather subjective as one cannot be certain that tie would have issued the 80.15 at an earlier date had Infraco issued its Estimate on time (or earlier than it did).

The FP licence event is considered to be concurrent up to January 2010. It does however subsequently become 'overtaken' by the period of the INTC 230 process (and in particular the late issue of the 80.15 instruction).

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
Delay; timescale from FP to 80.15 instruction for INTC 230	07/01/10	22/03/10	74	10.57	Delay to estimate for INTC 230 beyond MUDFA	20/07/09	28/07/09	8	1.14	IFC on time	10/12/08	10/12/08	0	-
			0	-				0	-				0	-
			10.57					1.14						-
2. UPPER LIMIT														
MUDFA / Utilities	21/01/09	20/07/09	180	25.71	FP Licence	21/01/09	07/01/10	351	50.14	FP Licence	21/01/09	07/01/10	351	50.14
Delay; from INTC 230 estimate to 80.15 instruction	20/07/09	25/02/10	220	31.43				0	-				0	-
Infraco Mobilisation	25/02/10	22/03/10	25	3.57				0	-				0	-
			60.71					50.14					50.14	
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -29 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period -29 wks: notwithstanding MUDFA / Utilities issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period -16 wks: Infraco clearly accepts the possibility for mitigation. Though currently not to the same extent as noted above. On the basis however that Infraco can mitigate to -29 wks per IM analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of -29wks if Infraco responsible for all increased durations									
Infraco Rev.3 Period = -16 wks	tie	Infraco	tie	Infraco										
Lower Limit	-29.00	-29.00	-29.00	-16.00										
Upper Limit	0.00	0.00	-16.00	0.00										

1A1 Road & Track



A. **IFC Process:** The initial IFC was 130 days (or 19 weeks) late; planned date was 25/09/08; the actual was 02/02/09. There is no information presently available to inform culpability for delay (see Preamble). Potential reasons include:-

- Late issue by SDS (at its simplest a CE under 65(t));
- A material breach by SDS (again at its simplest form a CE under 65(u));
- A failure of Infraco to provide the Infraco Design to SDS (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC/NR interface);
- A requirement of CEC/NR for which tie will bear responsibility.

Note: DS advises "late submission of TAA package followed by length of time needed to incorporate CEC comments due to poor / incomplete design". DS has further advised that on the basis of further IFC availability and approval dates – delay by SDS exists but in his opinion it is due to Infraco failing to manage the process. In our opinion this would clearly have an impact on culpability for this issue (requires audit or further investigation). **Delay by SDS, SDS /tie or Infraco?**

B. **Key INTC's:** From the information provided it appears that Infraco issued 6 No. INTC's against this area. INTC's 047, 056, 049, 086, 137 & 311 refer [Complete data on INTC's awaited]. Details as follows:-

- INTC 047:** issued 04/07/08; Estimate due 30/07/08; No Estimate provided by Infraco. **Delay by Infraco.**
- INTC 056:** issued 29/07/08; Estimate due 22/08/08; No Estimate provided by Infraco. **Delay by Infraco.**
- INTC 049:** issued 24/06/08; Estimate due 18/07/08; An Estimate was provided by Infraco on 30/07/09 (377 days late). **Delay by Infraco.**
- INTC 137:** issued 08/10/08; Estimate due 03/11/08; No Estimate provided by Infraco. **Delay by Infraco.**
- INTC 311:** issued 22/05/09; Estimate due 17/06/09; No Estimate provided by Infraco. **Delay by Infraco.**

An 80.13 instruction was issued by tie on 19/03/10 in respect of INTC 311 only (as this appears to be a key INTC in terms of facilitating commencement).

C. **MUDFA / Utilities:** Planned completion 31/10/08; Forecast as at 30/04/10 was 06/12/10 – now forecast completion is end of February 2011 on Constitution Street ch 2600 – 2700. We are advised by tie PM staff that this is not sufficient however, to facilitate meaningful commencement on this section of the works. Meaningful commencement is dependent on MUDFA / Utilities completion to Victoria Bridge East Side to Baltic Street ch 1700 – 2300; that is forecast to complete on 06/12/10 (as forecast at 30/04/10).

Delay by tie; tie culpability.

D. **Other Issues:**

- Sub-Contractor Procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. LOI to McKean of 04/08/08 does not appear to cover 1A1 Road & track; extended LOI issued 25/9/09 but scope not clear [subject to future tie audit]. **Delay by Infraco. Infraco culpability.**
- WPP Process:** Not yet submitted (as advised by MB). This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.**
- IDR/IDC process:** IDC not yet in place. Infraco programme of 18/12/09 shows this as being forecast to be in place by 15/01/10; but not yet in place. **Delay by Infraco. Infraco culpability.**
- Cemetery Wall:** Cemetery used to extend across Constitution Street. As a consequence, there are Archaeological and Historic Scotland issues governing the requirement to move skeletons displaced by the tram works. Given the intricacies attaching to these works the potential for further delays exist. We are advised that any works extending beyond August / September 2010 are likely to have a critical impact on works to 1B.

E. Construction Periods:

1A1 Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	25/11/2009	06/12/2010	53.71 wks	06/12/2010	53.71 wks
Finish	06/10/2010	09/10/2012	104.86 wks	19/03/2012	75.71 wks
Cal. Duration	45.14 wks	96.29 wks	51.14 wks	67.14 wks	21.00 wks

Note: MB suggested mitigation exercise shows overall commencement and completion in Intermediate Section 1A as 01/03/10 to 05/03/12 respectively. That equates to an overall period of **105 weeks** (but is not comparable with the above 1A1 split).

(i) Delay to Start: The table above refers to various programme dates. Forecast start dates differ between Issue 3, IM Issue 1, MB mitigated programme and MUDFA / Utility dates listed above.

Delay to start is therefore forecast to be **54 weeks (06/12/10)** in terms of both the Rev.3 and IM Rev.3 mitigation programmes. **MB mitigation exercise shows immediate commencement** [albeit now outdated].

Primary causes of delay to start as follows:-

A. IFC process: The initial IFC was **198 days (or 28 weeks) late**; planned date was **25/09/08**; the actual was **02/02/09**. There is no information presently available to inform culpability for delay. **Unless there is proof of Infraco breach, it will be a CE under either 65(t) or (u).**

B. INTC's: Lengthy delays by Infraco in the submission of Estimates. Delay at least up to 19/03/10 when tie issued clause 80.13 instruction.

C. MUDFA / Utilities: Planned completion **31/10/08**. Partial completion at Constitution Street ch 2600 – 2700 as at **31/05/10**; further release of areas as at **06/12/10**. We understand this is the area required to make meaningful progress. **Delay by tie; tie culpability.**

D. Other:

➤ **Sub-Contractor procurement:** No formal sub-contract has been put in place for this section. It is also not clear whether any informal (LOI) is in place for road works in this section. **Delay by Infraco. Infraco culpability.** Effect of this is not clear – it could be a hindrance to progress – but details not available to establish scope of work under McKean LOI. Without evidence to the contrary Infraco may be able to argue 'just-in time' procurement / authorisation.

➤ **WPP process:** Not yet submitted (as advised by MB). This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact;

➤ **IDR/IDC process:** IDC not yet in place. (tie's ability to stop work from commencing on this basis is not clear – see Preamble).

➤ **Cemetery Wall:** Works yet to commence. This could be an obstacle to commencement on 1B Road & Track if incomplete as at September 2010. If incomplete as at the forecasted completion of MUDFA / Utilities works i.e. 06/12/10, this will impact on the meaningful commencement of works to 1A1 Road & Track. **Potential future delay by tie; tie culpability.**

(ii) Delay to Finish: The Issue 3 programme shows an increase of circa **51 weeks** over timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 3 also shows an increased duration of **22 weeks** over the Rev.1 programme period (albeit 35 weeks shorter than Infraco's proposed Issue 3 programme).

MB mitigation proposal also has shorter duration than Issue 3. **Discuss how this is to be pursued with / instructed to Infraco.**

F. **tie position on area availability:**

(i) Refer to response (C) above re MUDFA dates (available from **06/12/10**).

G. **Conclusion:**

(i) **'Significant' issues/events:** In our opinion there were three main contributory factors, being (a) the IFC process; (b) the INTC process in respect of INTC's 264, 292 & 473; and (c) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC should have been issued on **25/09/08**; it was actually issued on **02/02/09 (130 days late)**. **MUDFA/utilities diversions** were planned to be completed on **31/10/08** (to facilitate a start on 1A1 Road & track on 25/11/09). Those diversions however are not forecast to complete until **06/12/10**. This is tie's culpability. Running concurrently with this was the **late provision by Infraco of the Estimates** for INTC's 047, 056, 049, 137 & 311. Those Estimates have yet to be provided. This is a matter for which Infraco is responsible. **Delay measured to 19/03/10** for INTC 311 (when clause 80.13 instruction issued). Each of those events (i.e. IFC, MUDFA, INTC's) could have delayed commencement in this area.

The **IDC process** could also be a contributing factor if Infraco has failed / fails to adhere to a contractual process (but tie's ability to stop work from commencing on this basis is not clear – see Preamble).

(ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.

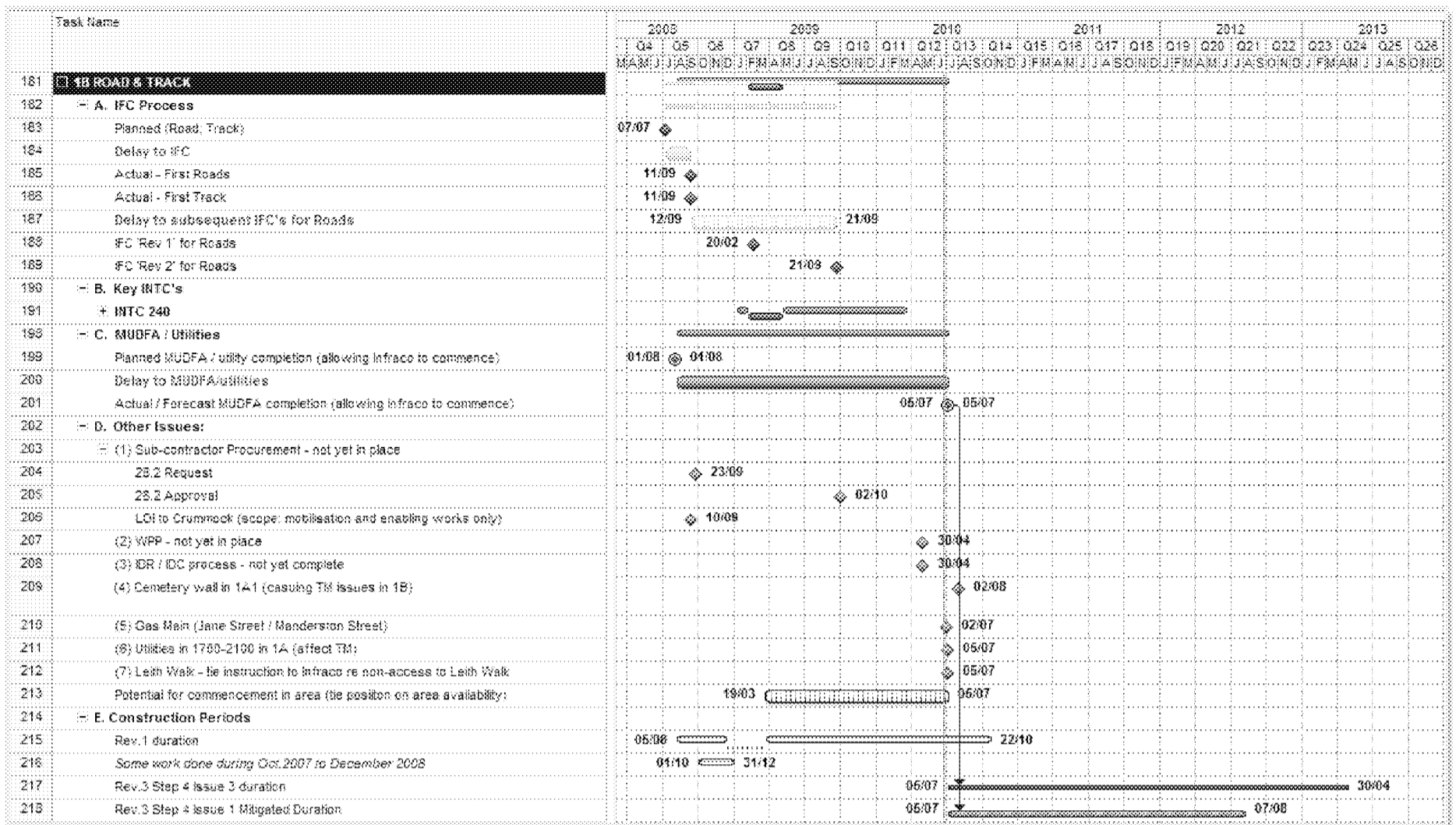
(iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability (due to MUDFA / utility delays) will have more causative significance. See previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

As such, in our opinion the delay to the MUDFA/utility works in 1A1 Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability					Infraco culpability					Poss. SDS culpability			
	From	to	Days	Weeks	Cause	From	to	Days	Weeks	Cause	From	to	Days	Weeks
1. LOWER LIMIT														
MUDFA / Utilities	25/11/09	06/12/10	376	53.71				0	-	Delay to IFC	25/09/08	02/02/09	130	18.57
			0	-				0	-				0	-
			53.71					-					18.57	
2. UPPER LIMIT														
MUDFA / Utilities	25/11/09	06/12/10	376	53.71										-
			0	-				0	-				0	-
			53.71					-					-	
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +22 wks	IM Mitigated Period				Infraco Rev.3 Period				IM mitigated period +22wks: this is likely to be BDD/IFC issues and TM revised phasing. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. Infraco Rev.3 period +51 wks: On the basis that Infraco can mitigate to 22 wks per IM analysis then Infraco lower limit restricted to anything in excess of 22 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations					
Infraco Rev.3 Period = +57 wks	IM		Infraco		IM		Infraco							
Lower Limit	0.00	0.00	0.00	29.00										
Upper Limit	22.00	22.00	22.00	51.00										

1B Road & Track



A. **IFC Process:** Initial IFC was 9.5 weeks late (planned 07/07/08; actual 11/09/08). This IFC was not issued as 1 no. IFC, it was divided into 2no. separate IFC's, addressing Roads and Track separately. Subsequent IFC's issued as follows:-

(i) 'Rev 1' Roads (20/02/09) & Rev '2' Roads (21/09/09). There is no information presently available to inform culpability for delay to the foregoing (see Preamble). It is notable however, that as Trackform and Roads requires the further integration of Infraco design there is a responsibility on Infraco to provide information to SDS for incorporation on time. Potential reasons for the late issue of IFC's to this area include:-

- Late issue by SDS (CE under 65(t));
- A material breach by SDS (a CE under 65(u));
- A failure of Infraco to timeously provide the Infraco Design to SDS (clause 19.19);
- A failure of Infraco in respect of its management of SDS or another breach by Infraco.

Infraco commenced some works on or around October 2008. This would indicate that this commencement was influenced by the late 'First Road & First Track' IFC's issues – but works appear to have been stopped because of the effect of the incomplete MUDFA / utility works. Comments flowing from meeting at Edinburgh Park on 03/06/10 suggest that questions exist as to the completeness of IFC's issued against this area. It is notable however that the later 'Rev 1 & Rev 2' Road's IFC's were clearly not an obstacle to Infraco's commencement or early progress on 1B Road & Track. (This however is a matter which requires further investigation. This investigation should also examine the possibility that the 'First Track' IFC issued on 11/09/08 was potentially an alignment drawing not track as labelled).

Potential delay by SDS/tie; Infraco

B. **Key INTC's:** From the information provided it appears that Infraco issued around 48 no. INTC's against this area [Complete data on INTC's awaited]. There is insufficient information available at present to establish which INTC's are significant. The only INTC which was identified as having the potential to cause delay to commencement or progress was INTC 240. It is noted however that all of the foregoing were the subject of an 80.13 instruction issued to Infraco on 19/03/10. As such, notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress.

C. **MUDFA / Utilities:** Planned completion 01/08/08. MUDFA / utilities works are partially complete on Leith Walk: Southbound Carriageway (ch 900 – 150). However current advice is that commencement / subsequent progress on this section of the works is dependent on forecast MUDFA / utilities completions as follows:-

- (i) Leith walk : Foot of the Walk to Jane Street was forecast as 30/04/10 (now appears likely to be July 2010) Delay by tie; tie culpability
- (ii) Leith Walk: Jane Street to McDonald Road was forecast as 05/07/10 (now appears likely to be September 2010) Delay by tie; tie culpability

Original, tie PM advice was that meaningful material commencement could not be made until 5 July 2010. However at meeting held at Edinburgh Park on 03/06/10, PD was of the opinion that Infraco could have commenced works in the Section of 1B running from Leith Walk to Jane Street on or around 12/03/09. That being the case, Infraco culpability would attach to its delay in reacting to this workforce availability. Cautionary Note: to what extent a start on that date would reduce the overall period of works after *all* utility diversions had been completed is somewhat subjective. As such, caution should be exercised when / if arguing that Infraco is responsible for delays post 12/03/09.

D. **Other Issues:**

- (i) Sub-Contractor Procurement: Understood that Crummock may be appointed by Infraco for 1B – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase on completion of utility issues cited as obstacles to Infraco commencement. .

- (ii) WPP Process: Not yet submitted. This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Again, the significance of this issue will increase as the 5 July 2010 nears.
- (iii) IDR/IDC process: Not yet in place. Infraco letter/programme of 18/12/09 identifies the requirement for 11 separate IDR/IDC's. Only 6 are shown in that programme. It is highly unlikely that Infraco will be permitted by tie to commence without this paperwork in place. This may merit further discussion. **Delay by Infraco. Infraco culpability.**
- (iv) Cemetery Wall: The original cemetery extended into Constitution Street. As a consequence there are Archaeological and Historic Scotland issues governing the requirement to move skeletons displaced by the tram works. Given the intricacies attaching to these works, the potential for further delays exist. Although this workscope is outwith intermediate section 1B, the impact of this work extending beyond August / September 2010 is likely to have a consequential impact on TM requirements on 1B Road & Track works. **No current delay (but potential to cause delay).**
- (v) Gas Main (Jane Street / Manderston Street): We have been advised that this is an issue which has not yet been discussed with Infraco. The current position is that if SDS design proposals do not meet SGN's requirements/aspirations, the potential exists for further substantive delays. At best this issue will rely on reasonable mitigation on the part of Infraco. This could therefore be an obstacle to future progress. **No current delay (but potential to cause delay)**
- (vi) Leith Walk Railway Bridge: SDS culpability exists in regard to progress of design with respect to trackform design. Shallow depth issues also exist which SDS have failed to address timeously.

E. Construction Periods:

1B Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	05/08/2008	05/07/2010	99.86 wks	05/07/2010	99.86 wks
Finish	22/10/2010	30/04/2013	131.57 wks	07/08/2012	93.57 wks
Cal. Duration	115.57 wks	147.29 wks	31.71 wks	109.29 wks	-6.29 wks

- (i) Delay to Start: The table above refers to various programme dates. Both the Issue 3 and IM mitigated programme use the same projected start date of 05/07/10. This was the same date that the PM's considered meaningful progress could be made. We are advised however that earlier commencement could have been made in relation to the outbound carriageway chainages 100 – 300 and 600 – 900 on or around **12/03/09**. That is to say, the delays to MUDFA / utility works have dictated and are dictating the commencement date. The **delay to start** is therefore forecast to be circa **100 weeks**. Primary causes of delay to start as follows:-
 - A. IFC process: The initial IFC **was 9.5 weeks late**; planned date was **07/07/08**; the actual was **11/09/08**. Subsequent revisions to the 'Roads' IFC were issued on 20/02/09 & 21/09/09. It is unclear as to whether these revisions would have been material to commencement (certainly (re)commencement was actually delayed by utility works beyond those later IFC dates). There is no information presently available to inform culpability for delay to these subsequent IFC's. Unless there is proof of Infraco breach, **this could be a CE under either 65(t) or (u)**.
 - B. INTC's: see comments above. **[Complete data on INTC's awaited]**. Notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress.
 - C. MUDFA / Utilities: Planned completion **01/08/08**. Partial availability on Leith Walk: Southbound Carriageway (ch 900 – 150); further release of areas as at **30/04/10 & 05/07/10**. tie PM advice is that meaningful commencement cannot be made until **5 July 2010**. **Delay by tie; tie culpability.**
 - D. Other:
 - **Sub-Contractor procurement**: Understood that Crummock may be appointed by Infraco for 1B – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 05/07/10 nears.
 - **WPP process**: Not yet in place. This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact if in place on time for commencement;
 - **IDR/IDC process**: yet in place. Infraco letter of 18/12/09 identifies the requirement for 11 separate IDR/IDC's. Only 6 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place (tie's ability to stop work from commencing on this basis is not clear – see Preamble) **Delay by Infraco; Infraco culpability.**
 - **Other potential obstacles to commencement / progress**: Cemetery wall; Gas main at Manderston Street & Jane Street; utility works to ch.1700 to 2100 (Section 1A1 Constitution Street) affecting TM.
- (ii) Delay to Finish: Issue 3 programme shows an **increase of circa 32 weeks** over the timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 3 shows a slight reduction in duration of **6 weeks** to the Rev.1 programme.
There is presently no justification for the increased Rev.3 duration.

F. tie position on area availability:

- (i) Despite current / earlier availability on Leith Walk (outbound carriageway chainages 100 – 300 and 600 – 900), we are currently advised that Infraco have to date declined to commence works on 1B Road & Track until all MUDFA / Utilities issues are completed. These works conclude on Leith Walk: Jane Street to McDonald Road on or around 05/07/10. **Delay by tie; tie culpability** For initial MUDFA / Utility delays. **Infraco culpability** would appear to exist with respect to its delayed reaction to the above noted workface availability on or around 12/03/09. (Cautionary Note: the reasonableness of that tie position will however have to be established. That is to say, to what extent a start on that date would reduce the overall period of works after *all* utility diversions had been completed is somewhat subjective. As such, caution should be exercised when / if arguing that Infraco is responsible for delays post 12/03/09).

G. Conclusion:

- (i) **'Significant' issues/events**: In our opinion there were three main contributory factors, being (a) the IFC process; (b) the INTC process; and (c) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC was programmed to be issued on **07/07/08**; the first IFC was actually issued on **11/09/08 (9.5 weeks late)**. This appears to have facilitated commencement in this area. This is either a CE under 65(t) (or possibly a failure by Infraco to manage SDS). Subsequent revisions were issued on 20/02/09 & 21/09/09 – those revisions however were issued after Infraco had stopped work in this area (and did not of themselves facilitate a restart). **MUDFA/utilities diversions** were supposed to be completed on **01/08/08** (to facilitate a start on 1B on 05/08/08). Those diversions however are forecast to be sufficiently complete suffice to allow re-commencement on **05/07/10**. This is tie's culpability.

The **IDR/IDC process** may also be a contributing factor affecting commencement (but tie's ability to stop work from commencing on this basis is not clear).

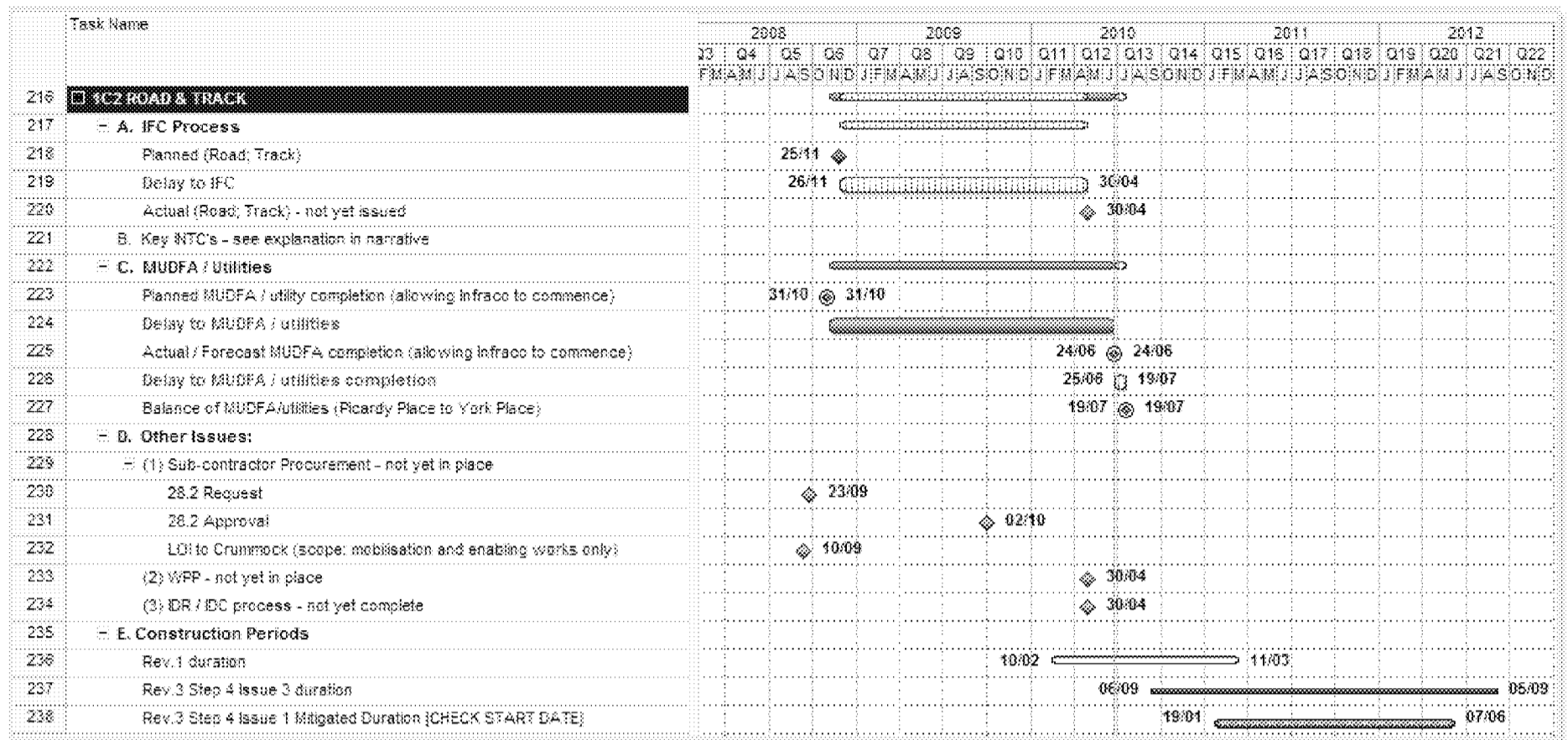
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. This is evident from the actual (partial) commencement in October 2008. Whilst in isolation these issues may have been critical to commencement, their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability in July 2010.
- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. The late issue of the first IFC in this area does appear to have affected commencement. That said, if contemporaneously Infraco and SDS knew that the utilities diversions were significantly delayed, such that they did not have to progress the design in accordance with the original programme, then the works area availability will have more causative significance. We understand that an instruction was issued by tie (post Christmas 2008 embargo; INTC 250) such that Infraco was instructed not to work in 1B until further instructed by tie. As a minimum that would appear to restrict access up to partial availability on Leith Walk: Southbound Carriageway (ch 900 – 150). See also previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

As such, in our opinion the delay to the MUDFA/utility works in 1B Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability					Infraco culpability					Poss. SDS culpability			
	From	To	Days	Weeks	Cause	From	To	Days	Weeks	Cause	From	To	Days	Weeks
1. LOWER LIMIT														
MUDFA / Utilities	05/08/08	12/09/08	219	31.29				0	-	Delay to 1st IFC	07/07/08	11/09/08	66	9.43
			0	-				0	-				0	-
				31.29										9.43
2. UPPER LIMIT														
MUDFA / Utilities	05/08/08	05/07/10	699	99.86	Poss. Late start	12/03/09	05/07/10	480	68.57	Delay to last IFC	07/07/08	21/09/09	441	63.00
			0	-				0	-				0	-
				99.86					68.57					63.00
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -6 wks	IM Mitigated Period				Infraco Rev.3 Period				IM mitigated period -6 wks: notwithstanding MUDFA / Utilities issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period +32 wks: On the basis that Infraco can mitigate to -6 wks per IM analysis then Infraco lower limit restricted to anything in excess of -6 wks. tie liability remains at lower limit of -6 wks if Infraco responsible for all increased durations					
Infraco Rev.3 Period = +32 wks	tie		Infraco		tie		Infraco							
	From	To	Days	Weeks	From	To	Days	Weeks						
Lower Limit	-6.00	-6.00	-6.00	32.00										
Upper Limit	0.00	0.00	0.00	38.00										

1C2 Road & Track



A. **IFC Process:** Initial IFC is currently **74 weeks late** (planned **25/11/08**; as at **30/04/10** the actual IFC is **yet to be issued**). DS advises that "... design not yet approved and still subject to change". DS also advised that the "... current design parameters were instructed by CEC and revised design parameters now being instructed – mainly to allow Picardy Place to function in traffic flow terms but also to take account of potential Henderson Global (St James Quarter)". From the above we understand that there are two concurrent issues. The first is that the SDS design is incomplete or not satisfactory to CEC. However the second issue (Henderson Global / St James Quarter) is outwith Infraco control. From discussion with DS, this appears to be the main issue delaying completion of the design in this area. Further information provided by DS on 02/06/10 states that "... delay for 1C2 Roads is attributable to CEC (and thus tie) except for any time where we can substantiate unreasonably slow progress by SDS / BSC, eg period taken to produce design estimates. SDS design unsatisfactory to CEC is a red herring because CEC instructed the constraints that give rise to unsatisfactory traffic impacts and CEC has had to relax those constraints to try to find an acceptable design". It is therefore likely that the late issue of this IFC flows from one or more of the following possibilities:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco? As a minimum however, it is expected that Infraco will be excused the time for this delay due to CEC indecision concerning Henderson Global (St James Quarter) design requirements.

B. **Key INTC's:** From the information provided it appears that Infraco issued around **13 no. INTC's** against this area [Complete data on INTC's awaited]. Of those INTC's 2No. are known to have TCO issued against them (INTC's 91 & 169). Beyond that however, there is insufficient information available at present to establish which INTC's are significant. That said, it is noted that 7 No. of the foregoing were the subject of an **80.13 instruction issued to Infraco on 19/03/10**. As such, notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress. In respect of the remainder, the obligation remains with Infraco to provide Estimates (which are overdue in terms of Clause 80 timescales).

C. **MUDFA / Utilities:** Planned completion was **31/10/08**. MUDFA / Utilities are forecast to complete at Broughton Street Junction on **24/06/10**. Meaningful commencement is dependent on MUDFA / Utilities completion on York Place / Elder Street to North St Andrews Square and Picardy Place to York Place on **18/07/10**. **Delay by tie; tie culpability**

D. Other Issues:

- (i) **Sub-Contractor Procurement:** Understood that Infraco has verbally advised that they are not sure how much work they will self-deliver and how much they may sub-contract. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 06/09/10 nears (this is the earliest date of commencement in this area between Issue 3 and IM mitigated programme).
- (ii) **WPP Process:** Not yet submitted. This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Again, the significance of this issue will increase as the 06/09/10 nears.
- (iii) **IDR/IDC process:** Not yet in place. Infraco letter / programme of 18/12/09 identifies the requirement for 12 separate IDR/IDC's. Only 6 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco. Infraco culpability.**

E. Construction Periods:

1C2 Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	10/02/2010	06/09/2010	29.71 wks	19/01/2011	49.00 wks
Finish	11/03/2011	05/09/2012	77.71 wks	07/06/2012	64.86 wks
Cal. Duration	56.43 wks	104.43 wks	48.00 wks	72.29 wks	15.86 wks

- (i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **30 weeks**; the IM mitigated programme projects a later start (delayed by **49 weeks**) but an earlier completion. Primary causes of delay to start as follows:-
- A. IFC process: Still not issued in respect of Roads & Track. Initial IFC is currently **74 weeks late** (planned **25/11/08**; as at **30/04/10** the actual IFC is **yet to be issued**). There are two concurrent issues. The first is that the SDS design is incomplete or not satisfactory to CEC. However the second issue (Henderson Global / St James Quarter) is outwith Infraco control and appears to be the main issue delaying completion of the design in this area. As a minimum however, it is expected that Infraco will be excused the time for this delay due to CEC indecision. **Delay by CEC (tie); tie culpability**
- B. INTC's: see text above. Notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that 80.13 instruction, these INTC's should not provide an obstacle to commencement or progress. In respect of the remainder, the obligation remains with Infraco to provide Estimates (which are overdue in terms of Clause 80 timescales).
- C. MUDFA / Utilities: Planned completion **31/10/08**. Estimated availability is **24/06/10 to 18/07/10**. **Delay by tie; tie culpability.**
- D. Other:
- **Sub-Contractor procurement:** Understood that Crummock may be appointed by Infraco for 1B – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 06/09/10 nears.
 - **WPP process:** Not yet in place. This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact if in place on time for commencement;
 - **IDR/IDC process:** Not yet in place. Infraco letter / programme of 18/12/09 identifies the requirement for 12 separate IDR/IDC's. Only 6 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco. Infraco culpability.**
 - **Other:** we understand that there is some concern about accuracy of CUS as-built drawings which may therefore cause unforeseen conflicts with road and track works. This however is not something which features in the retrospective analysis (but may impact on future progress).
- (ii) Delay to Finish: Issue 3 programme shows an **increase of circa 48 weeks** over the timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 3 shows an increase in duration of **16 weeks** to the Rev.1 programme (it is understood that this increase relates to the introduction of additional TM phasing). There is presently no justification presented for Infraco's increased Rev.3 duration.

F. tie position on area availability:

- (i) First available date for the meaningful commencement of works to this area is governed by the completion of MUDFA / Utilities works to York Place / Elder Street to North St Andrews Square and Picardy Place to York Place. Predicted completion of said MUDFA / Utilities (24/06/10 & 18/07/10). Commencement of works in this area appears to be driven by works in other areas. **Delay by tie; tie culpability**
- (ii) Notwithstanding the completion of the above noted MUDFA works, the further prerequisite to the physical commencement of works will rely on IFC completion which is yet to be achieved. **Delay by CEC (tie); tie culpability**

G. Conclusion:

- (i) **'Significant' issues/events:** In our opinion there were two main contributory factors, being (a) the IFC process; and (b) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC was programmed to be issued on **25/11/08**; the first IFC for Road and Track has still to be issued. The cause appears to be (i) a combination of potential inadequacies in SDS design SDS (either a CE under 65(t) or (u); or possibly a failure by Infraco to manage SDS); and (ii) a delay caused by CEC's indecision in respect of Picardy Place and Henderson Global (St James Quarter). We understand that latter point to be the main reason for delay. **MUDFA/utilities diversions** were supposed to be completed on **31/10/08** (to facilitate a start in 1C2 on 10/02/10). Those diversions however are forecast to be sufficiently complete suffice to allow commencement on **24/06/10 & 18/07/10**. This is tie's culpability.

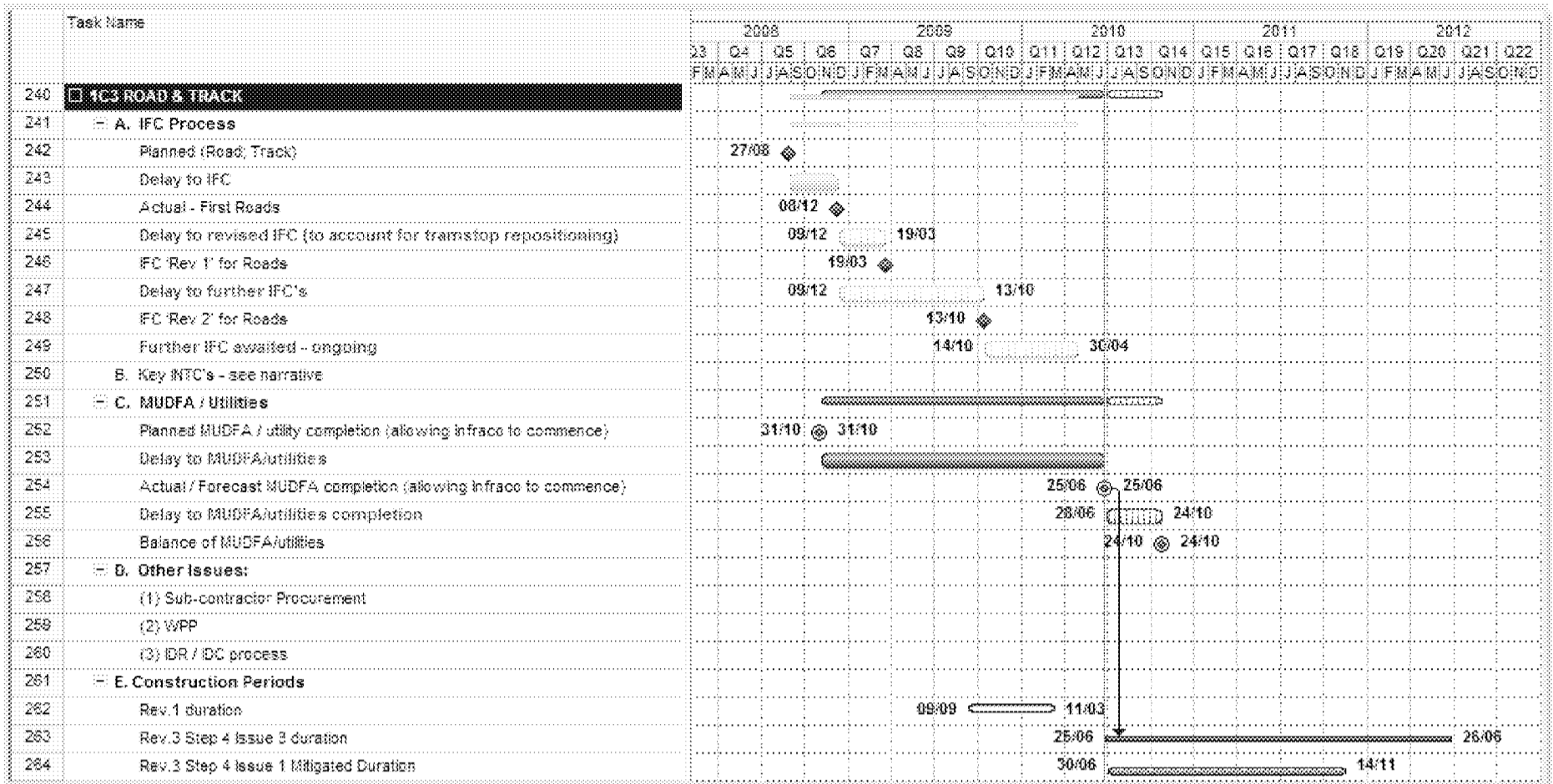
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability in June & July 2010.
- (iii) **Considerations of dominance:** availability of design and work areas are both equally important in terms of ability to commence. The significant delay to the issue of the first IFC in this area has clearly affected commencement. This appears to be an excusable delay for Infraco. The late completion of the MUDFA / utility works also restricted access to this area. See previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than its delays which would / could have been overcome in accordance with the original programme had it been necessary.

As such, in our opinion the delay to the MUDFA/utility works in 1C2 Road & Track is the dominant / critical 'physical' factor affecting commencement and hence completion in this intermediate section. That is not to diminish the obstacle to commencement presented by the IFC completion which runs concurrent with (and now past) the incomplete MUDFA / Utility works and is therefore of equal causative significance. As the delays attaching to the IFC completion perpetuate beyond completion of MUDFA / Utility works, the IFC issue in isolation will be the dominant cause of delay.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Ge culpability					Infraco culpability					Poss. SDS culpability			
	From	To	Days	Weeks	Cause	From	To	Days	Weeks	Cause	From	To	Days	Weeks
1. LOWER LIMIT														
MUDFA / Utilities & IFC delay	10/02/10	06/09/10	208	29.71				0	-	No SDS Delay			0	-
			0	-				0	-				0	-
				29.71					-					-
2. UPPER LIMIT														
MUDFA / Utilities & IFC delay	10/02/10	06/09/10	208	29.71									0	-
			0	-				0	-				0	-
				29.71					-					-
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +16 wks	IM Mitigated Period				Infraco Rev.3 Period				<p>IM mitigated period +16wks: this is likely to be BDDI/IFC issues and TM revised phasing. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability.</p> <p>Infraco Rev.3 period +48 wks: On the basis that Infraco can mitigate to 16 weeks per IM analysis then Infraco lower limit restricted to anything in excess of 16 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations</p>					
Infraco Rev.3 Period = +48 wks	To	Infraco	To	Infraco	To	Infraco	To	Infraco						
Lower Limit	0.00	0.00	0.00	32.00										
Upper Limit	16.00	16.00	16.00	48.00										

1C3 Road & Track



A. **IFC Process:** Initial IFC was **15 weeks late** (planned **27/08/08**; actual **08/12/08**). DS advises that 'Roads and Track' IFC was partially updated on **19/03/09** to incorporate moving "...St Andrew Square tram stop 4.5m south". The subsequent IFC issued on **13/10/09** was a further 'Roads' update closing out CEC comments. DS further advises that the IFC process is **not yet complete** noting "Infraco still to close out all informatives in 1C3 from CEC as planning authority and roads authority – particularly significant in terms of scale is requirement to close out tram stop informatives. However, not yet causing delay to construction". There are however, two issues which appear to be the cause of delay to completion of the design in this area: (i) CEC planning and roads authorities informatives / requirements; and (ii) the time taken for Infraco / SDS to close out said issues. Further information provided by DS on 02/06/10 advises that "... CEC has not closed these comments and informatives because BSC and SDS have not yet presented competent submissions to close them. This is a fundamental design failing that BSC has failed to manage. There may be some particular comments that BSC / SDS could demonstrate to be unreasonable / excessive but so far they have substantiated less than 10 and none in Section 1C3". Notwithstanding, responsibility for the above noted IFC delays is likely to flow from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco?

B. **Key INTC's:** From the information provided it appears that Infraco issued around **12 no. INTC's** against this area [Complete data on INTC's awaited]. Of those INTC's 1No. is known to have a TCO issued against it (INTC's 91). Beyond that however, there is insufficient information available at present to establish which INTC's are significant. That said, it is noted that 8 No. of the foregoing were the subject of an **80.13 instruction issued to Infraco on 19/03/10**. As such, notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with that instruction, these INTC's should not provide an obstacle to commencement or progress. In respect of the remainder, the obligation remains with Infraco to provide Estimates (which are overdue in terms of Clause 80 timescales). Only INTC 435 has an Estimate provided by Infraco (on 26/02/10). No instruction (80.13 or 80.15) has been issued for this INTC; neither has a TCO been issued. Whether there has been a delay by tie in instructing this INTC has yet to be established.

C. **MUDFA / Utilities:** Planned completion was **31/10/08**. MUDFA / Utilities are forecast to complete on South St. Andrew Street to Princes Street on **25/06/10** with the balance of MUDFA / Utilities completions forecast to complete on **24/10/10**. Meaningful commencement appears to depend on the completion of the South St. Andrew Street to Princes Street works as that appears to be the driver to Infraco's Rev 3 step 4 Issue 3 commencement date. **Delay by tie; tie culpability**

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Understood that Infraco are currently concluding terms and conditions with **Mackenzie Construction Ltd** over section 1C3 (Castle Street – Waverley Bridge) – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. However, David Burns has since advised that the most recent Infraco Monthly Report states that "A prequalification process is underway to deliver the remaining works in 1C2 (London Road to Waverley Bridge). DB states that in general terms this is correct but it should actually have stated that the prequel covered 1C2 and the part of 1C3 between St Andrews Square and Waverley Bridge. Therefore the current procurement status is that there is no sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 25/06/10 nears (this is the earliest date of commencement in this area between Issue 3 and IM mitigated programme).
- (ii) **WPP Process:** Not yet submitted. This *could* be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Again, the significance of this issue will increase as the 25/06/10 nears.

- (iii) IDR/IDC process: Not yet in place. Infraco letter of 18/12/09 identifies the requirement for 7 separate IDR/IDC's. Only 2 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco. Infraco culpability.**
- (iv) Street lighting: noted that street lighting works required (building fixings). Understood that Infraco has not priced this work
- (v) Public realm works: understood that a Prov. Sum included for wider area traffic signalling. Advised that all traffic lights in St. Andrew Square require to be renewed. Question arises as to what Infraco has included in pricing. Still to be resolved. Potential exists for further delay to be incurred pending resolution of this issue.
- (vi) St. Andrew Square tram stop height: may also be an issue to be resolved. Currently 600mm higher than road.

E. Construction Periods:

1C3 Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	09/09/2008	25/06/2010	41.29 wks	30/06/2010	42.00 wks
Finish	11/03/2010	26/06/2012	119.71 wks	14/11/2011	87.57 wks
Cal. Duration	26.29 wks	104.71 wks	78.43 wks	71.86 wks	45.57 wks

Note: start may be delayed until early **September 2010** (due to BT diversions and embargo period). This would add further period to delay to start.

- (i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **41 weeks**; the IM mitigated programme projects a slightly later start (delayed by **42 weeks**) but an earlier completion. Primary causes of delay to start as follows:-
 - A. IFC process: **Still incomplete**. This IFC is currently **87 weeks late** (planned **25/08/08**; as at **30/04/10** the actual IFC is **not yet complete**). The main issue flows from CEC planning and roads authority informatives which Infraco has still to close out. There are therefore two issues which appear to be the cause of delay to completion of the design in this area: (i) CEC informatives / requirements; and (ii) the time taken for Infraco / SDS to close out said issues. **Delay by SDS, SDS /tie or Infraco?**
 - B. INTC's: see text above. Notwithstanding Infraco delay in provision of Estimates, on the assumption that Infraco complies with the 80.13 instruction, these INTC's should not provide an obstacle to commencement or progress. In respect of the remaining INTC's, the obligation remains with Infraco to provide Estimates (which at this time are overdue in terms of Clause 80 timescales).
 - C. MUDFA / Utilities: Planned completion **31/10/08**. Estimated availability is **25/06/10** (could be to early **Sept. 2010**) to **24/10/10**. **Delay by tie; tie culpability.**
 - D. Other:
 - **Sub-Contractor procurement**: Understood that **Mackenzie Construction Ltd** may be appointed by Infraco for 1C3 – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. Sub-contract not yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 25/06/10 nears.
 - **WPP process**: Not yet in place. This could be an obstacle to commencement. **Delay by Infraco. Infraco culpability.** Unlikely to have significant impact if in place on time for commencement. The significance of this issue will however increase as the 25/06/10 nears;
 - **IDR/IDC process**: Not yet fully in place. Infraco letter of 18/12/09 identifies the requirement for 7 separate IDR/IDC's. Only 2 are shown in that programme. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco. Infraco culpability.**
 - **Other**: we understand that there is some concern about accuracy of CUS as-built drawings which may therefore cause unforeseen conflicts with road and track works. This however is not something which features in the retrospective analysis (but may impact of future progress).
- (ii) Delay to Finish: Issue 3 programme shows an **increase of circa 78 weeks** over the timescale in Rev.1 programme (majority of increase understood to be as a result of full-depth construction issue). IM mitigated view of Issue 3 shows an increase in duration of **46 weeks** to the Rev.1 programme. There is presently no substantiation provided by Infraco to justify their increased Rev.3 duration.

F. tie position on area availability:

- (i) First available date for the meaningful commencement of works to this area is governed by the completion of MUDFA / Utilities works forecast to complete in South St. Andrew Street to Princes Street on **25/06/10** (could be to early **Sept. 2010**). The completion of this work appears to be the driver to Infraco's Rev 3 step 4 Issue 3 commencement date. **Delay by tie; tie culpability**

G. Conclusion:

- (i) **'Significant' issues/events**: In our opinion there were two main contributory factors, being (a) the IFC process; and (b) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC was programmed to be issued on **27/08/08**; although the first IFC for Road and Track was issued on **08/12/08** subsequent revisions have been issued and further IFC expected.. The cause appears to be (i) a combination of potential inadequacies in SDS design SDS (either a CE under 65(t) or (u); or possibly a failure by Infraco to manage SDS); and (ii) a delay caused by SDS / CEC interface with respect to tram stop informatives. **MUDFA/utilities diversions** were supposed to be completed on **31/10/08** (to facilitate a start in 1C3 on 09/09/09). Those diversions however are forecast to be sufficiently complete suffice to allow commencement on **25/06/10 & 24/10/10**. This is tie's culpability.

- (ii) **Concurrent issues**: In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability in June 2010.
- (iii) **Considerations of dominance**: availability of design and work areas are both equally important in terms of ability to commence. In this instance however, it is the late completion of the MUDFA / utility works that has restricted access to this area. Significant delays attaching to

the late completion of the IFC process have the potential to frustrate / compromise future / ongoing progress of the works but will not / should not prevent commencement of the works. See previous comments re potential Infraco argument that the late completion MUDFA / utilities, and hence the late availability of the working area, will be more dominant (i.e. have more 'causative potency') than the other less significant delays which would / could have been overcome in accordance with the original programme had it been necessary.

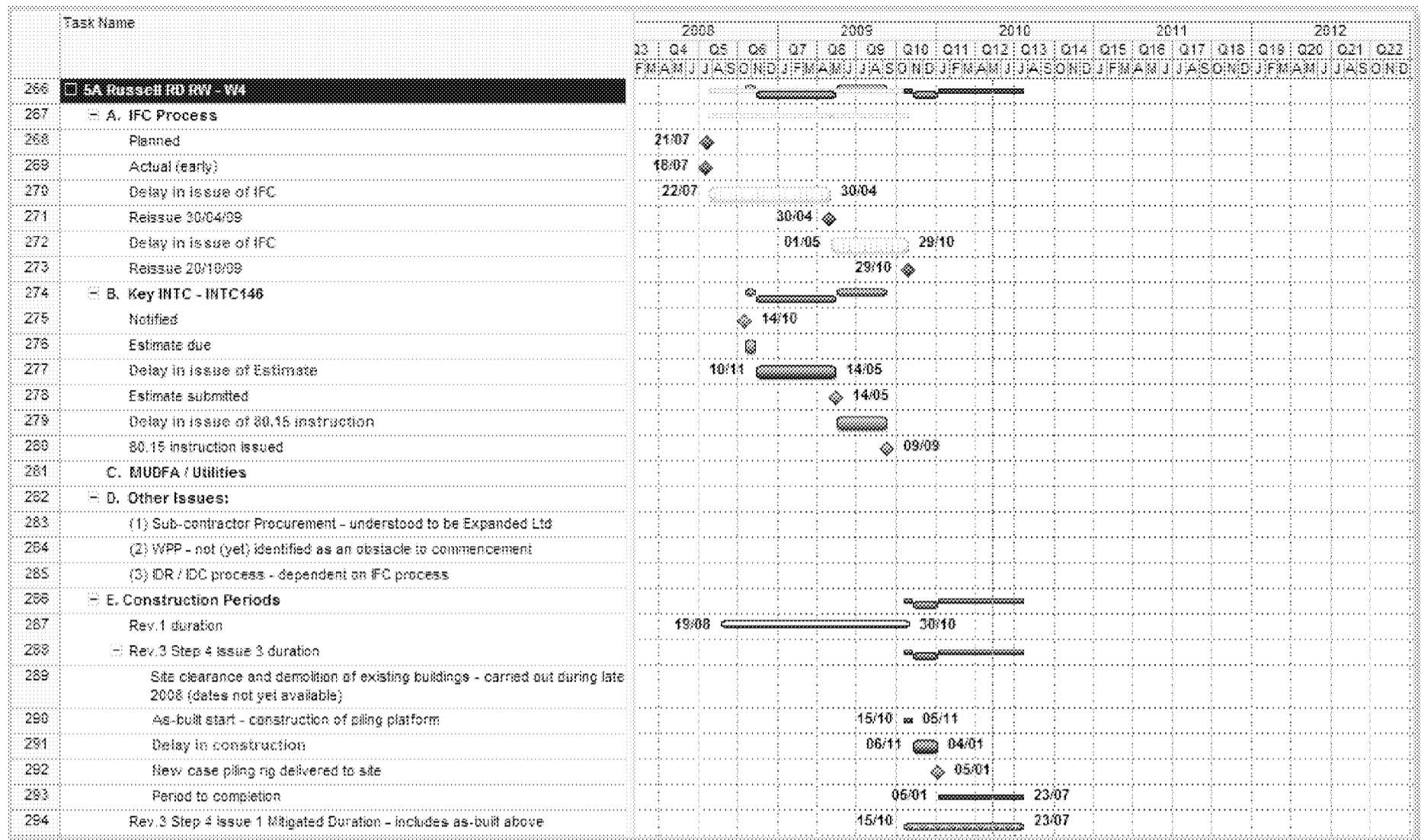
As such, in our opinion the delay to the MUDFA/utility works in 1C3 Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	No culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
MUDFA / Utilities	09/09/09	25/06/10	289	41.29				0	-	No delay			0	-
			0	-				0	-				0	-
				41.29					-					-
2. UPPER LIMIT														
MUDFA / Utilities	09/09/09	25/06/10	289	41.29						Delay to 1st IFC	27/08/08	08/12/08	103	14.71
			0	-				0	-				0	-
				41.29					-					14.71

B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]					
	IM Mitigated Period = +46 wks		Infraco Rev.3 Period = +78 wks		
	IM	Infraco	IM	Infraco	
Lower Limit	0.00	0.00	0.00	32.00	IM mitigated period +46wks: this is likely to be BDD/IFC issues and TM revised phasing. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. Infraco Rev.3 period +78 wks: On the basis that Infraco can mitigate to 46 wks per IM analysis then Infraco lower limit restricted to anything in excess of 46 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations
Upper Limit	46.00	46.00	46.00	78.00	

5A Russell Road RW – W4



A. **IFC Process:** Initial IFC issued on time (planned 21/07/08; actual 18/07/08). This original IFC addresses / satisfied 'Geotechnical TAA'. However, subsequent partial reissues of IFC's as at 30/04/09 & 29/10/09 suggest this initial IFC was incomplete. There is no information presently available to inform culpability for these delays. As a consequence, it is (likely) that the late issue of this IFC flows from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infracore to provide the Infracore Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infracore in respect of its management of SDS or another breach by Infracore (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility.

Delay by SDS, SDS /tie or Infracore?

B. **Key INTC's:** From the information provided it appears that Infracore issued around 10 no. INTC's against this area [Complete data on INTC's awaited]. It is noted that 5 No. (INTC's 092, 117, 368, 506 & 518) of the foregoing were the subject of an 80.13 instruction issued to Infracore on 19/03/10. As such, notwithstanding Infracore delay in provision of Estimates, on the assumption that Infracore complies with that instruction, these INTC's should not provide an obstacle to commencement or progress. We are advised that the key INTC which prevented commencement was INTC 146 (IFC Drawing Change Russell Road RTW's 1, 2, 3 & 4). That INTC was notified on 14/10/08; the Estimate was provided on 14/05/09 (27 weeks later than due). **Delay by Infracore.** This was the subject of an 80.15 instruction issued on 09/09/09; 17 weeks after submission of Estimate). **Delay by tie.**

C. **MUDFA / Utilities:** There are a number of MUDFA / Utilities issues impacting on this structure. There is a Scottish Power 11kV cable diversion required at Haymarket Scotrail Depot. Misinformation received from Scotrail/SP suggested that there was an alternative power supply which could be utilised. We understand that this would have allowed the existing cable to be removed. This information proved to be wrong. Consequent to this, this cable remains an obstacle to completion of RW4 for most of unit 19 where the cable clashes with the proposed line of the retaining wall. **tie** issued Infracore with a TCO in this regard 18/01/10. There are further MUDFA / Utilities issues which need addressed on the access road. These issues were the subject of a MUDFA to Infracore transfer under TCO 6 issued to BSC on 03/12/08 [INF CORR 454]. **Delay by tie (up to point of instruction). tie culpability . This however was not an obstacle to commencement;** but may yet prove to be an impediment to progress/completion. Delays beyond instruction (plus reasonable period for Infracore to mobilise and carry out the work) would be **Infracore delay.**

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Understood that Expanded Ltd have been issued with an extension to their current LOI to cover the mobilisation of a piling rig to complete the piling on Wall W4, units 11 to 18. – see tie audit and Infracore Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Subject to further tie audit. **Delay by Infracore. Infracore culpability.**
- (ii) **WPP Process:** Assumed WPP in place given the fact that works have commenced. **No delay (to date).**
- (iii) **IDR/IDC process:** IDR was in place as at 29/10/09. **No delay.**
- (iv) **Form 'C':** No information available on this issue. Assumed Form 'C' in place given the fact that works have commenced
- (v) **Scotrail Depot Access Road (Car Park):** New car park required to be constructed (by Infracore) to replace the existing car park. **Delay by Infracore. Infracore culpability**

E. **Construction Periods:**

5A Russell RD RW - W4 (piling & subsequent operations)					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	09/12/2008	15/10/2009	44.29 wks	15/10/2009	44.29 wks
Finish	30/10/2009	23/07/2010	38.00 wks	23/07/2010	38.00 wks
Cal. Duration	46.57 wks	40.29 wks	-6.29 wks	40.29 wks	-6.29 wks

Note: the above does not reconcile the actual site clearance and demolition activities. That as-built information is not (presently) available.

A re-commencement was made on 15/10/09 (on the construction of the piling platform) following resolution of the INTC 146 process. The delay up to this point centred on INTC146.

- (i) **Delay to Start:** The table above refers to various programme dates. Issue 3 programme shows a delay to piling start of **44 weeks**; the IM mitigated programme also shows a delay to start of piling of **44 weeks**. Primary causes of delay to start as follows:-
- IFC process:** This original IFC addresses / satisfied 'Geotechnical TAA'. However, subsequent partial reissues of IFC's as at 30/04/09 & 29/10/09 suggest this initial IFC was incomplete. There is no information presently available to inform culpability for these delays. **Delay by SDS, SDS /tie or Infraco?**
 - INTC's:** Key INTC 146 – That INTC was notified on 14/10/08; the Estimate was provided on 14/05/09 (220 days later than due). **Delay by Infraco.** This was the subject of an 80.15 instruction issued on 09/09/09; 118 days after submission of Estimate). **Delay by tie.** Other delays by Infraco in the submission of other Estimates; those INTC's however clearly did not delay commencement (it appears to have been INTC 146). Future delays attaching to the INTC process are probable. Delays may yet flow from the late IFC completion in the form of BDDI – IFC changes (i.e. further INTC's yet to be submitted).
 - MUDFA / Utilities:** There are a number of MUDFA / Utilities issues impacting on this structure. There is a Scottish Power 11kV cable diversion required at Haymarket Scotrail Depot. There are further MUDFA / Utilities issues which need addressed on the access road. **Delay by tie. tie culpability.** It is notable that neither of these issues were obstacles to Infraco's commencement of the structure. As at 30/04/10 these works are yet to be completed and as such have the potential to prevent / compromise completion.
 - Other:**
 - **Sub-Contractor procurement:** Understood that Expanded Ltd have been issued with an extension to their current LOI to cover the mobilisation of a piling rig to complete the piling on Wall W4, units 11 to 18. – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Subject to further tie audit. **Delay by Infraco. Infraco culpability**
 - **WPP process:** Permit to commence work has been received. **No Delay.**
 - **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. This process is dependent upon the IFC completion – not yet in place.
 - **Form 'C' Approval:** not yet identified as being an obstacle to commencement (but this still has the potential to cause delay depending on documentation collation and submission).
 - **Scotrail Depot Access Road (Car Park):** New car park required to be constructed (by Infraco) to replace the existing car park. Construction of this car park is essential as the existing car park is situated on the proposed position of W4 Units 1 – 9. Until such times as the new car park is available Infraco is unable to commence works to W4 Units 1 – 9. The corollary of this is that RW3 Walls B & C dependent on the completion of RW Units 1 – 9 cannot commence. **Delay by Infraco. Infraco culpability.**

- (ii) **Delay to Finish: the Issue 3 programme** shows a decrease in delay to finish to **circa 38 weeks** over the timescale in Rev.1 programme (i.e. a reduction in duration of 6 weeks). IM mitigated view of Issue 3 also shows a decrease in delay to finish to **circa 38 weeks** to the Rev.1 programme.

As noted above, Infraco re-commenced this structure on **15/10/09**. Thereafter a delay was incurred as a result of piling 'refusal' (**tie** contends that this was as a result of incorrect piling methodology adopted by Infraco – evidenced by subsequent change in piling). This could be either a **potential failure by Infraco**; or if caused by unforeseen ground conditions, **possibly a matter for which tie is responsible**. We are further advised that INTC 368 although the subject of an 80.13 instruction has not been satisfactorily progressed by Infraco. This could be significant in that this relates to the demolition of plots 102 & 92. The completion of this work is essential in that it creates the access required for the piling rig attendance for the construction of the retaining wall at the west end of RW 4. **Delay by Infraco. Infraco culpability**

F. **tie position on area availability:**

- (i) First available date for the meaningful commencement of works to this area is governed by two separate issues; (1) the demolition of the Viking & Simlock buildings (this work was completed during **December 2008**); and (2) the 80.15 instruction issued against INTC 146. The date of the 80.15 instruction issued against INTC 146 was 09/09/09; this in effect became the date at which meaningful (re-)commencement could take place.

Note: Demolition of the Viking & Simlock building was carried out by BSC as part of the contract works. Building Warrant Application submitted 01/08/08. Permit to commence 018 shows a planned start date of 01/09/2008 & a completion date of 16/11/2008. As-built dates not available for this operation.

G. **Conclusion:**

- (i) **'Significant' issues/events:** In our opinion there were two main contributory factors, being (a) the IFC process; and (b) the subsequent conclusion to INTC 146 (BDDI – IFC) IFC Drawing Change Russell Road RTWs 1,2,3 &4. Taking those events in chronological order: -

In our opinion the delaying effect of the protracted IFC process may have affected commencement. Although, first provided on time on **18/07/08**, this IFC was in effect incomplete. The IFC remained incomplete until **29/10/09**. Further information provided by DS on 02/06/10 advises that "Although incomplete it is not clear whether the IFC issued in July 2008 was sufficient to commence construction. Clear that it wasn't sufficient to complete construction". Responsibility on this matter is currently uncertain (requires audit of design process). Running concurrently with this issue was the delay flowing from the INTC process (INTC 146) in particular. This appears to have prevented construction beyond the early demolition of the Viking & Simlock buildings from progressing any further. Infraco is culpable for delays in the late provision of

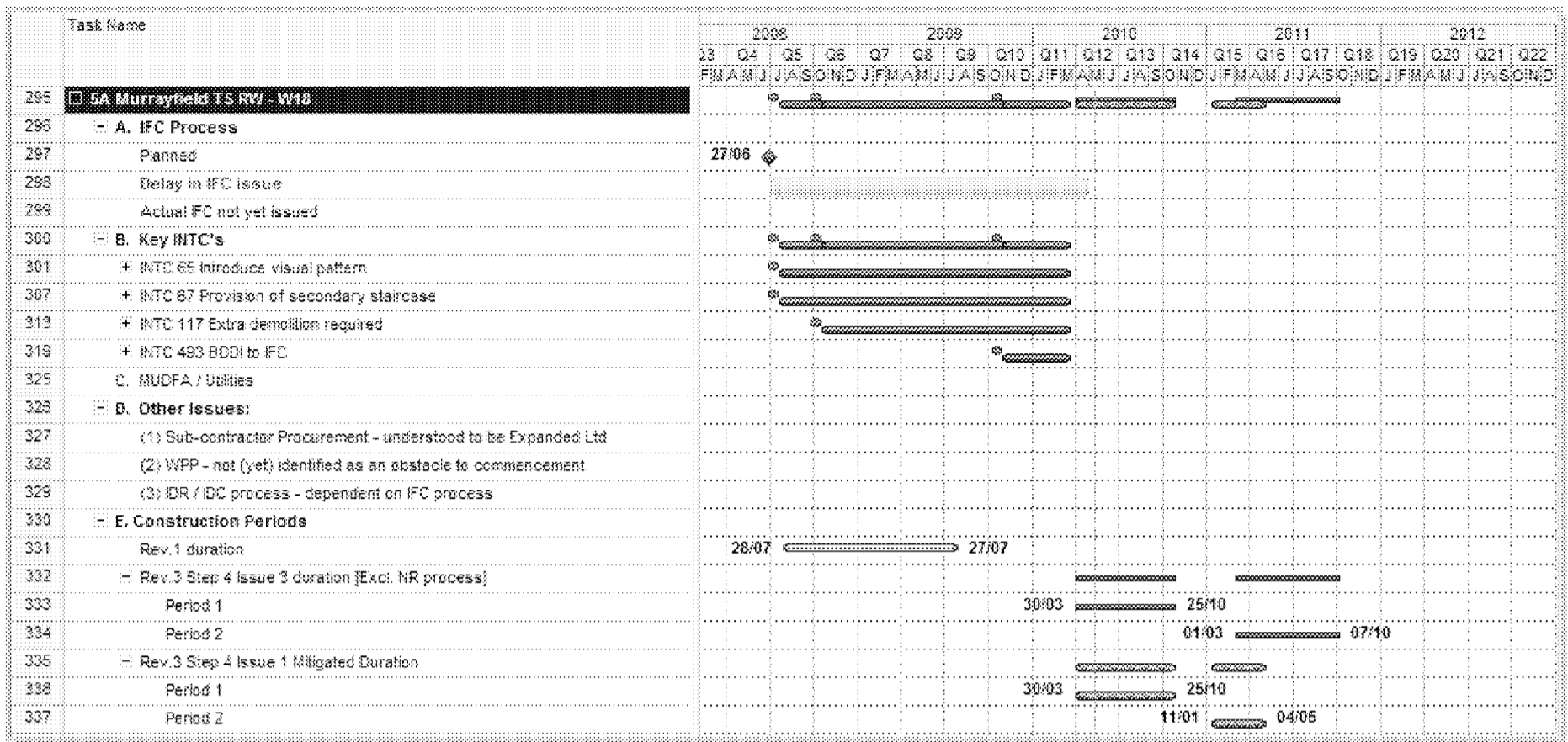
the estimate from Infraco. Delays beyond that point with respect to the time taken for tie to issue the 80.15 is a matter for which tie is responsible.

- (ii) **Concurrent issues:** In our opinion the other event detailed above i.e. **MUDFA / Utilities** has less of a bearing on the late commencement of this area. Whilst in isolation completion on this issue may have been a hindrance to commencement, its significance is considerably diminished by the fact that Infraco did commence. Incomplete MUDFA / Utilities issues will be more significant to the successful completion of the works in this area.
- (iii) **Considerations of dominance:** The protracted delay attaching to the IFC on this structure is likely to have affected commencement [this requires further review by DS & WB]. However, delays to the INTC process (INTC 146) in particular appear to be the dominant delay to this structure. Although Infraco did commence demolition works in advance of this issue arising, it is clear that meaningful commencement (and subsequent recommencement of the works) was precluded by the absence of a resolution to this issue.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	IC culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
Delay to 80.15 instruction	14/05/09	09/09/09	118	16.86	Actual start to delay in provision of INTC 146 estimate	09/11/08	14/05/09	156	22.29					
			0	-				0	-			0	-	
				16.86					22.29				-	
2. UPPER LIMIT														
Delay; from INTC 146 estimate to 80.15 instruction	14/05/09	09/09/09	118	16.86	Actual start to delay in provision of INTC 146 estimate	09/12/08	14/05/09	156	22.29	Delay to IFC	22/07/08	29/10/09	464	66.29
Period after 80.15	09/09/09	15/10/09	36	5.14	Period after 80.15	09/09/09	15/10/09	36	5.14				0	-
			0	-				0	-				0	-
				22.00					27.43					66.29
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -6 wks	IM Mitigated Period		Infraco Rev.3 Period				IM mitigated period -6 wks: notwithstanding INTC's issues and delays attaching to the progress of piling works extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period -6 wks: Infraco clearly accepts the above noted mitigation achievable. On the basis that Infraco can mitigate to -6 wks then Infraco lower limit restricted to anything in excess of 2.5 wks (this 2.5 wk period considers @ 5 wks Infraco culpability to ongoing works). tie liability remains at lower limit of -6wks.							
Infraco Rev.3 Period = -6 wks	IC	Infraco	IC	Infraco	IC	Infraco								
Lower Limit	-6.00	2.50	-6.00	2.50										
Upper Limit	0.00	0.00	0.00	0.00										
Observations on Actual Progress	IC	Infraco												
Analysis of ongoing progress, considered in 'Delay to Finish' periods detailed above.		-8.50												
*Infraco culpability attaching to downtime via piling issues. Period 6/11/09 to 4/1/10														

5A Murrayfield Tram Stop Retaining Wall – W18



Note: start date of 30/03/10 is now superseded by current events relating to RV VE IFC process. This is likely to be at least September 2010.

A. **IFC Process:** Initial IFC is currently **96 weeks late** (planned **27/06/08**; as at **30/04/10** the actual IFC is **yet to be issued**). Please see Preamble re availability of detailed information to inform culpability (and the SDS/Infraco design process being subject to further detailed tie audits). Information obtained to date as follows.

The delay in issuing this IFC appears to be a direct consequence of delays attaching to the Roseburn Viaduct VE exercise. DS advises that "... the reason for the delay in issuing this beyond the other retaining walls in this area has been BSC's decision not to issue the original design followed by the design as amended to accommodate the VE opportunity on Roseburn Viaduct. Instead BSC has opted to get SDS to only issue the design that incorporates VE and none of the VE package has yet been IFC".

Infraco period report dated 27 March 2010 noted anticipated commencement of Roseburn Viaduct as at 05/04/10. This commencement would clearly have depended on completion of the VE exercise. As at 30/04/10 the VE exercise remains incomplete. From information received on RV we understand that there are a number of contributory factors which have impacted on a resolution to this VE exercise. Absent better information from future recommended audit, the (current) headline issues are as follows:-

- (1) We understand that **Infraco was slow to start the VE process**. DS contends no progress initially noting that it was 18 periods (months) after novation that design actually started. This is a matter for which Infraco is responsible. However the timescale attaching to same will be constrained by the 'agreed' timeframe within which Infraco should reasonably have completed its VE exercise.
- (2) DS advises that **CEC Planning Authority's** behaviour with respect to finishes and aesthetics is questionable. There is a high risk that CEC requirements in respect to these issues were unreasonable and disproportionate to the surrounding environment. This is a matter for which CEC and consequently tie is responsible.
- (3) Delays were experienced in the receipt of **information from NR** following the completion of protective works to utilities within the NR Haymarket Depot. This information related to a request for subsequent survey levels which Infraco contend was impacting on the VE / IFC design process. This issue was concluded by the presentation of an L&M survey report presented to Infraco on 27/07/09. It is likely that this 9 week period is a matter for which **tie is responsible**.
- (4) Infraco has taken an extraordinarily long time period to respond and attend to planning issues. DS advises that Infraco initially put forward a design which was not 'approvable'. Secondly and latterly Infraco has been very slow to investigate / achieve proposals recommended/ advised by CEC. These are matters for which Infraco should be responsible.

Given the complexities attaching to the above, it is therefore likely, that the late issue of this IFC flows from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco? As a minimum however, it is expected that Infraco will be excused time for delays due to slow NR response and any agreed (and/or reasonable) time to complete the initial VE exercise.

B. **Key INTC's:** From information provided Infraco issued 4 no. key INTC's in relation to this structure; **INTC's 65, 67, 117 & 493**. We are advised that it is unlikely that any of the foregoing has materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 65:** issued by Infraco on **21/06/08** (prior to IFC issue). Estimate should have been submitted on or around 17/07/08. **Delay by Infraco.**
- (ii) **INTC 67:** issued by Infraco on **21/06/08** (prior to IFC issue). Estimate should have been submitted on or around 17/07/08. **Delay by Infraco.**
- (iii) **INTC 117:** issued by Infraco on **18/09/08** (prior to IFC issue). Estimate should have been submitted on or around 14/10/08. **Delay by Infraco.**

(iv) INTC 493: issued by Infraco on **05/10/09** (prior to IFC issue). Estimate should have been submitted on or around 29/10/09. **Delay by Infraco.**

80.13 Instruction issued by tie on 19/03/10.

Given the fact that SDS has yet to issue an IFC in relation to this structure it appears likely that Infraco will issue a further INTC specifically addressing 'final' BDDI – IFC changes. This is clearly dependent on the completion of the VE exercise. There therefore remains the potential that issues attaching to this process may yet prevent / compromise commencement. DS advises that this potential is likely to be realised. It is his consideration that this BDDI to IFC is likely to address the differences between Infraco's VE proposal and what it will in effect have to implement. Infraco will look to attribute delay in agreement of finishes to CEC on the basis that it was a higher finishes specification than that originally envisaged to gain planning permission. Infraco will argue that CEC changes / requirements were not reasonable and as such resulted in the VE saving not being fully achieved. Consequent to this Infraco will seek recompense for any shortfall. Given that there is clearly split culpability for issues attaching to the delays in issue of Estimates by Infraco may, at least in part, be excused.

C. **MUDFA / Utilities**: There are no MUDFA / Utilities issues impacting on this structure. **No Delay**

D. **Other Issues**:

- (i) Sub-Contractor Procurement: Understood that Infraco have sublet this structure to Grahams Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
- (ii) WPP Process: Permit issued **12/03/10** for site set-up only (since the IFC drawings are not in place as yet for a more expansive WPP application). **No Delay (to date).**
- (iii) IDR/IDC process: Not yet in place. Infraco letter of 18/12/09 predicted the IDC to be complete as 05/02/10. As at 30/04/10 the IDC is not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. This process is dependent upon the IFC completion – not yet in place.
- (iv) Form 'C': not yet identified as being an obstacle to commencement (but this still has the potential to cause delay depending on documentation collation and submission). As with other structures this process should be monitored.
- (v) Russell Road RW4 Interface: There is a sequencing interface between Murrayfield TS RW and Russell Road RW4. Piling works at rear of units 101 & 96 are required in conjunction with completion of the west end of RW4 to enable meaningful commencement of works on Murrayfield TS RW. **Delay by Infraco. Infraco culpability.**

E. **Construction Periods**:

5A Murrayfield TS RW - W18					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	28/07/2008	30/03/2010	87.14 wks	30/03/2010	87.14 wks
Finish	27/07/2009	07/10/2011	114.57 wks	04/05/2011	92.29 wks
Cal. Duration	52.14 wks	79.57 wks	27.43 wks	57.29 wks	5.14 wks

- (i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **87 weeks**; the IM mitigated programme also shows a delay to start of **87 weeks**. Actual start will be later than shown due to VE/IFC exercise (approximately **113 weeks** late; **28/07/08 to 30/09/10**). Primary causes of delay to start as follows:-
 - A. IFC process: This IFC is currently **96 weeks late** (planned **27/06/08**; as at **30/04/10** the actual IFC is **yet to be issued**). The delay in issuing this IFC appears to be a direct consequence of delays attaching to the Roseburn Viaduct VE exercise. It is understood that completion of this exercise is needed to better inform the IFC completion for Murrayfield TS RW. **Delay by SDS, SDS /tie or Infraco? [Subject to tie audit]**
Matter to consider: Can the (Infraco) logic, linking Roseburn Viaduct & Murrayfield TS RW be broken, such that Infraco's reliance on the VE exercise to enable IFC completion on Murrayfield TS RW can be shown as unnecessary?
 - B. INTC's: Delays by Infraco in the submission of Estimates. Delay up to 19/03/10 when tie issued clause 80.13 instruction. [Complete data on INTC's awaited]. Future delays attaching to the INTC process are probable. Delays may yet / are likely to flow from the late IFC completion in the form of BDDI – IFC changes.
 - C. MUDFA / Utilities: **No impact** on this structure.
 - D. Other:
 - **Sub-Contractor procurement**: Understood that Infraco intend to sublet this structure to Expanded Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
 - **WPP process**: Permit to commence work has been received. **No Delay.**
 - **IDR/IDC process**: Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. This process is dependent upon the IFC completion – not yet in place.
 - **Form 'C' Approval**: not yet identified as being an obstacle to commencement (but this still has the potential to cause delay depending on documentation collation and submission).
 - **Russell Road RW4 Interface**: There is a sequencing interface between Murrayfield TS RW and Russell Road RW4. Piling works at rear of units 101 & 96 is required in conjunction with completion of the west end of RW4 to enable meaningful commencement of works on Murrayfield TS RW. **Delay by Infraco. Infraco culpability.**
- (ii) Delay to Finish: Issue 3 programme shows an **increase of circa 27 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows a relatively minor increase in duration of **5 weeks** to the Rev.1 programme. There is presently no justification presented for the Infraco increased Rev.3 duration (noting in particular that the design is not yet complete).

F. **tie position on area availability:**

- (i) First available date for the meaningful commencement of works to this area is governed by two separate issues. The first being the IFC issue for Murrayfield TS RW. However, this is dependent on completion of the VE exercise on Roseburn Viaduct, which is currently predicted to complete **mid May 2010 (IFC by 09/06/10)**. Recent discussions with DS on 21/06/10 suggests that an approximate date for issue of the completed IFC is more likely to be (late) September 2010. The second issue is the completion of outstanding works to the west end of Russell Road RW4. This incomplete work is a matter for which Infraco is responsible.

G. **Conclusion:**

- (i) **‘Significant’ issues/events:** In our opinion there were two main contributory factors, being (a) the IFC process; and (b) outstanding works to Russell road RW4. Taking those events in chronological order: -

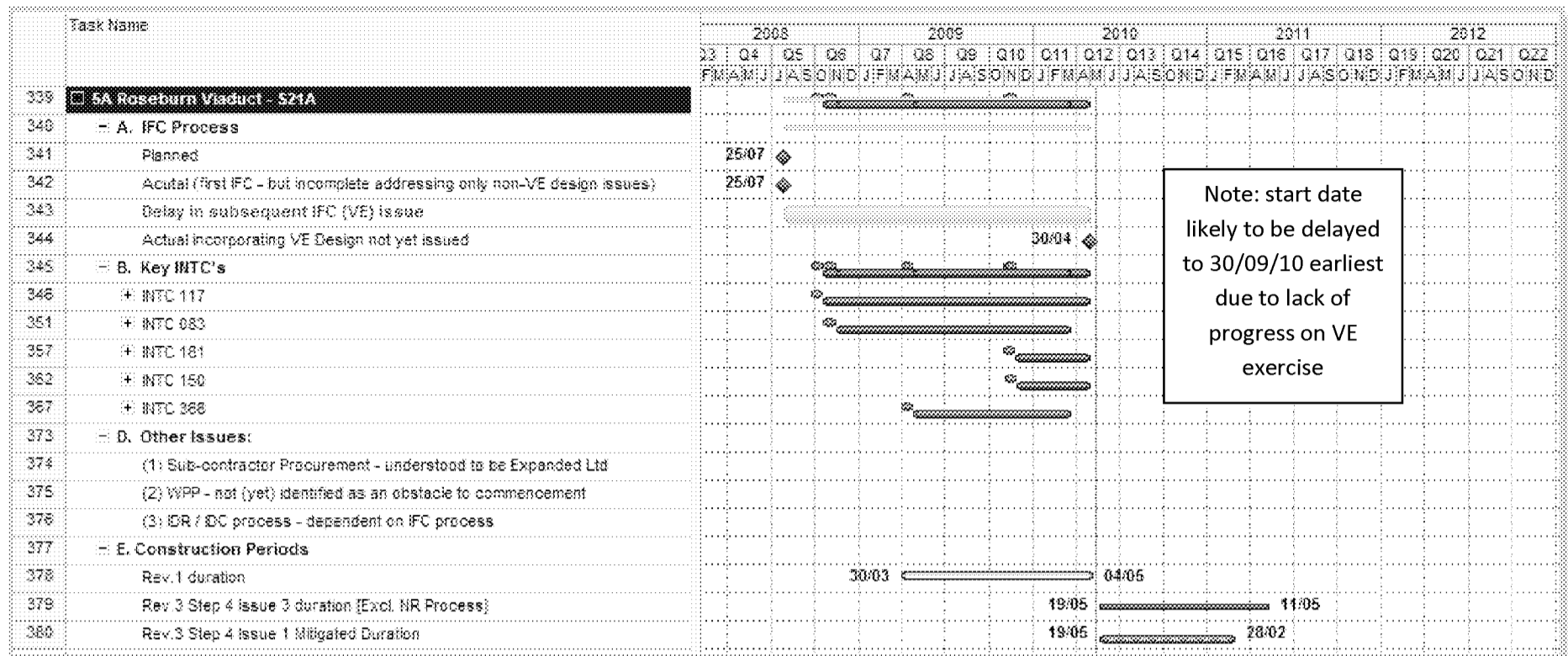
In our opinion the main delaying factor is the protracted IFC process. The IFC should have been provided by **27/06/08** as at **30/04/10** however, the IFC is **yet to be issued**. This is clearly dependent on the completion of the VE exercise at Roseburn Viaduct. Responsibility on this issue is uncertain. Running concurrent with this issue is Infraco’s inaction on construction works to the west end of Russell Road RW4. These works are in effect, enabling works which are material to the meaningful commencement of works on Murrayfield TS RW. tie considers this to be as a result of dilatory progress on Infraco’s part i.e. there is no known impediment to completion of this part of the works. This is a matter for which Infraco is responsible.

- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability in May/June 2010 (when the IFC is due to be issued). Running concurrently with this is the late provision by Infraco of Estimates for INTC’s **65, 67, 117 & 493**. Estimates are outstanding for all of the aforementioned INTC’s. Delay attaching to Infraco’s response on the foregoing is however linked to the absence of an IFC. This in turn is dependent on completion of the above noted VE exercise. Therefore although there is Infraco responsibility for delays in the provision of Estimates, this may well be subsumed by delays attaching to the VE exercise on RV. Responsibility therefore, remains uncertain pending further investigation into the RV VE exercise. Delay in provision of Estimates measured to 19/03/10 (when clause 80.13 instruction issued); but this is unlikely to have been an obstacle to actual commencement (due to RV VE & IFC processes).
- (iii) **Considerations of dominance:** The protracted delay attaching to the IFC on this structure has clearly affected commencement. This appears to be a direct consequence of delays attaching to the Roseburn Viaduct VE exercise. Responsibility on this issue is complex and presently uncertain due to absence of detailed evidence. This needs to be established by **tie** audit. Of equal ‘causative potency’ in terms of dominance is the incomplete works to the adjacent structure at Russell Road RW4. Delays attaching to the INTC process, sub-contractor procurement could **yet** prove significant but currently have less ‘causative potency’ than the above.

H. **Current assessment of culpability**

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
			0	-				0	-				0	-
			0	-				0	-				0	-
			0	-				0	-				0	-
			-					-					-	
2. UPPER LIMIT														
Roseburn Viaduct VE exercise	28/07/08	30/09/10	794	113.43	Roseburn Viaduct VE exercise	28/07/08	30/09/10	794	113.43	Roseburn Viaduct VE exercise	28/07/08	30/09/10	794	113.43
			0	-				0	-				0	-
			0	-				0	-				0	-
			113.43					113.43					113.43	
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +5 wks	IM Mitigated Period		Infraco Rev.3 Period				IM mitigated period +5wks: this is likely to be issues flowing from the RV VE exercise. Culpability not clear (audit recommended). Upper / lower limits recognise extremes of liability. Infraco Rev.3 period +27 wks: On the basis that Infraco can mitigate to 5 wks per IM analysis then Infraco lower limit restricted to anything in excess of 5 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations							
Infraco Rev.3 Period = +27 wks	tie	Infraco	tie	Infraco										
Lower Limit	0.00	0.00	0.00	22.00										
Upper Limit	5.00	5.00	5.00	27.00										

5A Roseburn Viaduct – S21A



Note: start date of 19/05/10 shown above is now superseded by current events relating to RV VE IFC process. This is likely to be **September 2010**.

A. IFC Process: Initial IFC issued on time (planned 25/07/08; actual 25/07/08).

It is important to note that this initial IFC although on time recognised only non VE design relating to this structure. Subsequent IFC's were forecast by SDS/Infraco to complete as follows:-

- S21A RC Portal Bridge – Roseburn Street Viaduct VE Design (forecast 23/03/10);
- S21A Steel Composite Bridge - Roseburn Street Viaduct VE Design (forecast 23/03/10); and
- S21A New Reinforced Earth Structure - Roseburn Street Viaduct VE Design (forecast 07/04/10).

The above issue dates were not achieved. As at 30/04/10 there have been **no further IFC's issued**.

DS advises that the revised IFC issue for the RV VE design is **forecast to be issued on 30/07/10** (in SDS v58). However, recent discussions with DS on 21/06/10 suggest that an approximate date for issue of the completed IFC is more likely to be (late) September 2010. Should this transpire the overall delay attaching to this issue will be around **114 weeks late**.

The delay in issuing this IFC appears to be a direct consequence of delays attaching to the Roseburn Viaduct VE exercise.

Infraco period report dated 27 March 2010 noted anticipated commencement of Roseburn Viaduct as at 05/04/10 (i.e. one week after issue of the said report). This commencement would clearly have depended on completion of the VE exercise. As at 30/04/10 the VE exercise remains incomplete.

From information received on RV we understand that there are a number of contributory factors which have impacted on a resolution to this VE exercise. Absent better information from future recommended audit, the (current) headline issues are as follows:-

- (1) Infraco was slow to start the VE process, DS contends no progress initially noting that it was 18 periods (months) after novation that design actually started. This is clearly a matter for which Infraco is responsible. However the timescale attaching to same will be constrained by the 'agreed' timeframe within which Infraco should reasonably have completed its VE exercise.
- (2) DS advises that CEC Planning Authority's behaviour with respect to finishes and aesthetics is questionable. There is a high risk that CEC requirements in respect to these issues were unreasonable and disproportionate to the surrounding environment. This is a matter for which CEC and consequently tie is responsible.
- (3) Delays were experienced in the receipt of information from NR following the completion of protective works to utilities within the NR Haymarket Depot. This information related to a request for subsequent survey levels which Infraco contend was impacting on the VE / IFC design process. This issue was concluded by the presentation of an L&M survey report presented to Infraco on 27/07/09. It is likely that this 9 week period is a matter for which tie is responsible.
- (4) Infraco has taken an extraordinarily long time period to meet with planning issues. DS advises that it initially put forward a design which was clearly not approvable. Secondly / latterly it has been very slow to investigate / achieve proposals recommended/ advised by CEC. These are matters for which Infraco are responsible.

Given the complexities attaching to the above, it is therefore likely, that the late issue of this IFC flows from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco? As a minimum however, it is expected that Infraco will be excused time for delays due to slow NR response and any agreed (reasonable) time to complete the initial VE exercise.

B. Key INTC's: From information provided Infraco issued 5 no. INTC's in relation to this structure; **INTC 117, 083, 181, 150, & 368**. It is unlikely that any of the foregoing has materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 117:** issued by Infraco on **18/09/08** (prior to IFC issue). Estimate should have been submitted on or around 14/10/08. **Delay by Infraco.**
- (ii) **INTC 083:** issued by Infraco on **15/10/08** (prior to IFC issue). Estimate should have been submitted on or around 10/11/08. **Delay by Infraco.**
- (iii) **INTC 181:** issued by Infraco on **28/10/09** (prior to IFC issue). Estimate should have been submitted on or around 23/11/09. **Delay by Infraco**

- (iv) INTC 150: issued by Infraco on **31/10/09** (prior to IFC issue). Estimate should have been submitted on or around 25/11/09. **Delay by Infraco**
- (v) INTC 368: issued by Infraco on **27/03/09** (prior to IFC issue). Estimate should have been submitted on or around 22/04/09. **Delay by Infraco**

INTC's 083 & 368 were the subject of an 80.13 Instruction issued by tie on 19/03/10.

Given the fact that SDS has yet to issue an IFC in relation to this structure it appears likely that Infraco will issue a further INTC specifically addressing 'final' BDDI – IFC changes. This is clearly dependent on the completion of the VE exercise. There therefore remains the potential that issues attaching to this process may yet prevent / compromise commencement. DS advises that this potential is likely to be realised. It is his consideration that this BDDI to_ IFC is likely to address the differences between Infraco's VE proposal and what it will in effect have to implement. Infraco will look to attribute delay in agreement of finishes to CEC on the basis that it was a higher finishes specification than that originally envisaged to gain planning permission.. Infraco will argue that CEC changes / requirements were not reasonable and as such resulted in the VE saving not being fully achieved. Consequent to this Infraco will seek recompense for any shortfall. Given that there is clearly split culpability for issues attaching to the delays in issue of Estimates by Infraco may, at least in part, be excused.

C. **MUDFA / Utilities**: There are no MUDFA / Utilities issues impacting on this structure. **No Delay.**

D. **Other Issues**:

- (i) Sub-Contractor Procurement: Understood that Infraco have sublet this structure to Grahams Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
- (ii) WPP Process: Not in place as yet but dependent on IFC process.
- (iii) IDR/IDC process: Not yet in place. Infraco letter of 18/12/09 predicted the IDC to be complete as 05/02/10. As at 30/04/10 the IDC is not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. This process is dependent upon the IFC completion – not yet in place.
- (iv) Form 'C': not yet identified as being an obstacle to commencement (but this still has the potential to cause delay depending on documentation collation and submission). As with other structures this process should be monitored.
- (v) VE Exercise: See 'A' (IFC Process) above.

E. **Construction Periods**:

5A Roseburn Viaduct - S21A					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	30/03/2009	19/05/2010	59.29 wks	19/05/2010	59.29 wks
Finish	04/05/2010	11/05/2011	53.14 wks	28/02/2011	42.86 wks
Cal. Duration	57.29 wks	51.14 wks	-6.14 wks	40.86 wks	-16.43 wks

- (i) Delay to Start: The table above refers to various programme dates. The Issue 3 programme shows a delay to start of **59 weeks**; the IM mitigated programme also shows a delay to start of **59 weeks**. Actual start will be later than shown due to VE/IFC exercise (approximately 78 weeks late; 30/03/09 to 30/09/10). Primary causes of delay to start as follows:-

- A. IFC process: **Still incomplete**. This IFC is projected to be **114 weeks late** (planned **25/07/08**; as at **30/04/10** the actual IFC is **yet to be issued and expected circa late September 2010**). The delay in issuing this IFC appears to be a direct consequence of delays attaching to the Roseburn Viaduct VE exercise. **Delay by SDS, SDS /tie or Infraco? Accuracy in the allocation of culpability is dependent on the outcome of the recommended audit process.**
- B. INTC's: Delays by Infraco in the submission of Estimates. Delay up to 19/03/10 when tie issued clause 80.13 instruction [Complete data on INTC's awaited]. Future delays attaching to the INTC process are probable. Delays may yet / are likely to flow from the late IFC completion in the form of BDDI – IFC changes.
- C. MUDFA / Utilities: **No impact** on this structure.
- D. Other:
- **Sub-Contractor procurement**: Understood that Infraco intend to sublet this structure to Expanded Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** But commencement / progress dependent on IFC process.
 - **WPP process**: Not in place as yet but dependent on IFC process.
 - **IDR/IDC process**: Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. Dependent on IFC process.
 - **Form 'C' Approval**: not yet identified as being an obstacle to commencement (but this still has the potential to cause delay depending on documentation collation and submission).
 - **VE Exercise**: See A (IFC Process) above.

- (ii) Delay to Finish: Issue 3 programme shows a reduction in duration of **circa 6 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows a reduction of **-16 weeks** to the Rev.1 programme. Noted that final estimates of durations will be dependent upon final design.

F. **tie position on area availability**:

- (i) First available date for the meaningful commencement of works to this area relies on the IFC issue for this structure. . This is dependent on completion of the VE exercise, which was predicted to complete mid May 2010 (IFC was expected by 30/07/10; SDS v58). Recent discussions with DS on 21/06/10 suggest that an approximate date for issue of the completed IFC is more likely to be (late) **September 2010**.

G. **Conclusion**:

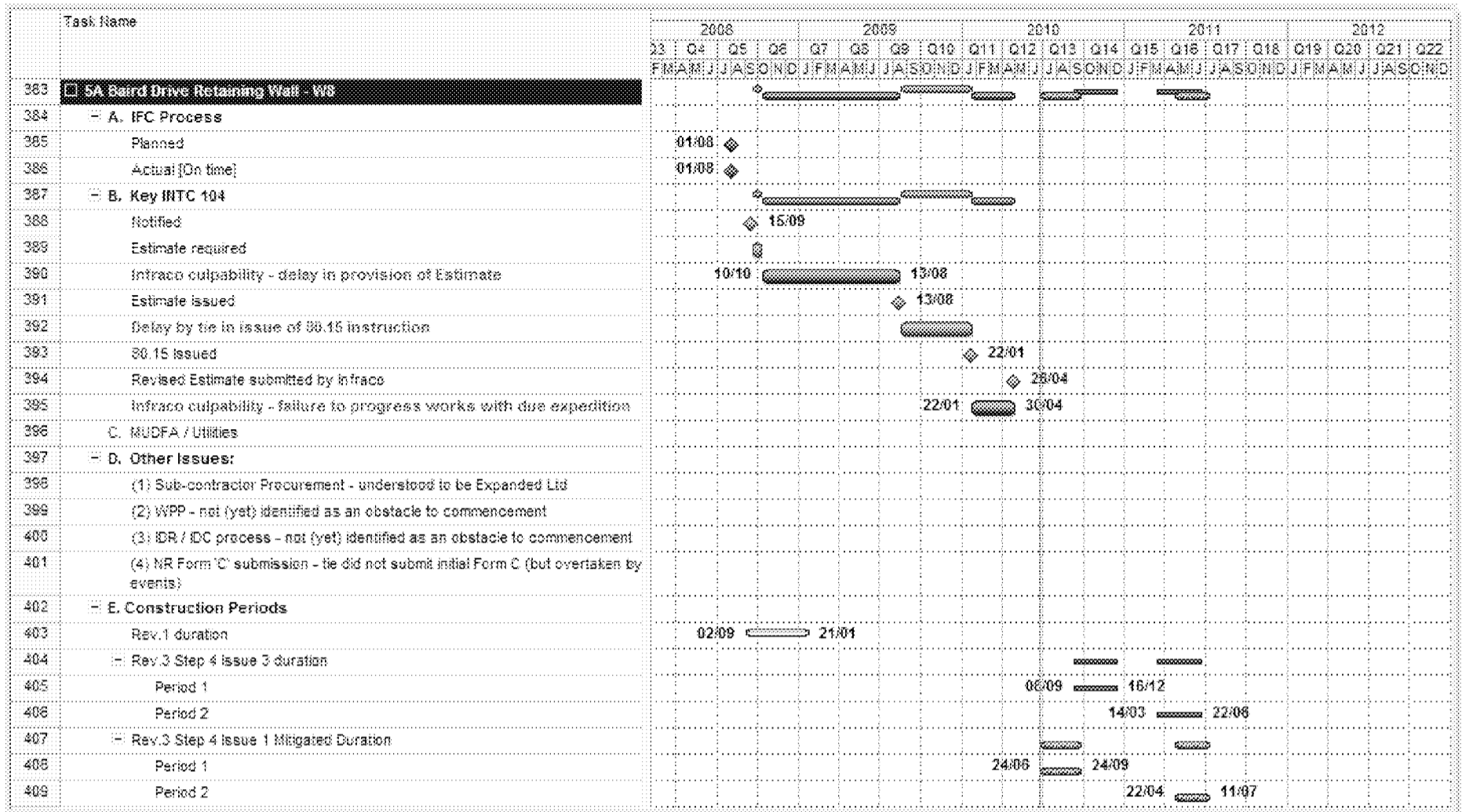
- (i) **'Significant' issues/events:** In our opinion the main obstacle to commencement on this structure is the delay to the revised IFC. The IFC should have been provided by **25/07/08** as at **30/04/10** however, the IFC is **still incomplete**. This is clearly dependent on the completion of the VE exercise. Responsibility on this issue is complex and presently uncertain due to absence of detailed evidence. This needs to be established by tie audit (see G(iii) below).
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing, the WPP process & the IDC / IDR process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G (i) above. They may however become more significant in the lead up to the area availability in June 2010. Running concurrently with this is the late provision by Infraco of Estimates for INTC's **117, 083, 181, 150, & 368**. Estimates are still outstanding for all of the aforementioned INTC's. Delays attaching to Infraco's response on the foregoing are due to the absence of an IFC. This in turn is dependent on completion of the above noted VE exercise. Therefore although there is Infraco responsibility for delays in the provision of Estimates, this may well be subsumed by delays attaching to the VE exercise on RV. Responsibility therefore, remains uncertain. Delay measured to 19/03/10 (when clause 80.13 instruction issued; but unlikely to have been an obstacle to actual commencement).
- (iii) **Considerations of dominance:** The protracted delay attaching to the IFC on this structure has clearly affected commencement. This appears to be a direct consequence of delays attaching to the Roseburn Viaduct VE exercise. Responsibility on this issue is complex and presently uncertain due to absence of detailed evidence. This needs to be established by tie audit. Delays attaching to the INTC process, sub-contractor procurement could yet prove significant but currently have less 'causative potency' than the above.

As such, in our opinion the delay to the issue of the IFC (and associated VE exercise) for this structure is the dominant / critical factor affecting commencement and hence completion for same. This should be the subject of a detailed tie audit. This issue has a knock-on delaying effect on Murrayfield Tramstop Retaining Wall – W18 and Murrayfield Tramstop.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	The culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
			0	-				0	-				0	-
			0	-				0	-				0	-
			0	-				0	-				0	-
				-					-					-
2. UPPER LIMIT														
Delay from rev 1 - Rev 3 date (Affected by RV VE)	30/03/09	30/09/10	549	78.43	Delay from rev 1 - Rev 3 date (Affected by RV VE)	30/03/09	30/09/10	549	78.43	Delay from rev 1 - Rev 3 date (Affected by RV VE)	30/03/09	30/09/10	549	78.43
			0	-				0	-				0	-
			0	-				0	-				0	-
				78.43					78.43					78.43
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -16 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period -16 wks: Notwithstanding delays attaching to the RV VE exercise this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period -6 wks: Infraco clearly accepts the possibility for mitigation. Though currently not to the same extent as noted above. On the basis however, that Infraco can mitigate to -16 wks per IM analysis then Infraco lower limit restricted to anything in excess of -16 wks. tie liability remains at lower limit of -16 wks if Infraco responsible for all increased									
Infraco Rev.3 Period = -6 wks	IC	Infraco	IC	Infraco										
Lower Limit	-16.00	-16.00	-16.00	-6.00										
Upper Limit	0.00	0.00	-10.00	0.00										

5A Baird Drive Retaining Wall – W8



A. **IFC Process:** Initial IFC issued on time (planned 01/08/08; actual 01/08/08). No subsequent IFC's have been issued as at 30/04/10. **No Delay**

B. **Key INTC's:** From information provided it appears that the Infraco issued 2 no. INTC in relation to this structure; **INTC's 104 & 105**. We are further advised that **INTC 104 (BDDI - IFC Drawing Changes – Baird Drive RW – Section 5A)** in particular, appears to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 104:** issued by Infraco on 15/09/08 (45 days after IFC issue). Estimate should have been submitted on or around 13/10/08. Estimate was received on 13/08/09; **43 weeks** later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 104. On 15/01/10 subsequent to review & discussion of **INTC 104**, tie gave notice that the Estimate in relation to W8 Baird Drive RW was being referred to DRP for determination. **80.15 Instruction issued by tie on 22/01/10; 23 weeks** following receipt of Estimate. **Delay by tie; tie culpability** for time taken to issue 80.15 instruction following receipt of Estimate dated 13/08/09.
Note: we understand that Infraco submitted revised Estimate for this structure w/c 26/04/10. It is not known whether this has delayed commencement of progress.

C. **MUDFA / Utilities:** There are no MUDFA / Utilities issues impacting on this structure. **No Delay**

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Understood that Infraco intend to sublet this structure to Expanded Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco; Infraco culpability.**
- (ii) **WPP Process:** Permit to commence work has been received. **No Delay.**
- (iii) **IDR/IDC process:** Not yet in place. Infraco letter of 18/12/09 does not identify what the IDR / IDC requirement is for Baird Drive RW. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
- (iv) **Form 'C':** Infraco submitted Form 'C' certificate to tie on 22/03/10. tie did not process this Form 'C' application. (TC advises that tie was concerned that by signing the Form 'C' sign-off, tie's position in respect of Infraco's argument on removal and replacement of the potentially soft underlying strata would in some way be undermined / diluted). That said, TC subsequently advised that a revised Form 'C' deleting the requirement for temporary sheet piles at the garden and embankment sides was submitted by Infraco on 20/05/10. Thereby confirming that the content of the initial submission to be non compliant / incorrect. In our opinion **tie** should therefore be excused the period during which it held out for a compliant application. Therefore delays attaching should be viewed as a **Delay by Infraco(i.e. Infraco culpability)** for the time taken to produce compliant Form 'C' application).
- (v) **Dynamic Probe Testing:** DPT carried out along Baird Drive as at w/c 22/02/10. Infraco state this was necessary because SI carried out July / August 2008 was insufficient to confirm the depth of excavation for the RW. These results have been sent to SDS by TQ. Infraco has stated that it is awaiting SDS conclusions regarding design assumptions with regard to the removal and replacement of the potentially soft underlying strata. It further states that upon receipt of SDS response Infraco will formalise a work scope and programme. This appears to be a **Delay by Infraco; Infraco culpability.** Note however that a **revised Estimate was submitted by Infraco during w/c 26/04/10.** This confirms that additional reduced level excavations are no longer required. Elaborate Temp. Works in association with this has now been replaced with a proposal for piling works in isolation. This therefore appears to be a **Delay by Infraco & Infraco culpability.** This particular issue has been resolved sufficiently in advance of (26/04/10) the earliest date of commencement in this area between Issue 3 and IM mitigated programme to have no material delaying effect.

E. Construction Periods:

5A Baird Drive Retaining Wall - W8					
	Rev.1	Rev.2 Issue 3	Delay	IM Mitigated Rev.4	Delay
Start	02/09/2008	08/09/2010	105.14 wks	24/06/2010	94.29 wks
Finish	21/01/2009	22/06/2011	126.00 wks	11/07/2011	128.71 wks
Cal. Duration	20.29 wks	41.14 wks	20.86 wks	54.71 wks	34.43 wks

- (i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **105 weeks**; the IM mitigated programme projects an earlier start (delayed by **94 weeks**) but a later completion. Primary causes of delay to start as follows:-
- IFC process: Initial IFC **issued on time** (planned & actual: **01/08/08**). No subsequent IFC's have been issued as at 30/04/10. **No Delay**
 - INTC's: INTC 104 issued 45 days after IFC; significant **Infraco delay to provision of Estimate (304 days late); tie delay (162 days) in dealing with Estimate through to 80.15 instruction on 22/01/10.**
 - MUDFA / Utilities: **No impact** on this structure.
 - Other:
 - **Sub-Contractor procurement:** Understood that Expanded Ltd may be appointed by Infraco for Baird Drive RW – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco. Infraco culpability.** The significance of this issue will increase as the 24/06/10 nears.
 - **WPP process:** Permit to commence work has been received. **No Delay.**
 - **IDR/IDC process:** Not yet in place. Infraco letter of 18/12/09 does not identify what the IDR / IDC requirement is for Baird Drive RW. In contrast to Section 1 works in particular, the absence of a completed IDR / IDC does not appear to be an obstacle to commencement for this structure. **Delay by Infraco; Infraco culpability** (but little / no effect).
 - **Form 'C' Approval:** Infraco submitted Form 'C' certificate to tie on 22/03/10. tie did not process this Form 'C' application. (TC advises that tie was concerned that by signing the Form 'C' sign-off, tie's position in respect of Infraco's argument on removal and replacement of the potentially soft underlying strata would in some way be undermined / diluted). That said, TC subsequently advised that a revised Form 'C' deleting the requirement for temporary sheet piles at the garden and embankment sides was submitted by Infraco on 20/05/10. Thereby confirming that the content of the initial submission to be non compliant / incorrect. In our opinion **tie** should therefore be excused the period during which it held out for a compliant application. Therefore delays attaching should be viewed as a **Delay by Infraco(i.e. Infraco culpability)** for the time taken to produce compliant Form 'C' application).
 - **Dynamic Probe Testing:** DPT carried out along Baird Drive as at w/c 22/02/10. **Delay by Infraco; Infraco culpability.** (Revised Estimate submitted w/c 26/04/10 appears to confirm that additional reduced level excavations are no longer required. Elaborate Temp. Works in association with same has now been replaced with a proposal for piling works in isolation). **Delay by Infraco; Infraco culpability.** This issue has been resolved sufficiently in advance of (24/06/10) the earliest date of commencement in this area between Issue 3 and IM mitigated programme to have no material delaying effect.
- (ii) Delay to Finish: Issue 3 programme shows an **increase of circa 21 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows an increase in duration of **34 weeks** to the Rev.1 programme. There is presently no justification presented for Infraco's increased Rev.3 duration. In respect of IM's increase in overall duration, this is due to the relationship between this structure, Water of Leith Bridge (S21E) and Balgreen Road Bridges (S22A & S22B) – see gap in chart above. *Potential for reduction of this gap has been identified.*

F. tie position on area availability:

- (i) First available date for the meaningful commencement of works to this area is governed by the 80.15 Instruction issued by tie on 22/01/10. Allowing for 20 working days mobilisation beyond this date, works should have commenced on or around **18/02/10.**

Commencement of works in this area is not driven by works in other areas. Initial **delay by Infraco;** subsequent **delay by tie** in respect of timing of the 80.15 instruction. Subsequent delays attaching to the re-submission of the Form 'C' application serve to exacerbate ongoing delays. This is a matter for which Infraco is responsible.

G. Conclusion:

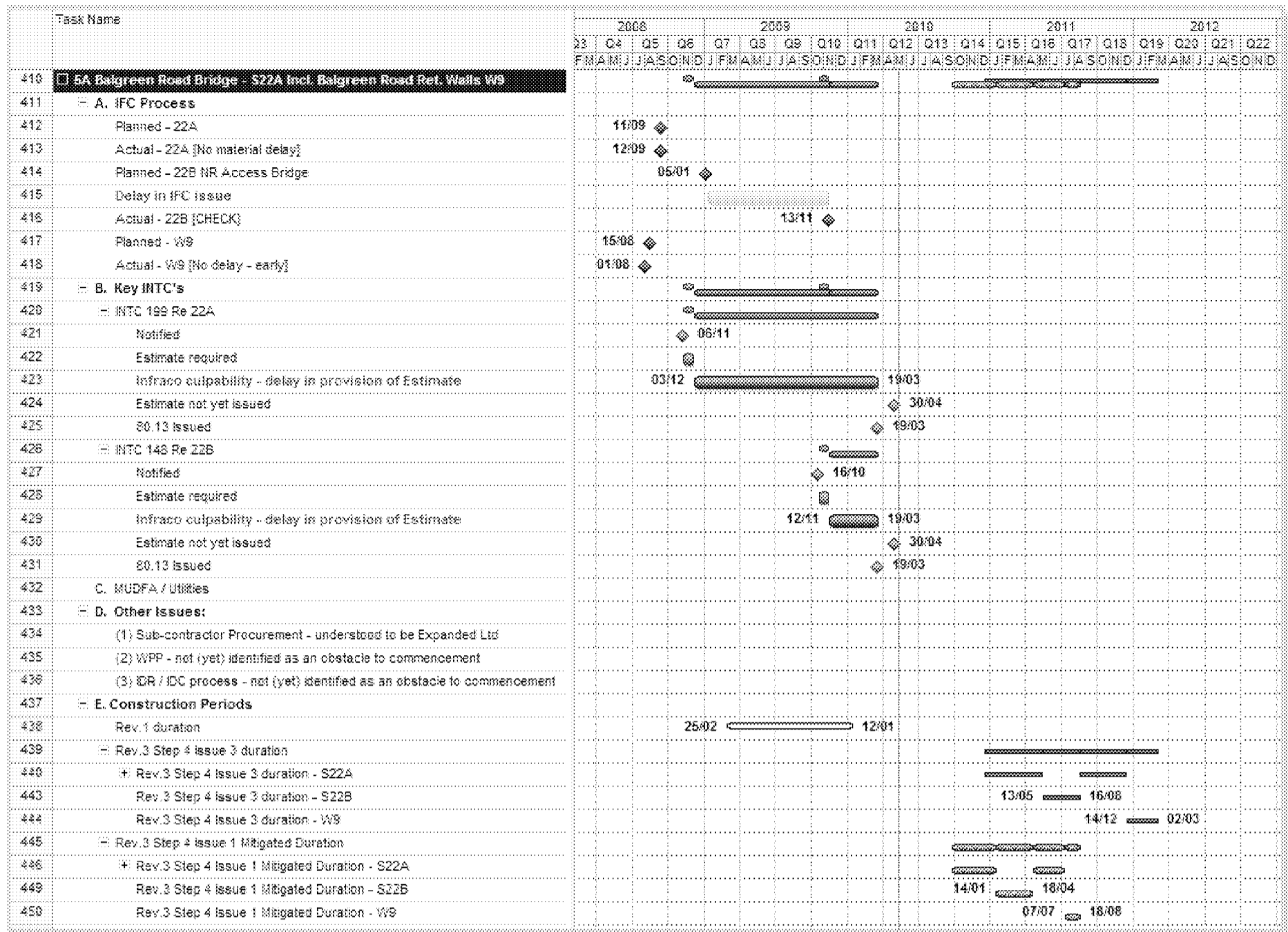
- (i) **'Significant' issues/events:** In our opinion there were two main contributory factors, being (a) the INTC process; and (b) delays attaching to Infraco's failure to provide a compliant Form 'C' application. Taking those events in chronological order:-
- In our opinion the main delaying factor was the protracted INTC process attaching to **INTC 104 (BDDI - IFC Drawing Changes – Baird Drive RW – Section 5A).** INTC 104 was issued by Infraco on **15/09/08** (45 days after IFC issue). That should have been provided by 13/10/08 (earliest) but was actually provided w/c 13/08/09. This is a matter for which Infraco is responsible. Beyond 13/08/09 however, tie's review and inaction on the Estimate for INTC 104 ran until **22/01/10** (when the 80.15 instruction was issued). In light of the advice from DLA dated 24 March 2010, this is a period for which tie bears responsibility. Following the issue of the 80.15 instruction Infraco is obliged to commence the works. Commencement however, was compromised by the absence of Form 'C' approval. tie withheld this approval pending negotiations over ground conditions. Subject to Infraco's recently resubmitted (compliant) Form 'C' application on 20/05/10 this is likely to be a matter for which Infraco is responsible. TC advises that Infraco's latest revised Estimate does not now reflect Infraco's previous intentions in regard to work scope. This has resulted in its latest estimate affording a circa £2,750,000.00 reduction to that presented in its initial submission. The latest Form 'C' application reflects the work content in this latest estimate submission.
- (ii) **Concurrent issues:** In our opinion the other event detailed above (i.e. the sub-contractor procurement timing) has much less of a bearing on the late commencement of this area. Whilst in isolation this issue may have been critical to commencement its significance is considerably diminished by the fact that there is a WPP package in place. (This suggests that the procurement process is close to resolution). This may however (if unresolved) become more significant if unresolved beyond the completion of the Form 'C' approval process.

(iii) **Considerations of dominance:** The significant delays attaching to the issue of the first INTC on this structure has clearly affected commencement. The delay has in effect three constituent parts (1) Infraco's delay in issuing an INTC from the IFC issue date (2) the protracted timeframe taken by Infraco to provide a compliant Estimate following the issue of the INTC, and (3) tie's delay in issuing an 80.15 instruction on receipt of the Estimate. The late approval of the Form 'C' may also have restricted access to this area. Following the issue of the 80.15 instruction Infraco is obliged to commence the works. Commencement however, was compromised by the absence of a compliant Form 'C' application by Infraco. . Subsequent delays attaching to this issue are matters for which Infraco is responsible.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
Recognises upper limit less 2 weeks prolonged INTC notice			0	27.00	Delay to estimate INTC 104	10/10/08	13/08/09	307	43.86	No IFC delay	01/08/08	01/08/08	0	-
			0	-	Delay; From 80.15 instruction to revised Infraco estimate	22/01/10	30/04/10	98	14.00				0	-
			0	-	Delay; From 80.15 instruction to Rev 3 start date	30/04/10	08/09/10	131	18.71				0	-
				27.00					76.57					-
2. UPPER LIMIT														
Delay; Rev 1 start to INTC 104 notification	02/09/08	15/09/08	13	1.86	Delay to estimate INTC 104	10/10/08	13/08/09	307	43.86				0	-
INTC 104 estimate period	15/09/08	10/10/08	25	3.57	Delay; From 80.15 instruction to revised Infraco estimate	22/01/10	30/04/10	98	14.00				0	-
Delay; From INTC 104 estimate to 80.15 instruction	13/08/09	22/01/10	162	23.14	Delay; From 80.15 instruction to Rev 3 start date	30/04/10	08/09/10	131	18.71				0	-
			0	-	Prolonged INTC notice			0	1.57				0	-
				28.57					78.14					-
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +34 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period +34 wks: this is likely to be delays flowing from BDD1/IFC issues and TM revised phasing. Culpability not clear; although likely to rest with Infraco. Upper / lower limits recognise extremes of liability. Infraco Rev.3 period +21 wks: On the basis that Infraco can mitigate to 21 wks per IM analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations									
Infraco Rev.3 Period = +21 wks	tie	Infraco	tie	Infraco										
Lower Limit	13.00	0.00	0.00	0.00										
Upper Limit	34.00	21.00	21.00	21.00										

5A Balgreen Road Bridge – S22A (Incl. Balgreen Road RW9); & Bridge 22B



A. **IFC Process:** Initial IFC for 5A Balgreen Road Bridge – S22A was issued (effectively) on time (planned 11/09/08; actual 12/09/08). No material delay. Initial IFC for Balgreen Road RW9 was issued 2 weeks early (planned 15/08/08; actual 01/08/08). Initial IFC for 5A Balgreen Road (NR) Bridge – S22B however, was issued 45 weeks late (planned 05/01/09; actual 13/11/09). We are advised by DS that the salient factors contributing to this delay are as follows:-

- (i) Throughout the Prior Approval process there was some debate over the appropriate shape and form of the bridge. In particular, the way in which voids below the bridge would / should be treated. This however, appears to have been resolved to allow on-time granting of PA.
- (ii) Issues arose over protection measures to secure departure from recognised standards to allow a lower than 5.30m clearance. SDS was 24 weeks late in submitting the bridge for technical approval. It appears that this delay can be attributed to the late provision of access to NR land to undertake ground investigations. That said, it is our understanding that the delay noted arose from SDS's failure to request access timeously. This is a matter for which SDS is responsible.
- (iii) Following submission of the bridge for TAA, approvals were delayed by the requirement for Cat 3 checks and agreement on protection measures against bridge strikes by NR. This resulted in disagreements between NR & CEC over bridge heights. DS further advises that SDS failed to prepare a briefing note to NR & CEC with a view to meeting at the end of May 2009. Consequent to this, delays continued until the IFC was issued on 13/11/09. **Note:** this 6 month period appears odd, however it is presently the only information available.

Having regard to the foregoing, DS advises culpability for the delays noted rests mainly with SDS in failing to manage the Technical Approvals process / interface with both NR & CEC. Whether this extends to a failure of Infraco in respect of its management of SDS is currently uncertain (further details required from audits to be carried out). It therefore appears that the late issue of this IFC flows from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change (depending on BDDI to IFC issues)?;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility.

Delay by SDS, SDS /tie or Infraco?

B. **Key INTC's:** From information provided Infraco issued 3 no. INTC's in relation to this structure; INTC's 097, 148 & 199. We are advised that INTC 148 (IFC Drawings for Balgreen Road Tram Bridge) and INTC 199 (IFC Drawings for Balgreen Bridge S22A) have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) INTC 148: issued by Infraco on 16/10/09. Estimate should have been submitted on or around 11/11/09. **Delay by Infraco.**
- (ii) INTC 199: issued by Infraco on 06/11/08. Estimate should have been submitted on or around 02/12/08. **Delay by Infraco**

All of the above INTC's were the subject of an 80.13 Instruction issued by tie on 19/03/10.

C. **MUDFA / Utilities:** There are no MUDFA / Utilities issues impacting on this structure. **No Delay**

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Understood that Infraco intend to sublet this structure to Expanded Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco; Infraco culpability.**
- (ii) **WPP Process:** Not in place as yet. **Delay by Infraco; Infraco culpability.**
- (iii) **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
- (iv) **Form 'C':** Not yet in place. Infraco Period Report No.3-1 report to 24/04/10 notes '*Form C/WPP has continued*'. **Delay by Infraco; Infraco culpability.**
- (v) **Demolition works:** Demolition of the Busy Bee (Cafeteria) yet to be undertaken.

E. **Construction Periods:**

5A Balgreen Road Bridge - S22A Incl. Balgreen Road Ret. Walls W9 & Bridge S22B					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	25/02/2009	16/12/2010	94.14 wks	24/09/2010	82.29 wks
Finish	12/01/2010	02/03/2012	111.43 wks	18/08/2011	83.29 wks
Cal. Duration	46.00 wks	63.29 wks	17.29 wks	47.00 wks	1.00 wks

- (i) **Delay to Start:** The table above refers to various programme dates. Issue 3 programme shows a delay to start of **94 weeks**; the IM mitigated programme projects an earlier delay to start of **83 weeks**. Primary causes of delay to start as follows:-
 - A. **IFC process:** Initial IFC for **5A Balgreen Road (NR) Bridge – S22B** was issued **45 weeks late** (planned **05/01/09**; actual **13/11/09**). Culpability for the delay appears to rest with SDS in failing to manage the Technical Approvals process / interface with both NR & CEC. Whether this extends to a failure of Infraco in respect of its management of SDS is currently uncertain **Delay by Infraco, SDS /tie or tie?**
 - B. **INTC's:** **INTC 199 (IFC Drawings for Balgreen Bridge S22A)** issued by Infraco on **06/11/08** (55 days after IFC issue). As at 30/04/10 Estimate is currently outstanding i.e. 540 days later than permitted by the Contract. **INTC 148 (IFC Drawings for Balgreen Road Tram Bridge S22B)** issued by Infraco on **16/10/09** (in advance of IFC issue issued 13/11/09). As at 30/04/10 Estimate is currently outstanding i.e. 196 days later than permitted by the Contract. **Significant Delay by Infraco. Infraco culpability**
Delay taken up to 19/03/10 when tie issued clause 80.13 instruction.
 - C. **MUDFA / Utilities:** **No impact** on this structure.
 - D. **Other:**
 - **Sub-Contractor procurement:** Understood that Infraco intend to sublet this structure to Expanded Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco; Infraco culpability.**
 - **WPP process:** Not in place as yet. **Delay by Infraco; Infraco culpability**
 - **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
 - **Form 'C' Approval:** Not yet in place. Infraco Period Report No.3-1 report to 24/04/10 notes '*Form C/WPP has continued*'. **Delay by Infraco; Infraco culpability**
- (ii) **Delay to Finish:** Issue 3 programme shows an increase in duration of **circa 17 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows a minor increase of **1 week** to the Rev.1 programme. There is presently no justification presented for the Infraco increased Rev.3 duration.

F. **tie position on area availability:**

- (i) First available date for the meaningful commencement of works to this area **relies on a proportion of reinforced earthworks on Baird Drive** to enable its commencement. Protracted delays on Baird Drive (for the most part the INTC process) have significantly delayed its commencement. Infraco Period Report No.3-1 report to 24/04/10 forecasts commencement on Baird Drive on 17 May 2010.

G. **Conclusion:**

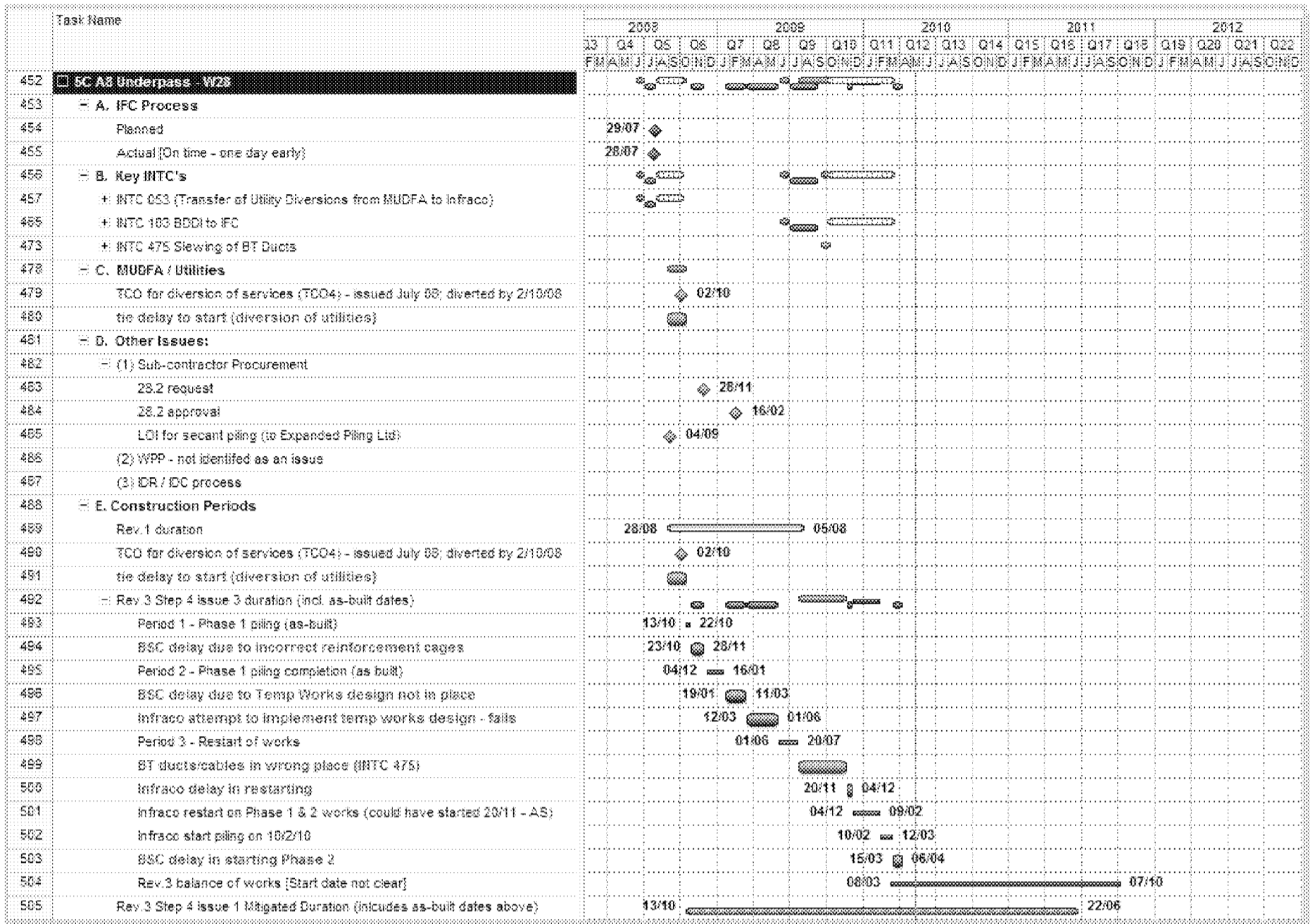
- (i) **'Significant' issues/events:** In our opinion there are three main contributory factors, being (a) completion of a proportion of reinforced earthworks on Baird Drive RW; (b) the IFC process; and (c) the INTC process. Taking those events in chronological order:-
In our opinion the main delaying factor is completion of a proportion of reinforced earthworks on Baird Drive RW. Protracted delays on Baird Drive have significantly delayed commencement on Balgreen Road Bridge 22A. For responsibility refer Summary chart / narrative for Baird Drive RW above (in summary a delay caused by the INTC process re INTC 104. Split culpability – majority rests with Infraco)
Running concurrently with the 'Baird Drive' delays are delays attaching to both the IFC and INTC processes. The IFC for **5A Balgreen Road (NR) Bridge – S22B** was issued **45 weeks late** (planned **05/01/09**; actual **13/11/09**). Responsibility on this issue is uncertain (see above – this should be subject to tie audit).
Thereafter, delays attaching to the provision of Estimates for INTC's 148 & 199 are matters for which Infraco is responsible.
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing, the WPP process and the NR Form C process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been / may yet be critical to commencement their significance is considerably diminished by the occurrence of the events in G (i) above. They may however become more significant in the lead up to the area availability in September 2010. Infraco's failure to submit Form 'C' for approval is a matter for which it is responsible.
- (iii) **Considerations of dominance:** The protracted delay attaching to the IFC for 5A Balgreen Road (NR) Bridge – S22B and subsequent delays attaching to INTC process for both bridges have clearly been obstacles to commencement on this element of the works. However, Balgreen

Road Bridges rely on a proportion of reinforced earthworks on Baird Drive to enable its commencement. The above noted IFC & INTC delays are in effect subsumed by the delays attaching to Baird Drive RW reinforced earthworks which are clearly the determinant / predecessor to commencement of the Balgreen Road Bridges; and as such this has greater 'causative potency' than the other issues above.

H. Current assessment of culpability

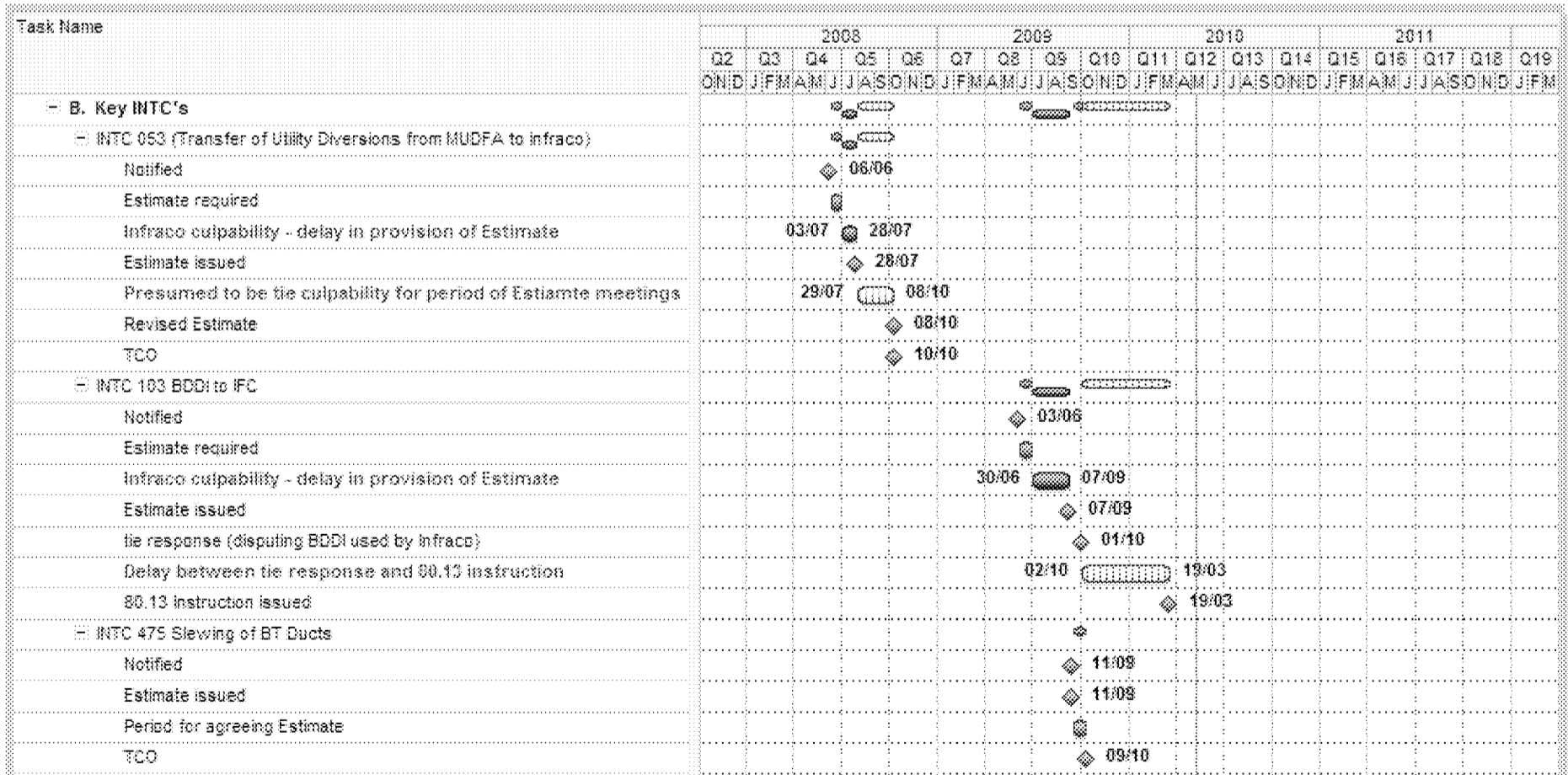
A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Tie culpability					Infraco culpability					Poss. SDS culpability			
	From	To	Days	Weeks	Cause	From	To	Days	Weeks	Cause	From	To	Days	Weeks
1. LOWER LIMIT														
No Tie culpability dependent on BDRW			0		Delay to estimate INTC 199	25/02/09	19/03/10	387	55.29	Delay to last IFC	05/01/09	13/11/09	312	44.57
			0	-	Delay; From 80.13 instruction to Rev3 start date	19/03/10	16/12/10	272	38.86				0	-
			0	-				0	-				0	-
									94.14					44.57
2. UPPER LIMIT														
			0	-	Delay to estimate INTC 199	25/02/09	19/03/10	387	55.29	Delay to last IFC	05/01/09	13/11/09	312	44.57
			0	-	Delay; From 80.13 instruction to Rev3 start date	19/03/10	16/12/10	272	38.86				0	-
			0	-				0	-				0	-
									94.14					44.57
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = + 1 wks	IM Mitigated Period		Infraco Rev.3 Period				IM mitigated period 0 wks: Currently no mitigation considered possible Rev 1 construction duration still considered more or less achievable. Affected by the consequential 'knock on' effect of delays attaching to Baird Drive RW's. Infraco Rev.3 period +17 wks: Infraco clearly considers slippage likely. On the basis however, that Infraco can (more or less) maintain the original Rev 1 programmed duration as per IM analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability							
Infraco Rev.3 Period = +17 wks	IC	Infraco	IC	Infraco										
Lower Limit	0.00	0.00	0.00	16.00										
Upper Limit	1.00	1.00	1.00	17.00										

5C - A8 Underpass – W28



A. **IFC Process:** planned date of **29/07/08**; actual issue on **28/07/08**; **No delay**. We are also advised that 4 drawings were re-issued on **03/12/09** (no details available re reason for, or effect of, same). This may explain the re-start date of works on 4/12/09 (but has not been identified as an obstacle to recommencement).

B. **Key INTC's:** we are advised that the following INTC's were key to commencement and progress (see chart and details below):-



(i) **INTC 053 (Transfer of Utility Diversions from MUDFA to Infraco):** we understand that this was a critical delay to commencement of the A8 Underpass. Delay from planned commencement of 28/8/08 to 13/10/08 (i.e. allowing Infraco mobilisation period). **Minimum 5 weeks delay; tie culpability. Likely be delay of 7 weeks to 13/10/08** (when piling actually started; allowing for mobilisation)

- (ii) INTC 103 (BDDI to IFC): notified 03/06/09; Estimate required 29/06/09; Estimate issued 07/09/09 (**10 weeks late**). **tie** response issued 01/10/09 disputing BDDI design information used by Infraco in preparation of Estimate; requesting Infraco to review Estimate detail. No reply from Infraco to date. [Not clear who is correct in this – affects culpability]. **80.13 Instruction issued 19/03/10.**
It is not clear what this affects – as does not appear to have affected progress to date (but could increase duration required for additional work).
- (iii) INTC 475 (Slewing of BT Ducts): INTC issued 11/09/09; Estimate issued 11/09/09; TCO issued 9/10/09. See notes below (under 'C') re period of work and effect on progress. **tie accepts culpability for effect.**

C. **MUDFA / Utilities**: utility diversions transferred to Infraco under **INTC 053** appear to be the critical delay to start of Phase 1. Utility diversion was complete by 02/10/08. Phase 1 piling started on **13/10/08. Delay of 5 to 7 weeks; tie culpability.** This issue is not disputed by **tie**. Similarly, **INTC 475** is not disputed. Issue identified July 2009; causing work to stop while investigations and solution found. Work took from 02/11/09 to 04/12/09. **tie** (AS) however believes that work could have recommenced on 20/11/09. Delay from 21/07/09 to 19/11/09 = **17 weeks; tie culpability.** Note: further utility diversions (SP & SGN) appear to be identified within the tie PM Report 'Period Two; Year 10/11'. Those diversions may yet affect progress.

D. **Other Issues:**

- (i) Sub-Contractor Procurement: LOI issued to Expanded Piling on 04/09/08 for piling works. Although this is later than planned commencement of 28/08/08, the delay due to utility diversion was known about at that time. Appears LOI issued 'just in time' and therefore not affecting commencement.
- (ii) WPP Process: not identified as an obstacle to commencement or progress generally. However, see details below re temporary works design during January to March 2009.
- (iii) IDR/IDC process: understood not to have delayed commencement or progress.

E. **Construction Periods:**

5C A8 Underpass - W28					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	28/08/2008	13/10/2008	6.57 wks	13/10/2008	6.57 wks
Finish	05/08/2009	07/10/2011	113.29 wks	22/06/2011	98.00 wks
Cal. Duration	49.00 wks	155.71 wks	106.71 wks	140.43 wks	91.43 wks

- (i) Delay to Start: Actual commencement was achieved on 13/10/08 (**6.57 weeks late**). Primary causes of delay to start as follows:-
- IFC process: no delay identified.
 - INTC's: **INTC 053** (utility transfer) caused delay to commencement of **5 to 7 weeks**. **INTC 475** caused **17 week** delay to progress. **Both tie culpability.**
 - MUDFA / Utilities: see above re delays caused by **INTC's 053 & 475**.
 - Other: please see comments at 'D' above. These matters are not understood to have been an obstacle to commencement.

- (ii) Delay to Finish: delay to actual progress (and commencement) can be summarised as follows (also see chart above):-

Description of activities	From	To	Duration		Culpability
			Days	Weeks	
Delay to Start	28/08/08	13/10/08	47	6.71	tie
Period 1 - Phase 1 piling (as-built)	13/10/08	22/10/08	10	1.43	
BSC delay due to incorrect reinforcement cages	23/10/08	28/11/08	37	5.29	Infraco
Period 2 - Phase 1 piling completion (as built)	01/12/08	16/01/09	47	6.71	
BSC delay due to Temp Works design not in place	19/01/09	11/03/09	52	7.43	Infraco
Infraco attempt to implement temp works design - fails	12/03/09	01/06/09	82	11.71	Infraco
Period 3 - Restart of works	01/06/09	20/07/09	50	7.14	
BT ducts/cables in wrong place (INTC 475)	21/07/09	20/11/09	123	17.57	tie
Infraco delay in restarting	20/11/09	04/12/09	15	2.14	Infraco
Infraco restart on Phase 1 & 2 works (could have started 20/11 - AS)	04/12/09	09/02/10	68	9.71	
Infraco start piling on 10/2/10	10/02/10	12/03/10	31	4.43	
BSC delay in starting Phase 2	15/03/10	06/04/10	23	3.29	Infraco

Summary of delays		
Days	Weeks	Culpability
209	29.86	Infraco
170	24.29	tie

Increased durations

The table at 'E' above shows that the Issue 3 programme includes an **increase of circa 107 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows an increase in duration of **92 weeks** to the Rev.1 programme. There is presently no justification for the Infraco increased Rev.3 duration. Increased durations are reconciled as follows:-

Phase	Rev.1 (wks)	Infraco Rev.3 (wks)	Increase (wks)
Phase 1	9		
Phase 2	18		
Phase1&2		95	68
Phase 3	12	22	10
Phase 4	10	28	18
Subway	Incl.	7	7
Sub-total	49	152	103
Add'l Holidays	0	4	4
Total	49	156	107

The increased durations however, include the periods of earlier as-built delays (totalling circa **54 weeks**) as summarised above. These delays are reconciled below (showing a net increased duration in the Issue 3 programme of **52.57 weeks**; and **37 weeks** in IM's mitigated Rev.3 programme). Note: it is understood that Infraco are looking at running Phase 4 concurrently with Phases 1 & 2, which could considerably reduce projected timescale.

Description	Durations (weeks)		
	Rev.1	Rev.3 Issue 3	If Mitigated Rev.3
Original Duration	49.00	49.00	49.00
Delay: tie		24.29	24.29
Delay: Infraco		29.86	29.86
Increased duration		52.57	37.29
Total	49.00	155.71	140.43

Note: further utility diversions (SP & SGN) appear to be identified within the tie PM Report 'Period Two; Year 10/11'. Those diversions may yet affect progress.

Key issues which do or may entitle Infraco to further time are as follows:-

- (i) Delay to start (INTC 053): **6.5 weeks**
- (ii) BT diversion (INTC 475): **17.5 weeks**
- (iii) Additional scope / utility diversion or handling not included in the INTC's above (may be included in INTC Master list being complied).

The remainder of the time would appear to matters for which Infraco is responsible (as-built delays of **30 weeks**) or increased durations (**53 weeks**) which have yet to be substantiated or shown to be tie responsibility. It is noted that Infraco are considering running Phase 4 concurrently with Phases 1 & 2, which would / should reduce the projected timescales.

F. **tie position on area availability:** There was a delay of circa 7 weeks in availability of this area as a result of utility diversions (INTC 053 refers). Those utility diversions were complete by 02/10/08 with piling commencing on 13/10/08. **Delay by tie; tie culpability.**

G. **Conclusion:**

(i) **'Significant' issues/events:** In terms of as-built progress, a delay was incurred to commencement. Thereafter, various issues arose affecting actual progress. These issues can be summarised as follows:

- Utility delays (INTC 053 & 475) appear to have caused a total of **24 weeks delays; tie culpability.**
- Delays to progress which appear to be **Infraco culpability; 30 weeks.** Those matters relate in the most part to slow progress and Temporary Works design not being in place.

In addition, Infraco's Revision 3 programme also indicates increased durations of a further **52 weeks** (or **37 weeks** IM Estimate). Of those increased durations it is possible that **tie** may be culpable for a period of this. No information however is available to inform an estimate at this stage.

(ii) **Concurrent issues:** no material concurrent issues were identified. Although there is a period of delay in tie's response to INTC 103, this does not appear to have affected progress. It is also noted however that Infraco itself delayed the provision of that Estimate.

(iii) **Considerations of dominance:** please refer to comments above under 'Significant issues / events for matters which appear to have caused delay to actual start, actual progress and projected completion.

H. **Current assessment of culpability**

(see over page)

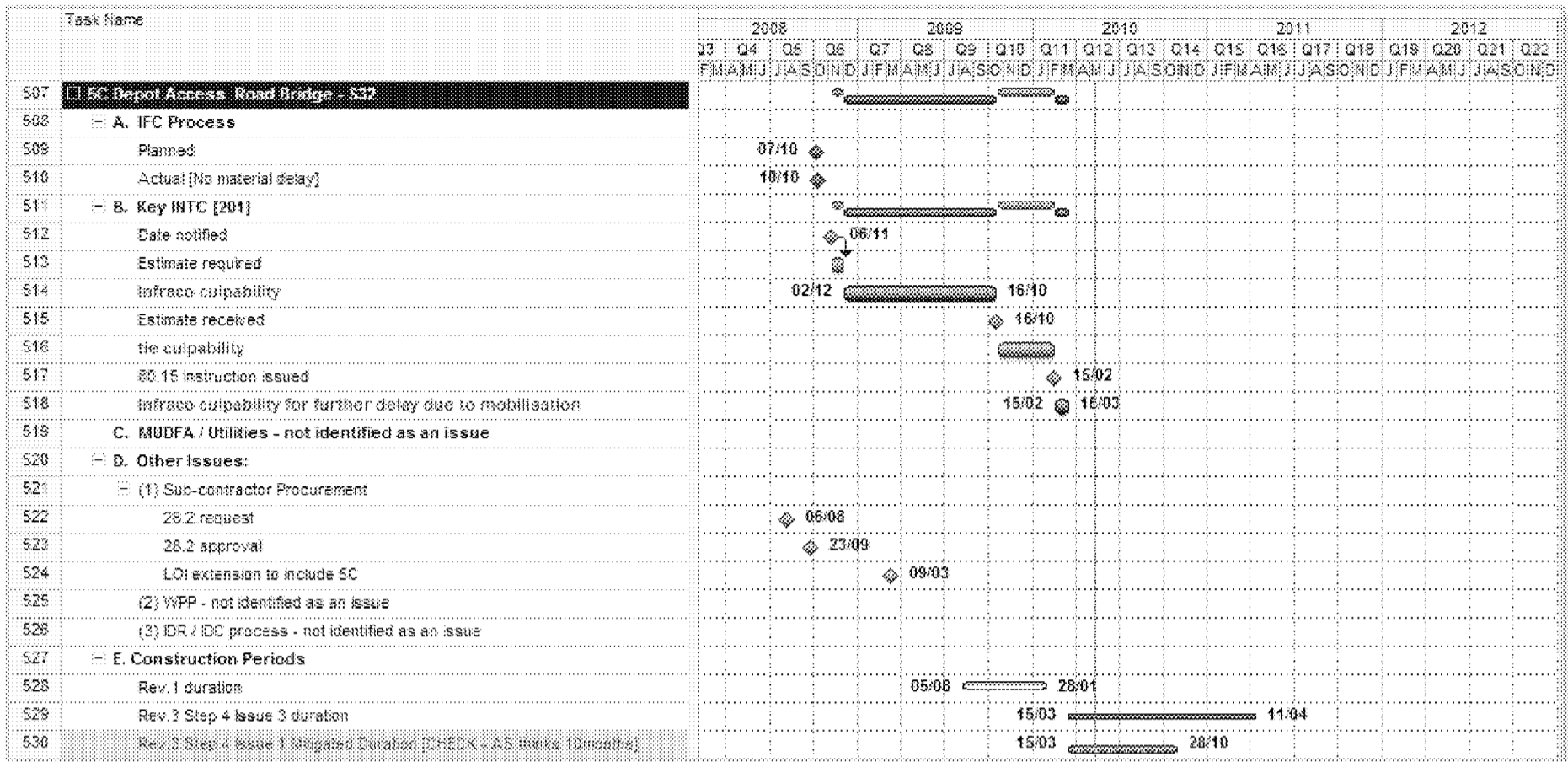
A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	No culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
Completion of Utilities beyond Rev 1 start date	29/08/08	13/10/08	46	6.57	No infraco culpability in delay to start			0	-	No delay to IFC	29/07/08	29/07/08	0	-
			0	-				0	-				0	-
				6.57					-					-
2. UPPER LIMIT														
Completion of Utilities beyond Rev 1 start date	29/08/08	13/10/08	46	6.57				0	-				0	-
			0	-				0	-				0	-
				6.57					-					-

B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	IM Mitigated Period		Infraco Rev.3 Period											
	IM	Infraco	IP	Infraco										
Lower Limit	24.00	30.00	24.00	46.00	<p>IM mitigated period +91wks: this is likely to be MUDFA / Utilities completions and issues attaching to INTC's. Myriad delays to progress compromise progress thereafter. These range from incorrect usage of reinf. cages and delays in the implementation of TW design by Infraco. tie culpability attaching to MUDFA / Utilities and INTC's. Infraco culpability attaching to delays to the progress of the works. (Refer ongoing progress chart).</p> <p>Infraco Rev.3 period +107 wks: On the basis that infraco can mitigate to 91 wks as per IM's analysis then infraco lower limit restricted to anything in excess of 30 wks. tie liability remains at lower limit of 24 wks if infraco responsible for all increased durations. (Lower limit periods derived from delays observed to actual progress - see opposite).</p>									
Upper Limit	61.00	67.00	61.00	83.00										

Observations on Actual Progress	IM	Infraco
Analysis of ongoing progress, considered in 'Delay to Finish' periods detailed above.	-24.00	-30.00

**Refer to chart (contained in summary narrative for this structure), capturing actual progress for breakdown of the above figures.*

5C – Depot Access Bridge – S32



- A. **IFC Process:** planned IFC date was **07/10/08**; actual was **10/10/08** i.e. 3 days late; no material delay. We are advised that one drawing was reissued on **13/11/09**. That however was not identified as a material factor delaying commencement; nor was it identified as being critical to construction.
- B. **Key INTC's:**
 - (i) **INTC 201 (BDDI to IFC):** INTC issued **6/11/08**; Estimate required **02/12/08**; Estimate submitted 16/10/09 (**45 weeks late; Infraco culpability**). **tie** response issued **12/01/10**; reference to DRP on **15/02/10** including issue of 80.15 instruction (**17 weeks; tie culpability**).
- C. **MUDFA / Utilities:** not identified as an issue.
- D. **Other Issues:**
 - (i) **Sub-Contractor Procurement:** understood that Farrans Construction has been appointed for this area. Although appointment is via LOI, the procurement itself does not appear to have affected commencement.
 - (ii) **WPP Process:** not identified as an issue.
 - (iii) **IDR/IDC process:** not identified as an issue.

E. **Construction Periods:**

5C Depot Access Road Bridge - S32					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated	Delay
				Rev.3	
Start	05/08/2009	15/03/2010	31.71 wks	15/03/2010	31.71 wks
Finish	28/01/2010	11/04/2011	62.57 wks	28/10/2010	39.00 wks
Cal. Duration	25.29 wks	56.14 wks	30.86 wks	32.57 wks	7.29 wks

- (i) **Delay to Start:** both the Issue 3 programme and IM's mitigated programme show a delay to start of **32 weeks**. The primary causes of delay to start as follows:-
 - A. **IFC process:** No material effect.
 - B. **INTC's:** INTC 201 caused the delayed start. **Infraco delay** in provision of Estimate causes a minimum of **14 weeks** delay (between 05/08/09 16/10/09; plus 4 weeks mobilisation). **tie culpability** will most likely be **17 weeks** (from 17/10/09 to 15/02/10). It may be that tie could try to argue that 'but-for' Infraco's 45 week delay in provision of the Estimate, that no delay would have occurred as a result of tie's period of review and reference to DRP. That however should be discussed further.
 - C. **MUDFA / Utilities:** not identified as an issue.
 - D. **Other:**
 - **Sub-Contractor procurement:** not identified as an issue.
 - **WPP process:** not identified as an issue.
 - **IDR/IDC process:** not identified as an issue.
 - (ii) **Delay to Finish:** Issue 3 programme shows an **increase of circa 31 weeks** over the timescale in Rev.1 programme. The IM mitigated view of Issue 1 shows an increase in duration of **7 weeks** to the Rev.1 programme. There is presently no justification presented for the Infraco increased Rev.3 duration. That said however, AS believes that a reasonable period for this structure is circa 10 months (or **43 weeks**). That view appears to be based on the fact that the design of this structure has become more complex and hence is likely to take more time to construct. This would clearly affect projected finish of this structure.
- F. **tie position on area availability:** this area was available as per the original Rev.1 commencement date. The delay to commencement has been the INTC process associated with INTC 201.

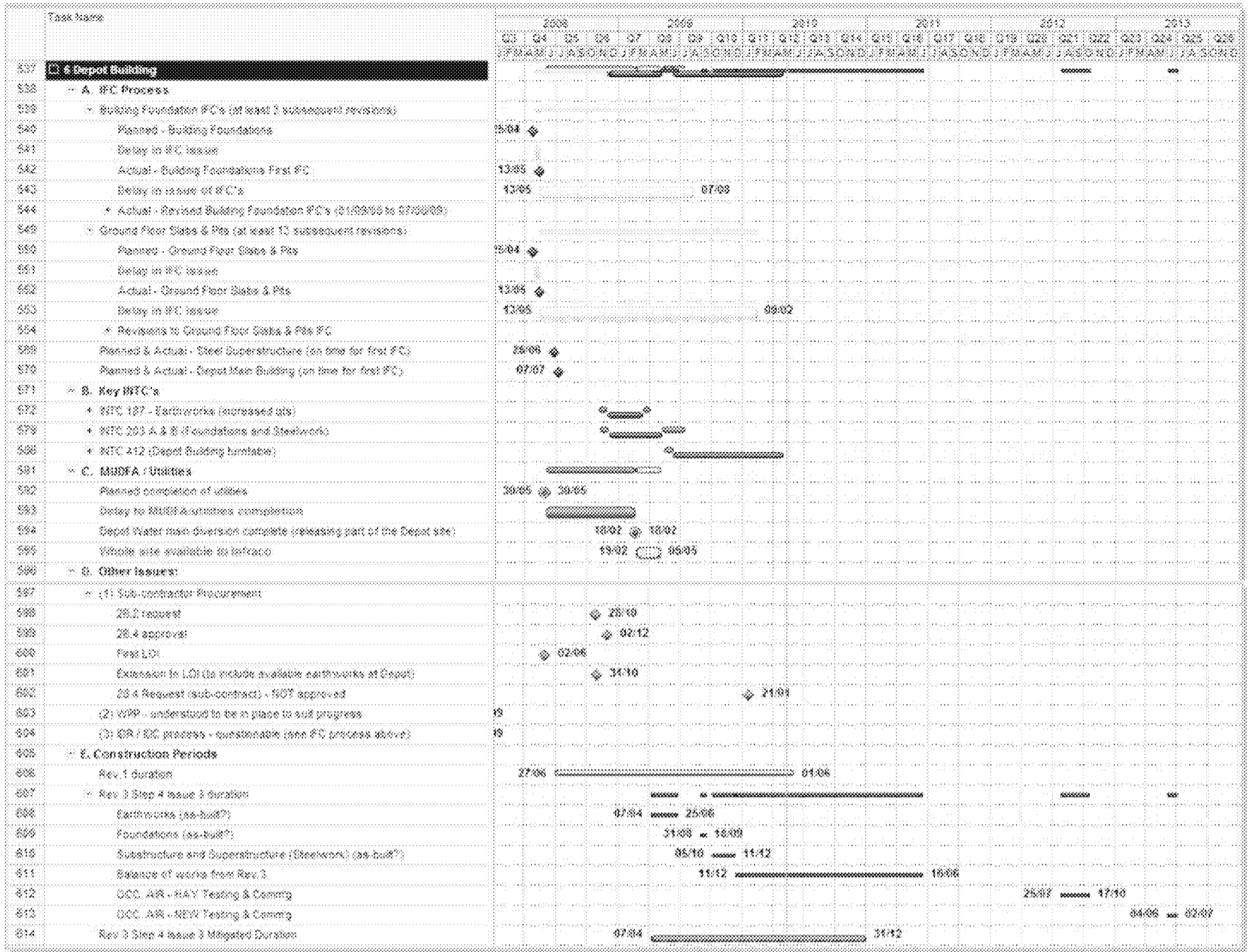
G. Conclusion:

- (i) **‘Significant’ issues/events:** the process of providing an Estimate and instruction in relation to INTC 201 appears to have been the issue affecting commencement of this structure. This was caused by an **Infraco delay** in provision of the Estimate; causing a minimum of **14 weeks** delay (between 05/08/09 16/10/09; plus 4 weeks mobilisation). **tie culpability** will most likely be **17 weeks** (from 17/10/09 to 15/02/10) as a result of the time taken to issue an 80.15 instruction for same.
 It may be that tie could try to argue that ‘but-for’ Infraco’s 45 week delay in provision of the Estimate, that no delay would have occurred as a result of tie’s period of review and reference to DRP. That however should be discussed.
 It also appears that Infraco will be due some further time for construction of this structure beyond the duration included within the Revision 1 Programme. That increase has arisen as a result of the increased complexity / workscope involved in the final design. It is estimated that an increase in duration in the region of **7 to 18 weeks** may be appropriate.
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing, the WPP process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been / may yet be critical to commencement their significance is considerably diminished by the process associated with INTC 201.
- (iii) **Considerations of dominance:** the process of providing the Estimate for INTC 201, tie’s review of same and ultimate reference to DRP is the dominant delay affecting commencement. Thereafter forecast increase in construction period affects end date.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
estimate to 80.15 instruction	17/10/09	15/02/10	121	17.29	Delay in provision of INTC 201 estimate	05/08/09	16/10/09	72	10.29	No (material) delay to IFC	07/10/08	10/10/08	3	0.43
			0	-	Infraco mobilisation period	15/02/10	15/03/10	28	4.00				0	-
			0	-				0	-				0	-
				17.29					14.29					0.43
2. UPPER LIMIT														
estimate to 80.15 instruction	17/10/09	15/02/10	121	17.29	Delay in provision of INTC 201 estimate	05/08/09	16/10/09	72	10.29				0	-
			0	-	Infraco mobilisation period	15/02/10	15/03/10	28	4.00				0	-
			0	-				0	-				0	-
				17.29					14.29					-
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +7 wks	IM Mitigated Period		Infraco Rev.3 Period				IM mitigated period +7wks: this is likely to be issues flowing from INTC 201. These issues range from delays in provision of estimate (by Infraco) to delays attaching to tie's instruction of said INTC. BDD) - IFC changes have resulted in increased complexities attaching to the construction of this structure. This however should be considered in the context of a reduction in the workscope to adjacent RW's. Culpability remains unclear. Infraco Rev.3 period +31 wks: On the basis that Infraco can mitigate to 91 wks as per IM's analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of 0 wks if Infraco responsible for all increased durations. (tie culpability likely regardless).							
Infraco Rev.3 Period = +31 wks	tie	Infraco	tie	Infraco										
Lower Limit	0.00	0.00	0.00	24.00										
Upper Limit	7.00	7.00	7.00	31.00										

6 Depot Building



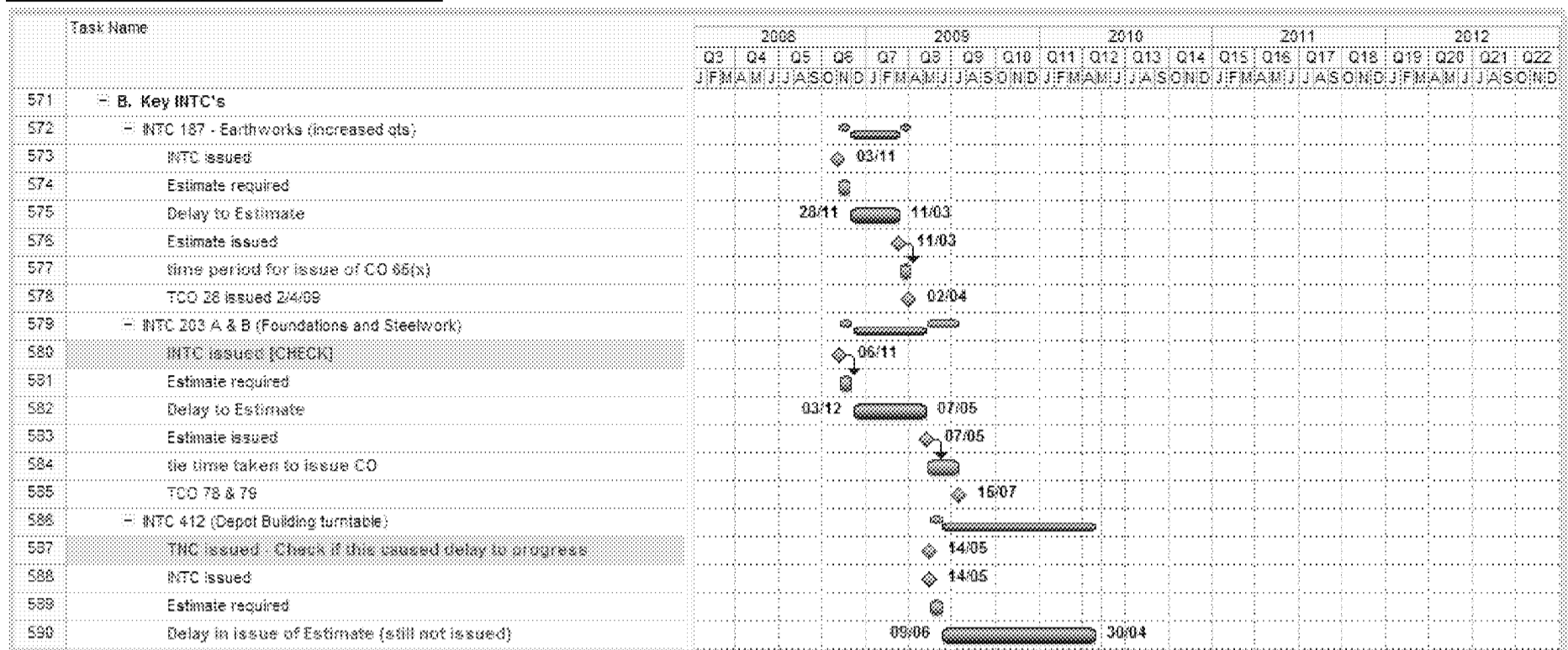
- A. **IFC Process:** Numerous IFC's have been and continue to be issued for this structure. Main elements as follows:-
- (i) **Building Foundations:** planned IFC **25/04/08**. Actual IFC **13/05/08**. Initial delay of **18 days (2.5 weeks)**. **4 No.** subsequent revisions to the IFC have been issued on 01/09/08, 24/10/08; 24/02/09; 07/08/09. It is understood that the latter revisions to the IFC's were brought about by SDS failure to consider foundation design integration with ground floor slab and pits design. This is **likely to be a failure of SDS under CE(u) – excusing Infraco of culpability for delay**. Building foundation drawing revision issue requires to be audited by **tie** as issue may be related to preferred construction sequence of erect steelwork followed by excavate pits. This could be an integration with Infraco design which would be **Infraco liability**.
 - (ii) **Ground Floor Slab & Pits:** planned IFC **25/04/08**. Actual IFC **13/05/08**. Initial delay of **18 days (2.5 weeks)**. **13No.** subsequent revisions to the IFC have been issued on 01/09/08; 23/09/08; 24/10/08; 24/02/09; 15/05/09; 23/06/09; 07/08/09; 20/08/09; 17/09/09; 13/10/09; 10/11/09; 10/11/09; 09/02/10. For the most part these revised IFC issues appear to relate to integration of Infraco design into the initial IFC design issued by SDS. This should not be a matter for tie i.e. it appears for the most part to be **Infraco culpability**. We understand that this has caused a delay to actual progress on ground floor slab and pits. Note however that **tie is responsible for addition of turntable into ground floor slab design** (this appears to have been incorporated into either Rev. 14 (17/9/09) or 15 (13/10/09)).
 - (iii) **Steel Superstructure:** planned IFC **24/06/08**; actual IFC **on time**. Details on extent and dates of revisions not yet available (see comment below).
 - (iv) **Depot Main Building:** planned IFC **07/07/08**; actual IFC **on time**. Details on extent and dates of revisions not yet available (see comment below).

Extent and time taken for design finalisation is a major area of concern. Recommendation: that this should be audited / investigated in detail.

- B. **Key INTC's:** numerous INTC's have been issued for the Depot Building. We are advised that the main INTC's which were obstacles to commencement (or progress) were INTC's 187, 203A & B; 412. Details as follows (see also chart extract below):-
- (i) **INTC 187 (Earthworks Increased Qts):** INTC issued **03/11/08**; Estimate required **27/11/08**; Estimate issued **11/03/09 (15 weeks)** later than required). **TCO issued 02/04/09** (a 3 week turnaround does not appear unreasonable; but is also 'excusable' in terms of CE(x)). This process should however have occurred sooner (it appears that the delay in provision of Estimate contributed to the late start on earthworks between 18/02/09 and 07/04/09).
 - (ii) **INTC 203A (Depot Building Foundations):** INTC 203 issued on **06/11/08**; AS believes this is the trigger for 203A (not 07/05/09 as noted in the Master INTC list; **this needs to be verified by tie**). On that basis, Estimate required **01/12/08**; Estimate issued **07/05/09 (22 weeks)** later than required). **TCO issued 15/07/09 (10 week)** turnaround does not appear reasonable; this is also 'excusable' in terms of CE(x)).
 - (iii) **INTC 203B (Depot Building Steelwork):** same details as INTC 203A above.

- (iv) **INTC 412 (Depot Building turntable):** TNC issued **14/05/09**; Estimate required **09/06/09**; Estimate **not yet issued** (currently **46 weeks** late). IFC appears to have been revised on either Rev. 14 (17/9/09) or 15 (13/10/09). This timescale (4 to 5 months) appears quite long. **Recommendation:** Check SDS / Infraco performance (during tie audit). **tie accepts culpability for this issue.**

Summary (image) of key INTC's listed above



- C. **MUDFA / Utilities:** Water main diversion is main issue. Planned completion of utilities was **30/05/08**. Actual completion of water main sufficient to permit material commencement of earthworks achieved on **18/02/09** (plus add time for mobilisation; approx. 1 week). **Delay to this milestone of 38 weeks; tie culpability.** Remainder of area available by 05/05/09 (**further delay of 11 weeks** – but understood that this would / should not have been critical to building progress).

Note: the above is slightly different from previous information supplied. That is, previously we understood that tie's position was that partial access was available on or around late 2008 (i.e. prior to the completion of the water main). The above however is the explanation we have recently received. If however the earlier tie position is correct the balance of culpability shifts more towards Infraco as a result of a failure to commence earlier. The measure of the shift in culpability is likely to be in the region of **6-10 weeks**.

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** first LOI issued to Barr issued on 02/06/08; 28.2 approval sought 28/10/08 – approval given 02/12/08. Extension to LOI issued on 31/10/08 to include available earthworks. This is therefore not seen as an obstacle to commencement or progress.
- (ii) **WPP Process:** we do not understand this to have been an obstacle to commencement or progress.
- (iii) **IDR/IDC process:** there is a question here about SDS / Infraco design integration – see IFC process above and extent of revised IFC's which have been (and continue to be) issued. **Recommendation:** that this should be audited / investigated in detail.

E. **Construction Periods:**

6 Depot Building (taking Earthworks as start dates)					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	27/06/2008	07/04/2009	40.57 wks	07/04/2009	40.57 wks
Finish	01/06/2010	16/06/2011	54.29 wks	31/12/2010	30.43 wks
Cal. Duration	100.71 wks	114.43 wks	13.71 wks	90.57 wks	10.14 wks

Note: part of Rev.3 Issue 3 and IM mitigated Rev.3 duration include delays to early progress. This table shows a delay to completion of 54 weeks. However delays to start of **41 weeks** and subsequent progress delays of circa **16 weeks** equate to an overall delay of **57 weeks** which requires to be analysed.

- (i) **Delay to Start:** The table above refers to various programme dates. Delay to actual start of earthworks is **41 weeks**. Primary causes as follows:-
 - A. **IFC process:** see comments above. Considerable questions about SDS performance and possibly Infraco management of SDS and performance in providing Infraco Design. **Recommendation:** Detailed audit required.
 - B. **INTC's:** INTC 187 (delay in provision of Estimate) appears to have caused a **6 week delay to the earthworks** (from 25/02/09 to 07/04/09) (**Infraco culpability**); INTC 203A & B (and relevant TCO's) contributed to the delay to the start of foundations.
 - C. **MUDFA / Utilities:** delay due to water main, causing delay to access – 27/06/08 (planned start) to 18/02/09 (plus one week mobilisation; when material start should have commenced). **35 week delay** (from 27/06/08 to 25/02/09); **tie culpability.**
 - D. **Other:**
 - **Sub-Contractor procurement:** no material cause of delay.
 - **WPP process:** ditto.
 - **IDR/IDC process:** see comments above. Considerable questions about SDS performance and possibly Infraco management of SDS and performance in providing Infraco design. **Detailed audit required.**
- (ii) **Delay to Finish:** Issue 3 programme shows an **increase of circa 14 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows a decrease in duration of **10 weeks** to the Rev.1 programme. There is presently no justification for the Infraco increased Rev.3 duration (it appears to be masking Infraco culpability in early performance). Delay to progress up to start of foundations can be summarised as follows:-

- Rev.1 Period from Earthworks to Foundation start is 5 weeks (27/06/08 to 01/08/08). Actual period from Earthworks commencement to foundation commencement 21 weeks (07/04/09 to 31/08/09). Increase in lag (i.e. further delay) of **16 weeks**.
- Delay to actual steelwork erection commencement (compared to Rev.1 programme) was **also 16 weeks** (01/09/08 versus 05/10/09).

This equates to a further delay (beyond that incurred to earthworks start) of **16 weeks**. This appears to have been caused by the following:-

- Apparent Infraco refusal to excavate down to formation level under building footprint (until it found location for 'suitable' excavated material – linked to INTC 399). Delay 15/5/09 to 15/6/09; **4 weeks**. tie's current position is that handling of excavated material is an Infraco responsibility. We proceed on that premise for the time being but this should be further investigated;
- Increased workscope in respect of INTC 187 (increased volume of earthworks). Something should be allowed by tie here for this increase in workscope;
- Late Estimates from Infraco on INTC's 203A & B (Estimates issued 07/05/09; causing late issue of TCO in respect of same until 15/7/09). Estimates should have been issued 01/12/08 [but see note above re INTC date – it is crucial to understand correct INTC date];
- It is also possible that late steelwork procurement (delaying steelwork erection until 05/10/09 from 18/09/09; **3 weeks**). That is, Infraco holding off working on foundations because it knew that steelwork delivery had been delayed. This is likely to relate to late design approval between Barr (Solway) and Infraco. **A matter for which Infraco should be culpable. This needs to be verified however.**
- There may also be questions about SDS/Infraco design – see comments above re IFC revisions and audit being required.

Infraco failure to mitigate (and/or to accelerate?) is also an issue in respect of overall period to completion of Depot Building (see IM mitigation exercise).

F. tie position on area availability:

- (i) Area available for earthworks commencement as of 18/02/09 (plus one week for mobilisation of earthworks contractor). **Delay by tie (35 weeks)**. Infraco failure to provide Estimate on INTC 187 caused delay to issue of TCO (issued in reasonable time). Had Infraco issued Estimate timeously commencement would have been circa 25/02/09 (further delay of **6 weeks** to earthworks commencement). **Infraco delay.**

G. Conclusion:

- (i) **'Significant' issues/events:** the significant issues affecting commencement of the earthworks were (i) water main diversion; and (ii) INTC 187. The delay due to water main, causing delay to access – 01/08/08 (planned start) to 18/02/09 (when material start should have commenced). **35 week delay (tie culpability)**. INTC 187 (delay in provision of Estimate) appears to have caused a further **6 week delay to the earthworks (Infraco culpability)**. Thereafter there are questions surrounding Infraco performance in earthworks operations, commencement of foundations and steelwork – causing a **16 week delay** to foundations and steelwork. For the most part, excluding the water main, these appear to be Infraco culpability. That said, issues such as increased workscope in terms of earthworks volumes and foundation increased scope must be taken into account. **Split liability for this 16 weeks period.**
Note: the above is based on recent discussions. Contemporaneous correspondence suggests slightly earlier access dates may have been possible (tie letters dated 27 February 2009 (2No.) refer). If the earlier **tie** position is correct the balance of culpability shifts more towards Infraco as a result of a failure to commence earlier. The measure of the shift in culpability is likely to be in the region of **6-10 weeks**.
- (ii) **Concurrent issues:** there is a question of the completion of the water main diversion (to 05/05/09) being concurrent. This however was not seen as critical to the building. No doubt Infraco will however major on this and the time periods taken by tie for issue of TCO's.
- (iii) **Considerations of dominance:** water main work will be difficult to argue as being anything other than dominant until 18/02/09. Thereafter, the delays to commencement of earthworks, foundations and steelwork are critical.

As such, our current opinion on allocation of culpability can be summarised as follows:-

Description	Opinion on tie culpability	Opinion on Infraco culpability
Delay to Start	Range of 25 to 35 weeks	Range of 6 to 16 weeks
Delay up to Steelwork erection: further 16 week delay. This may have been caused by late procurement of steelwork (hence lower range of 0 weeks); but some allowance may also be due for increased earthworks and foundation work (need more detailed as-built data to conclude).	<i>Range of 0 weeks to 8 weeks</i>	<i>Range of 8 weeks to 16 weeks</i>
Lower limit:	25 weeks	14 weeks
Upper limit:	43 weeks	32 weeks

H. Areas of risk for tie which should be addressed:-

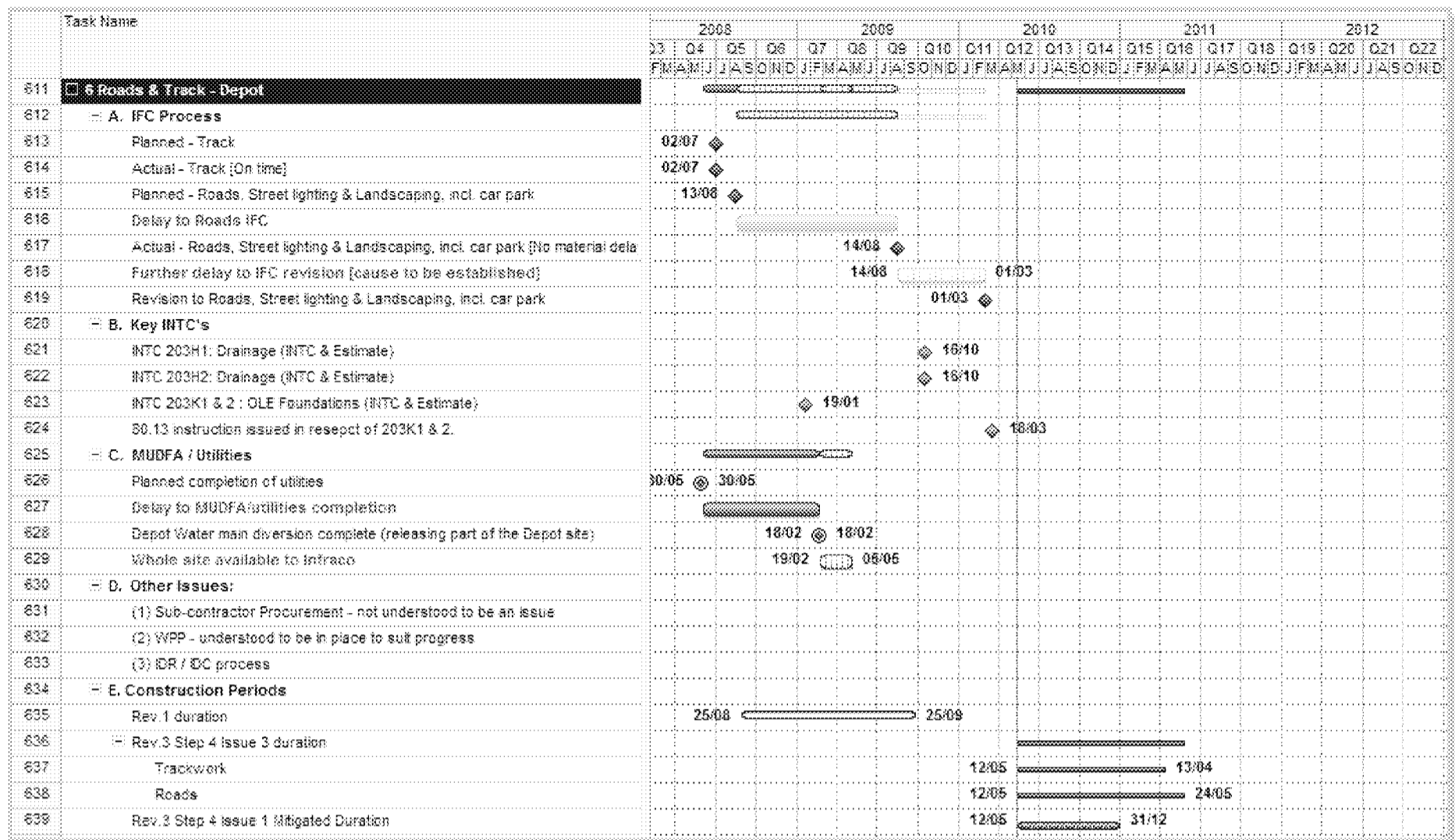
- (i) INTC 203A & B notification dates;
- (ii) Additional time for increased volumes (but this is partially recognised in that Rev.1 e/wks to Founds was 5 wks; we are currently allowing them 7.43 wks – but may need to excuse / extend);
- (iii) Period taken for tie to issue TCO in respect of INTC's 203A (tie had previously issued an instruction to Infraco on 4/6/08 to procure steelwork early; so TCO in respect of INTC 203B should not have caused delay).
- (iv) Effect of turntable INTC 412 on progress / design.

I. Current assessment of culpability

(see over)

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	He culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
MUDFA (watermain)	27/06/08	17/12/08	173	24.71	Infraco failure to commence when w/m complete	25/02/09	07/04/09	41	5.86	Ongoing IFC issues			0	-
Recognises opportunity to start prior to completion of the w/m. (-10wks)			0	-				0	-				0	-
			0	-				0	-				0	-
				24.71					5.86					-
2. UPPER LIMIT														
MUDFA (watermain)	27/06/08	25/02/09	243	34.71	Infraco failure to commence when w/m substantively complete	17/12/08	25/02/09	70	10.00				0	-
			0	-	Infraco failure to commence when w/m complete	25/02/09	07/04/09	41	5.86				0	-
			0	-				0	-				0	-
			0	-				0	-				0	-
				34.71					15.86					-
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -10 wks	IM Mitigated Period		Infraco Rev.3 Period				<p>IM mitigated period -10 wks: notwithstanding MUDFA / Utility and INTC issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco.</p> <p>Infraco Rev.3 period +14 wks: Infraco clearly accepts the possibility for mitigation. Though currently not to the same extent as noted above. On the basis however that Infraco can mitigate to -10 wks as per IM's analysis then Infraco lower limit restricted to anything in excess of -10 wks. The liability remains at lower limit of -10 wks if Infraco responsible</p>							
Infraco Rev.3 Period = +14 wks	IM	Infraco	IM	Infraco										
Lower Limit	-10.00	-10.00	-10.00	14.00										
Upper Limit	0.00	0.00	0.00	24.00										

6 Roads & Track - Depot



This element must be considered in conjunction with the Depot Building (particularly in relation to mitigated completion date). It would be a rather artificial exercise to consider it in isolation. Following gaining access to this area the key to these external works appears to be the drainage and OLE foundations.

The current Rev.3 programme shows the Drainage and Outfall works commencing on 22/03/10; with the Track and road works commencing on 12/05/10 (a lag of 7 weeks). The Rev.1 programme dates were 28/07/08 and 25/08/08 respectively (a shorter 4 week lag to the Roads; but longer 18 week lag to track).

A. IFC Process: two IFC packages identified, being:-

- (i) **Track:** planned IFC **02/07/08**; actual IFC **on time**. Details on extent and dates of revisions not yet available (see comment below).
- (ii) **Roads, Street Lighting and Landscaping, including car park:** planned IFC **13/08/08**; actual **14/08/09**. **52 week delay**. Appears that this could be failure of SDS to prepare design to CEC satisfaction (possible dilatory progress by SDS – but detailed audit / further investigation and analysis required). Delay arose during Technical Approvals process. This however needs to be traced through via audit/other investigative process.

Note from DS on 2 June 2010: Delay related to the IFC does not necessarily end with the initial IFC issues on 14/8/2009 given the comments made by CEC and the need to resolve those comments by SDS. However, work should have been able to commence on the roads at that point had other issues been resolved. Further investigation is needed of the subsequent IFCs to determine which issues were sorted when. This investigation would impact on the dates on which the roads could be completed. Further thought is needed about how much road was needed at which point for Sectional Completion Date – a number of outstanding issues are relevant to the ability to open the Depot Access Road to general traffic but they would not impact on the usability of the Depot Access Road formation as a construction and tram delivery route.

Note from DS on 7 June 2010: First we should meet CEC to understand chronology for them and comments made by them. It may not be necessary to audit to achieve access to much of the information. If, as I believe is likely, CEC can demonstrate chronology and that SDS had not proposed a compliant design then the question will be whether we can demonstrate failure of BSC to manage SDS.

Potential causes include:-

- a. Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- b. A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- c. A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- d. A tie Change;
- e. A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- f. A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco?

We are also advised that the Roads IFC was reissued with some changes in **March 2010** (details to be established via tie audit of design process; AS will also provide further detail of design timeline – ongoing action on **tie**).

B. **Key INTC's:** the following INTC's have been identified by **tie** personnel as being key to progress:-

- (i) **INTC 203H1 (Drainage):** notified **16/10/09**, Estimate submitted **16/10/09**. No delay to submission of Estimate. Revised Estimate (203V) submitted by Infraco on 22/03/10. It is understood that Infraco has carried on with this work in the absence of a TCO.
- (ii) **INTC 203H2 (Drainage):** notified **16/10/09**, Estimate submitted **16/10/09**. No delay to submission of Estimate. Revised Estimate (203N) submitted by Infraco on 22/03/10. Understood that Infraco has carried on with this work in the absence of TCO.

- (iii) INTC 203K1 (OLE foundations - Introduction of Piling to OHLE Bases) & INTC 203K2 (OLE foundations - Increase in number of OLE Bases): notified 19/01/09, Estimate submitted 19 [possibly 26]/01/09. No delay to submission of Estimate. **tie** dispute the validity of this INTC (letter dated 03/02/10). **Period for tie reply (58 weeks) is excessive.** **tie** culpability may arise in respect of same (but may not be critical to overall completion – see issue below re design of OLE founds).

It is understood that in respect of the OLE foundations, Infraco received an IFC design from SDS but have decided to seek another different design (from Border Rail). This appears to be a preference (on Infraco's part) rather than a failure on the part of SDS or instruction from **tie**.

INTC's 203K1 & K2 are covered by the **tie** 80.13 Instruction dated 19/03/10. Neither 203H1 nor 203H2 are included in that instruction (but it is understood that Infraco is carrying out that work on site).

- C. **MUDFA / Utilities**: See comments under 6 Depot Building. **Delay of 38 weeks (to 18/02/09); tie culpability.** Remainder of area available by 05/05/09 (**further delay of 11 weeks** – understood this would not be critical to building progress; this would however be relevant to commencement and progress of external works incl. road and track).

D. **Other Issues**:

- (i) Sub-Contractor Procurement: this is understood not to have been an issue in terms of commencement and progress (albeit sub-contractor working under LOI).
- (iv) WPP Process: we do not understand this to have been an obstacle to commencement or progress.
- (ii) IDR/IDC process: see comments above re Depot Building and IFC process immediately above.

E. **Construction Periods**:

6 Roads & Track - Depot					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	25/08/2008	12/05/2010	89.29 wks	12/05/2010	89.29 wks
Finish	25/09/2009	24/05/2011	86.57 wks	31/12/2010	66.00 wks
Cal. Duration	56.71 wks	54.00 wks	-2.71 wks	33.43 wks	-23.29 wks

- (i) Delay to Start: The table above refers to various programme dates. Both the Issue 3 and IM mitigated programmes show a delay to start of **89 weeks**. Primary causes of delay to start as follows:-

- A. IFC process: see narrative above. **Track IFC on time; 'Roads, Street Lighting and Landscaping, including car park' IFC No material delay.** We are advised however that the Roads IFC was reissued with some changes in **March 2010** (details to be established via tie audit of design process; AS will also provide further detail of design timeline – ongoing action on **tie**). Any delay to progress should therefore be to Infraco account.
- B. INTC's: see narrative above. INTC's 203K1 & K2 are covered by the **tie** 80.13 Instruction dated 19/03/10. Neither 203H1 nor 203H2 are included in that instruction (but it is understood that Infraco is carrying out that work on site).
- C. MUDFA / Utilities: See comments under 6 Depot Building. **Delay of 38 weeks (to 18/02/09); tie culpability.** Remainder of area available by 05/05/09 (**further delay of 11 weeks** – understood this would not be critical to building progress; would however be relevant to commencement and progress of external works incl. road and track).
- D. Other:
- **Sub-Contractor procurement**: we are not aware of any issues in relation to this
 - **WPP process**: ditto.
 - **IDR/IDC process**: See comments re design of OLE foundations. This appears to be an Infraco preference not something driven by tie / INTC's. Any delay to progress should therefore be to Infraco account.

- (ii) Delay to Finish: Issue 3 programme shows a slight decrease of **-3 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows a decrease in duration of **-23 weeks** in the Rev.1 programme durations. The delays incurred therefore appear to relate to the delayed start of this element.

- F. **tie position on area availability**: Area available for earthworks commencement as of 18/02/09 – 05/05/09. **This is a delay for which tie is responsible.**

G. **Conclusion**:

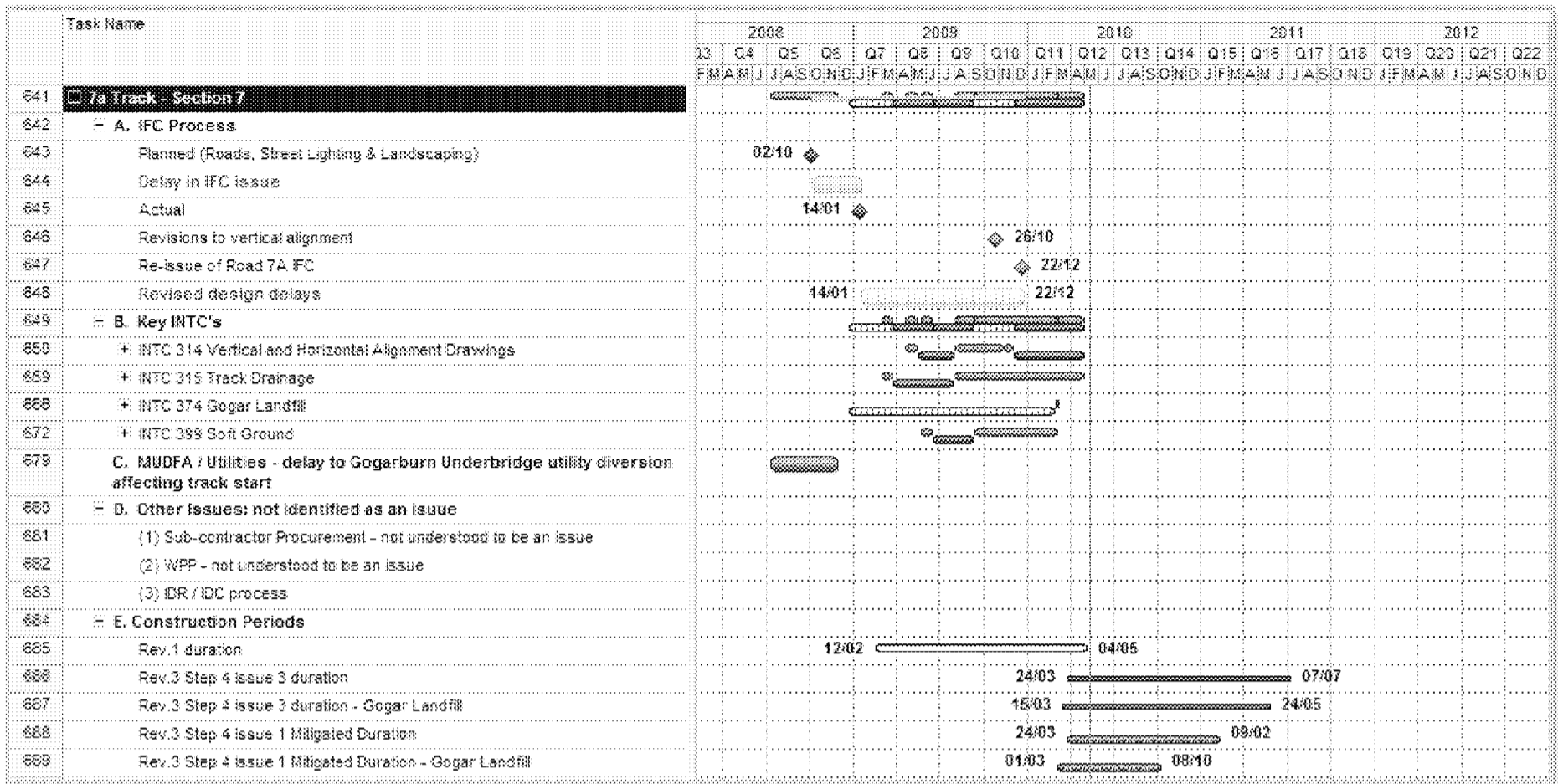
- (i) **'Significant' issues/events**: There appear to be five main issues affecting this element. Those are (i) the water main delay; (ii) INTC 187; (iii) the delay to issue of the Roads IFC; (iv) delay to drainage design; and (v) delays to the OLE foundation design. Please refer to comments under '6 Depot Building' re (i) 7and (ii); summarised as follows. The delay due to water main, delayed access to the site – from 01/08/08 (planned start) to 18/02/09 (when material start should have commenced). **35 week delay (tie culpability)**. INTC 187 (delay in provision of Estimate) appears to have caused a further **6 week delay to the earthworks (Infraco culpability)**. Thereafter there are questions surrounding the production of the Roads IFC and drainage design. This was not issued by SDS until 14/08/09 (52 weeks later than planned – albeit that the 41 week delay to commencement takes up the majority of that delay). This needs to be audited and analysed.
- (ii) **Concurrent issues**: there is a question of the final completion of the water main diversion to 05/05/09, being concurrent with other issues above. No doubt Infraco will however major on this and the time periods taken by tie for issue of TCO's. Infraco culpability in respect of the OLE foundations design may yet prove to cause further delay to progress (those delays however have yet to unfold). This should be monitored closely via as-built programme collation and other tie audits.
- (iii) **Considerations of dominance**: water main work will be difficult to argue as being anything other than dominant until 18/02/09 (as it restricted access to the whole site until mid February 2009). Thereafter, the delay to issue of the Roads IFC is likely to feature significantly in any delay analysis. Culpability for this delay may well rest with SDS (excusable under CE(t) or (u); but may also relate to Infraco failure to manage SDS).

Risks remain that CEC was complicit in delay. Overall delay to this element and Section 'A' in particular however linked closely to completion of Depot Building (which at present is the longer more dominant string of activities).

H. Areas of risk for tie which should be addressed:-

- (i) Design process leading up to issue of Roads IFC's.
- (ii) CEC approvals (part of the above).

7 Track



A. **IFC Process:** planned IFC date for 'Roads, Street Lighting & Landscaping' was **02/10/08**; actual was **14/01/09** i.e. **15 weeks late**. We are advised that explanation for delay is as follows:-

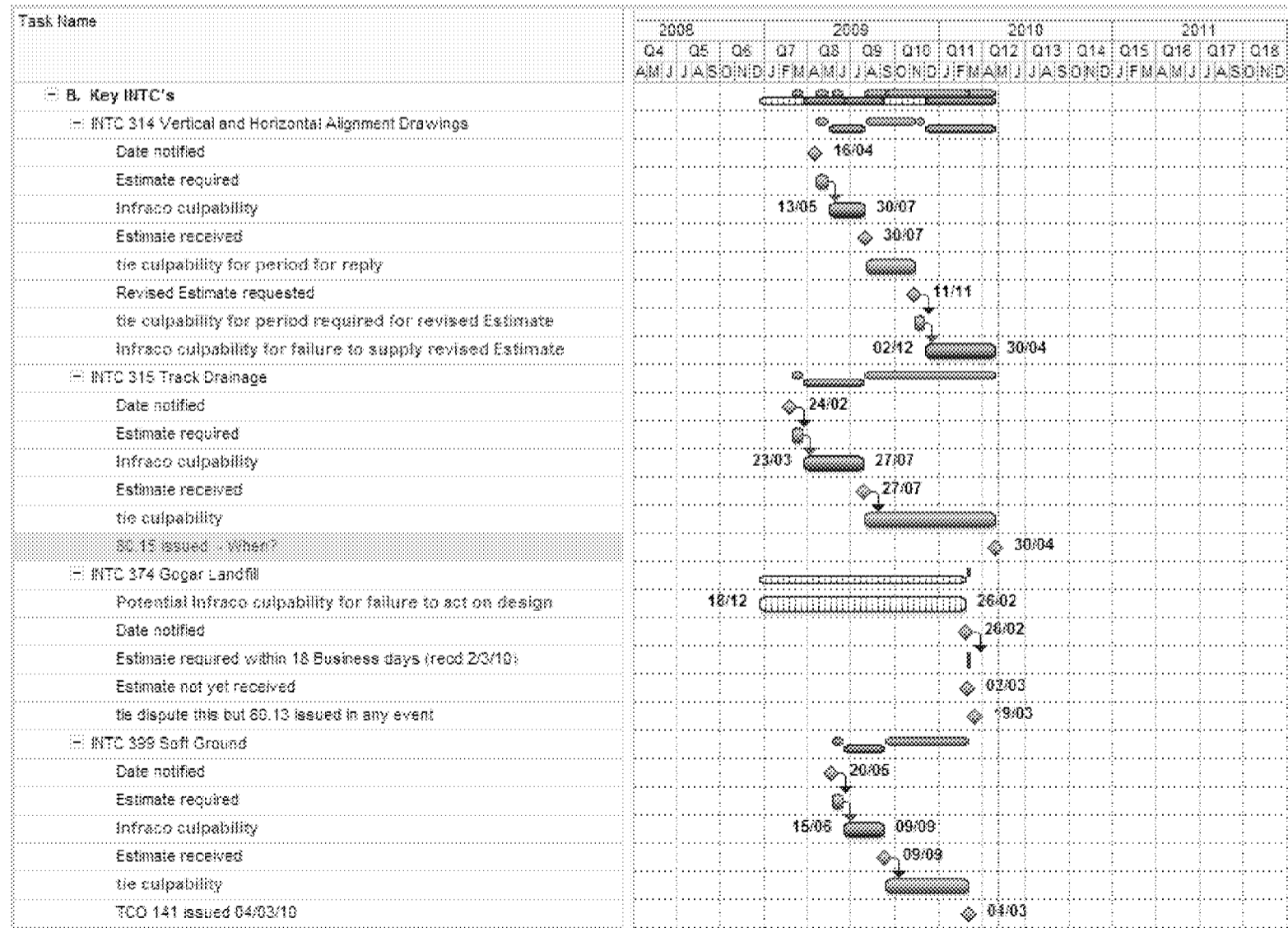
"SDS had allowed no time to incorporate CEC comments on the roads design. Initial approvals package for roads submitted 1 day late by SDS to CEC but approved **13 days late by CEC (14/10/2008)** – further info would be required [from] CEC but likely reason for delay will have been SDS not having provided all necessary information in their original package. SDS then took 3 months to incorporate CEC comments into final IFC – should not have been necessary if original SDS design had been competent and complete. I note that the track design was marked as IFC at 29/9/2008 but was held back as part of wider roads and track package."

Revisions to IFC's: we are also advised that "3 vertical alignment drawings were reissued 26/10/2009 due to need to re-profile earthworks following errors in original SDS survey – BSC was not paid for redesign work here so expect that SDS was not paid either as this was their original error. These 3 drawings cover the Ingliston Park & Ride site and the area immediately to the east of the site."

Possible failure on part of SDS; possibly a failure on part of Infraco to manage SDS.

Further analysis required in respect of whether there any issues about unforeseen ground conditions which Infraco may rely upon.

B. **Key INTC's:** We are advised that the key INTC's which were / are material to commencement in this area are as follows:-



- (i) INTC 399 (Soft Ground): INTC issued **20/5/09**; Estimate due **12/06/09**; Estimate provided **09/09/09**. Delay in provision of Estimate **13 weeks. Infraco culpability**. TCO 141 issued 04/03/10 (**25 weeks** after Estimate). **tie culpability**. AS advises that it is relevant to note that throughout the currency of the INTC 399 issue, delays in the provision of estimates (by Infraco) and subsequent delays (by tie) in issuing TCO 141 were affected by a number of IFC changes. In the absence of accurate / specific information it is difficult to assess where culpability lies. AS is of the opinion that culpability is likely to attach to Infraco, this however needs to be clarified.
- (ii) INTC 315 (Track Drainage): INTC issued **24/02/09**; Estimate due **20/03/09**; Estimate provided **27/07/09**. Delay in provision of Estimate **18 weeks. Infraco culpability**. 80.15 issued by tie on [awaiting details from AS]. **tie culpability**.
- (iii) INTC 374 (Gogar Landfill): INTC issued **26/02/10**; Estimate due **24/03/10**; Estimate provided (for 374B) **02/03/10**. Disputed by tie. **80.13 instruction issued on 19/03/10**. If tie is correct, then there is no culpability for this issue. Risk may be that a third party decides against tie position. In that event, period from INTC to 80.13 may be a tie issue (only 3 weeks; longer however if 80.13 instructions are held as not being valid).
Note: Geotechnical IFC apparently issued on 18/12/2008. Understood that Infraco decided to verify design; but it took a long period to do so (dates not yet available). Initial design subsequently found to be acceptable; hence INTC issued 26/2/10 – but circa 14 months after geotechnical IFC issued in 12/08. **Potential Infraco culpability in failing to proceed with ‘due expedition’**.
- (iv) INTC 314 (Quantity of earthworks in embankment): INTC issued **16/04/09**; Estimate due **12/05/09**; Estimate provided **30/07/09**. Delay in provision of Estimate **11 weeks. Infraco culpability**. tie requested a revised Estimate from Infraco on 11/11/09 (tie culpability for time period to 11/11/09). **tie culpability (circa 15 weeks)**.

C. **MUDFA / Utilities**: there is a period of **tie culpability** for the delay caused to the utility diversion affecting commencement of Gogarburn Underbridge. Trackwork in this section (7) was dependent upon the completion of that structure. Delay incurred to commencement of Gogarburn Underbridge was **21 weeks** (07/07/08 to 28/11/08). **tie culpability**.

Understood from AS that subsequent progress on Gogarburn Underbridge was not affected by tie – we have proceeded on that premise (that structure is not part of the current exercise. It is also possible that Infraco delays to progress on that structure could affect completion of the associated track in Section 7. This however is a separate exercise distinct from the current prioritised elements.

D. **Other Issues**:

- (i) Sub-Contractor Procurement: no issues identified. Farrans appear to have been appointed (albeit under LOI) in sufficient time.
- (ii) WPP Process: no issues identified.
- (iii) IDR/IDC process: subject to audit.

E. **Construction Periods**:

7 Track - Section 7					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	12/02/2009	15/03/2010	56.57 wks	01/03/2010	54.57 wks
Finish	04/05/2010	07/07/2011	61.29 wks	09/02/2011	40.14 wks
Cal. Duration	63.86 wks	68.57 wks	4.71 wks	49.43 wks	14.43 wks

- (i) Delay to Start: The table above shows both the Issue 3 and IM mitigated programmes showing a delay to start of **57 weeks** (IM programme takes earlier Issue 1 start date – so in practical terms there is no material difference). Actual start not yet achieved therefore actual delay will be greater than shown. Current cause of delay is understood to be **INTC 374** (although now subject to **tie 80.13** instruction). Primary causes of delay to start as follows:-
 - A. IFC process: It is not entirely clear if design is the issue or INTC process.
 - B. INTC's: There are delays on the part of both parties in respect of INTC Estimate submissions and TCO/80.13/80.15 instructions. See above. See chart under 'B' above. In terms of INTC 374, there is a significant question about the date this was notified by Infraco (i.e. delay in notification). To discuss. There are however other areas of tie culpability in terms of issue of instruction.
 - C. MUDFA / Utilities: Critical delay (affecting commencement) of circa **21 weeks (tie culpability)**;
 - D. Other:
 - **Sub-Contractor procurement**: not an obstacle to commencement;
 - **WPP process**: ditto;
 - **IDR/IDC process**: not identified as causing delay (but refer to IFC process above).
- (ii) Delay to Finish: Issue 3 programme shows a minimal **increase of circa 5 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 1 shows a decrease in duration of **-14 weeks** to the Rev.1 programme.

F. **tie position on area availability**: there is a period of **tie culpability** for the delay caused to the utility diversion affecting commencement of Gogarburn Underbridge. Trackwork in this section (7) was dependent upon the completion of that structure. Delay incurred to commencement of Gogarburn Underbridge was **21 weeks** (07/07/08 to 28/11/08). **tie culpability**. [See also comments at 'C' above re progress on Gogarburn Underbridge]

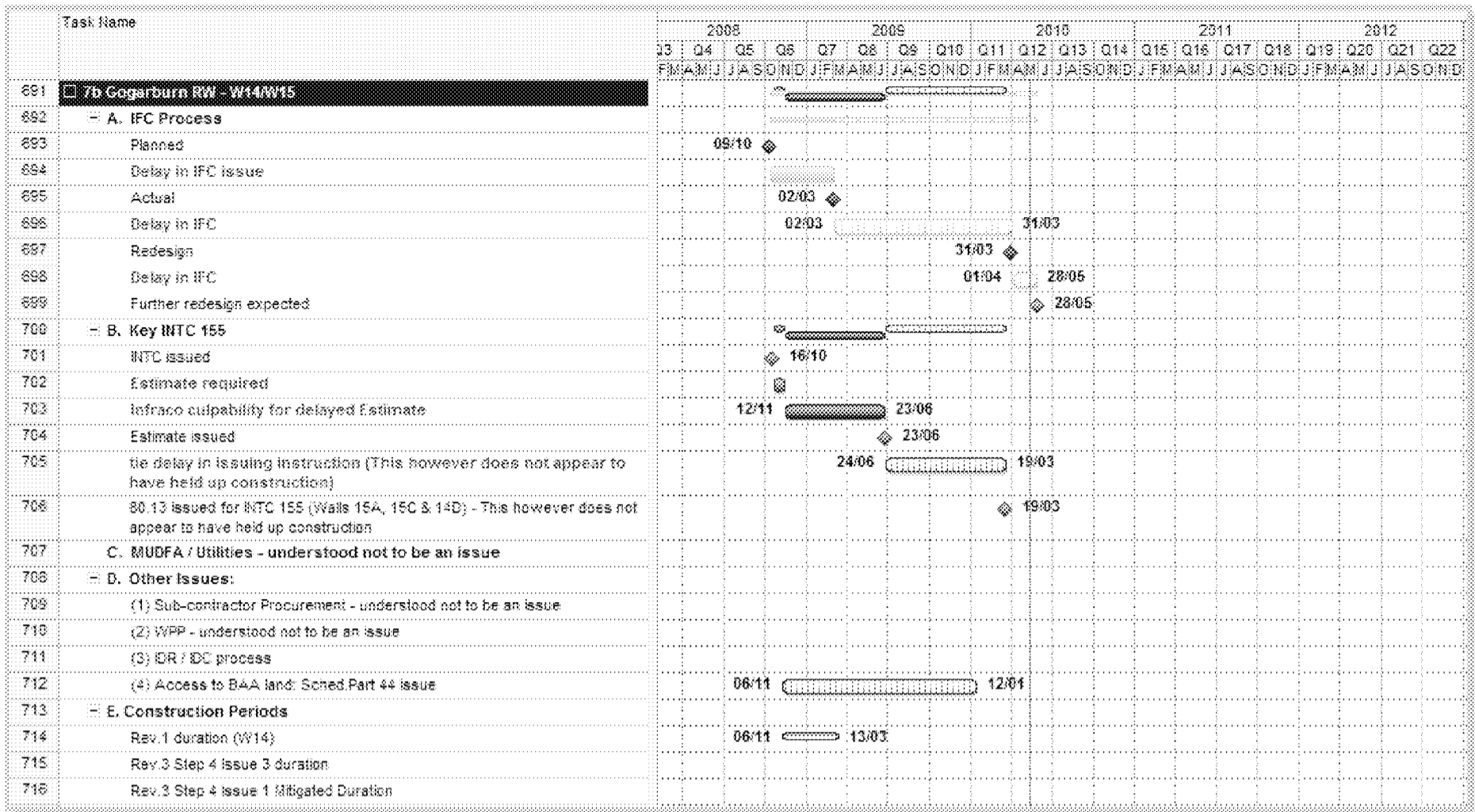
G. **Conclusion**:

- (i) **'Significant' issues/events**: after initial critical delay due to utilities at Gogarburn Underbridge (**21 weeks; tie culpability**); design and INTC's appear to be the most significant issues affecting commencement.
- (ii) **Concurrent issues**: there is a considerable amount of culpability on the part of both parties in respect of the INTC process.
- (iii) **Considerations of dominance**: utility diversion at Gogarburn Bridge was critical to commencement. Thereafter a combination of revisions to IFC's and the protracted INTC process appears to have been the dominant obstacles to commencement.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	SDS culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
INTC 314 estimate period	16/04/09	13/05/09	27	3.86	Delay in provision of INTC 315 estimate	29/09/09	27/07/09	126	18.00	Delay to IFC	02/10/08	14/01/09	104	14.86
Tie culpability in review of INTC 314	30/07/09	02/12/09	125	17.86				0	-				0	-
			0	-				0	-				0	-
				21.71					18.00					14.86
2. UPPER LIMIT														
INTC 315 notification period	12/02/09	24/02/09	12	1.71	Rev 1 start date to INTC 314 notification	12/02/09	16/04/09	63	9.00	Delay to IFC	02/10/08	14/01/09	104	14.86
INTC 315 estimate period	24/02/09	23/03/09	27	3.86	Delay in provision of INTC 314 estimate	13/05/09	30/07/09	78	11.14				0	-
Delay from INTC 315 estimate to 80.15 instruction (ongoing)	27/07/09	15/03/10	231	33.00	Failure to supply revised estimate	02/12/09	15/03/10	103	14.71				0	-
			0	-				0	-				0	-
				38.57					34.86					14.86
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -14 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period -14 wks: Notwithstanding delays attaching to the BDD IFC and subsequent INTC's this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period +5 wks: Infraco clearly considers slippage likely. On the basis however that Infraco can mitigate to -14 wks per IM analysis then Infraco lower limit restricted to anything in excess of -14 wks tie liability remains at lower limit of -14 wks if Infraco responsible for all increased durations									
Infraco Rev.3 Period = +5 wks	IP	Infraco	IP	Infraco										
Lower Limit	-14.00	-14.00	-14.00	-9.00										
Upper Limit	0.00	0.00	0.00	5.00										

7 – Gogarburn Retaining Walls W14 & W15



A. **IFC Process:** planned date for IFC issue was **09/10/08**; actual IFC (first) was **28/02/09**. This equates to a delay of **20 weeks**. We are advised that this delay resulted from a delay in submission for, and granting of, Prior Approval. This is explained below:-

W14 & W15: Prior Approval Process

Description	Planned	Actual	Delay (days)
Submission to CEC	30/06/08	05/09/08	67
CEC Approval	09/09/08	19/02/09	163
Period (days)	71	167	96

- (i) A **67 day delay** in submission by SDS; and
- (ii) A further **96 day delay** in CEC granting PA. We understand that this was driven by the delays to the Edinburgh Airport Tram Stop (same Prior Approval batch) which were driven by changes to the design being agreed between tie and BAA.

Revised IFC's:

It is understood that the original CEC TA was provided on the basis of the original design and erroneous information provided to it as part of the SDS TA submission. During **June 2009 BAA rejected** the SDS design on the basis that the SDS design was based on incorrect flood model data. Initially the objection was to all walls but has since been reduced to W14C & D only which relate to Phase C of the Gogarburn Retaining Wall works. AS advises that it took SDS / Infraco until September 2009 to accept that there was a problem with the design. AS further advises that retaining walls W14C & D are now the subject of redesign by Infraco. It is understood that part of structures W14 & W15 were re-issued on **31/03/10**. It is anticipated however, that the balance of the revised design proposal (addressing flood model) will be submitted by Infraco on or around 30/06/10 for BAA approval. The resultant IFC is expected during **August 2010**.

B. Key INTC's:

- (i) INTC 155 (BDDI to IFC changes): INTC issued **16/10/08**; Estimate required **11/11/08**; Estimate submitted **23/06/09**. Delay to Estimate **32 weeks; Infraco culpability**. It is understood that INTC 155 was issued on the basis of the design of structures W14 & W15 contained in the first IFC issue. Subsequently however, that IFC was found to be incorrect in respect of W14C & W14D see explanation under 'A. IFC Process' above. Consequent to that, **tie** issued a TNC for walls W14A and W15A, W15B and W15C under cover of a letter dated 22/12/09. In response to this, Infraco submitted a revised estimate for W14B including new wall W15D on 03/03/10. **tie** issued a further TNC on 18/06/10 under cover of letter reference 5370. As at 24/06/10 this estimate is outstanding pending resolution of the redesign identified at 'A' above.

C. **MUDFA / Utilities:** It is important to note that there was no utility interface preventing the commencement of Construction Phase A. However, AS advises that **tie** had to clear / complete utility works in Section 7B prior to commencement of works to Construction Phases B & C. Utility diversion works facilitating same were completed November 2009 with as built drawings issued on 15/01/10. **Delay by tie; tie culpability.**

D. Other Issues:

- (i) Sub-Contractor Procurement: understood not to be an issue affecting commencement or progress.
- (ii) WPP Process: ditto.
- (iii) IDR/IDC process: understood not to be an issue affecting commencement or progress (but see IFC process above).
- (iv) Access to BAA land (EAL Licence): we understand that access to BAA land was not possible until **12/01/10**. Advised that this appears to have been as a result of delay in issue of BAA licence. This was brought about by (i) possible failure of Infraco to provide information to BAA; and (ii) due to design errors identified in IFC – re flood model. Sched.Part44 refers. AS advises that Infraco issued a drawdown notice for Construction

Phase B on 18/06/10 with works expected to commence on or around 12/06/10. The drawdown notice cannot be issued for Construction Phase C until Infraco has resolved the redesign issue identified at 'A' above.

- (v) **Hilton Hotel Car Park Works:** The precursor to commencement of Retaining Walls W14A, W15A, B & C was the creation of car park spaces for the Hilton Hotel. This issue was referred to DRP with the outcome being held in **tie's** favour. As at 14/08/09 Infraco intimated their intention to commence works on 28/09/09. AS advises that this was the first intimation that Infraco would commence the works. Upon receipt of this communication **tie** obtained the license to occupy BAA land and issued same to Infraco. The works commenced November 2009 and were completed on 08/12/09.

E. **Construction Periods:** Currently there is no as-built information available for these structures. Similarly there is no detail of activity durations from the Rev.3 programme. As such, delay to finish will be assessed upon receipt of same

7b Gogarburn RW - W14/W15					
	Rev.3	Rev.3 Issue 3	Delay	Issue Identified Rev.5	Delay
Start	06/11/2008	12/01/2010	61.71 wks	12/01/2010	61.71 wks
Finish	13/03/2009	No data	No data	No data	No data
Cal. Duration	18.29 wks				

- (i) **Delay to Start:** planned commencement was 06/11/08 (for W14). Actual commencement as circa 12/01/10 – a delay to start of **62 weeks**.
- A. **IFC process:** actual IFC (first) was **28/02/09**. This equates to a delay of **20 weeks**. Combined culpability for delay.
- B. **INTC's:** INTC issued **16/10/08**; Estimate required **11/11/08**; Estimate submitted **23/06/09**. Delay to Estimate **32 weeks; Infraco culpability**. It is understood that INTC 155 was issued on the basis of the design of structures W14 & W15 contained in the first IFC issue. Subsequently however, that IFC was found to be incorrect in respect of W14C & W14D see explanation under 'A. IFC Process' above. Consequent to that tie issued a TNC for walls W14A and W15A, W15B and W15C under cover of letter dated 22/12/09. In response to this, Infraco submitted a revised estimate for W14B including new wall W15D on 03/03/10. Tie issued a further TNC on 18/06/10 under cover of letter reference 5370. As at 24/06/10 this estimate is outstanding pending resolution of the redesign identified at 'A' above.
- C. **MUDEFA / Utilities:** It is important to note that there was no utility interface preventing the commencement of Construction Phase A. However, AS advises that tie had to clear / complete utility works in Section 7B prior to commencement of works to Construction Phases B & C. Utility diversion works facilitating same were completed Nov'09 with as built drawings issued on 15/01/10. **Delay by tie; tie culpability**.
- D. **Other:** Access to BAA land not resolved until **12/01/10** enabling works to commence on Construction Phase A only (when works commenced). Drawdown Notice issued by Infraco on 18/06/10 for Construction Phase 'B'. Phase 'C' cannot be issued until Infraco has resolved BAA objection issues identified at 'A' above.
- (ii) **Delay to Finish:** Currently there is no as-built information available for these structures. Similarly there is no detail of activity durations from the Rev.3 programme. As such, delay to finish will be assessed upon receipt of same. That said, from analysis of the above it appears that the majority of the delays incurred will be Infraco culpability.

F. **tie position on area availability:**

- (i) First available date for the meaningful commencement of works to this area is governed by three separate issues; (1) BAA Licence; (2) Hilton Hotel Enabling Works; and (3) Utility diversions in Section B. The impact of the foregoing on the phased commencement of the works is as follows:-
- Commencement of Construction Phase A was not subject to preceding utility works. It did however rely on the completion of Hilton Car Park enabling works. These works were not completed until 08/12/09. **Delay by Infraco; Infraco culpability**. It further relied on the granting of the BAA Licence which was not concluded until 12/01/10. (This is the date at which works began) **Delay by Infraco; Infraco culpability**.
 - Commencement of Construction Phase B was not subject to Hilton Car Park enabling works. It was however dependent on Section 7B utility diversion works. This was completed by **tie** in November 2009. **Delay by tie; tie culpability** The further requirement of the BAA Licence which is subject to BAA's approval of Infraco's drawdown notice should allow works to commence on 12/07/10. **Delay by Infraco; Infraco culpability**
 - Commencement of Construction Phase C is subject to the same conditions as Phase B above. However, the drawdown notice cannot be issued for this Phase until Infraco has resolved the issues identified at 'A' above. **Delay by Infraco; Infraco culpability**

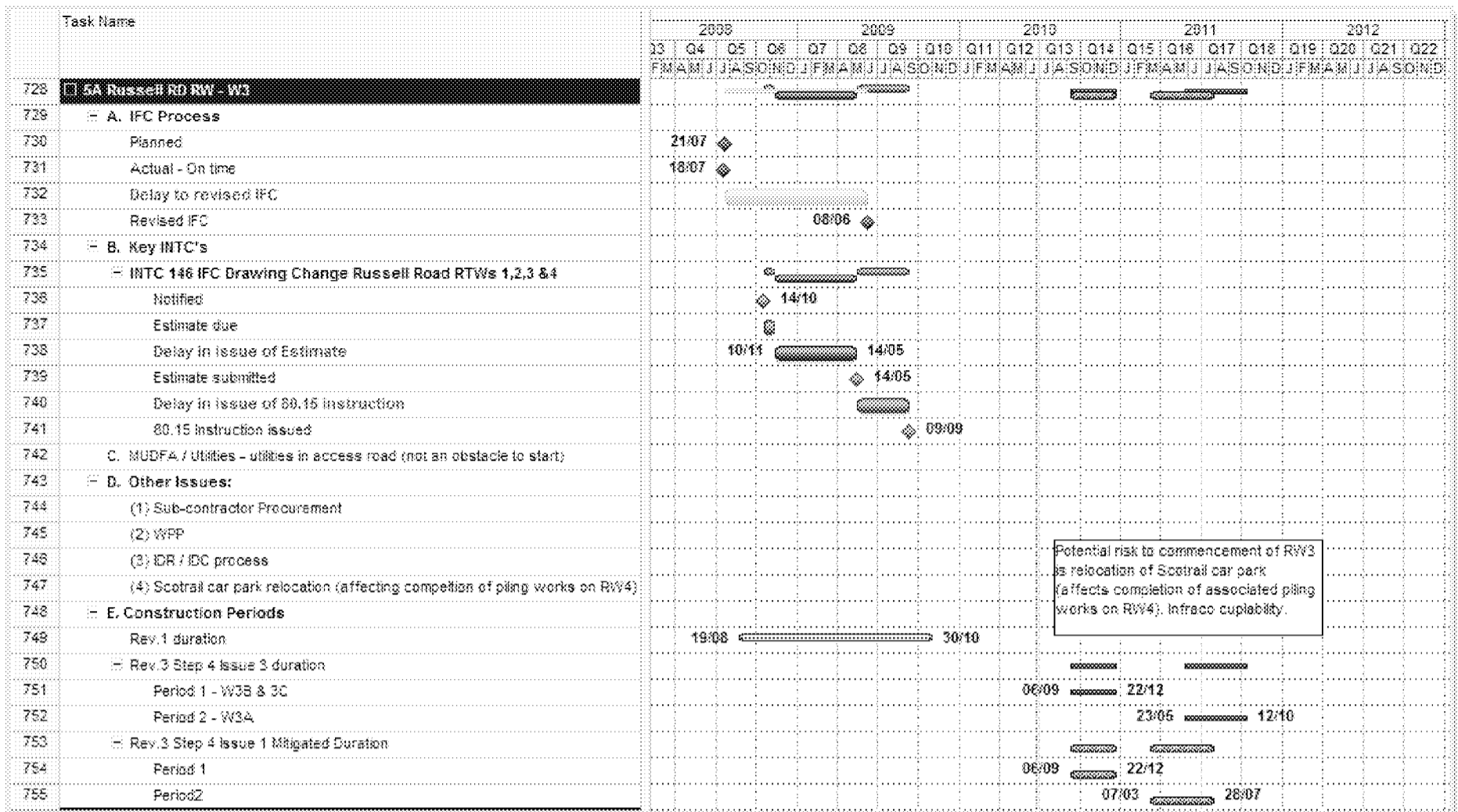
G. **Conclusion:**

- (i) **'Significant' issues/events:** Refer items (ii) and (iii) below.
- (ii) **Concurrent issues:** Whilst in isolation issues attaching to INTC 155 may have proved obstacles to commencement. It is clear that the protracted delays attaching to the issues detailed at 'F. tie position on area availability' considerably diminished any criticality that may have attached to the INTC process.
- (iii) **Considerations of dominance:** Commencement of the works in this area was compromised by (1) incompetent IFC process which was in effect rejected by BAA; (2) delays in the completion of enabling works to the Hilton Car Park; (3) delays in the completion of utility diversions to Section 7B; and (4) delays in the production of drawdown notices required to facilitate BAA approvals. With the exception of the delays in completion of the utility diversions to Section 7B all of the above are matters for which Infraco are responsible. Although there is a period of concurrent **tie** culpability for the utility works, it is notable that completion of same only affects Phases B & C. Phase A should have been the first available workforce and that particular commencement was compromised by delays attaching to the IFC process, Hilton Car Park and subsequent delays in producing drawdown notices for BAA approval. All of which are matters for which Infraco is responsible.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Infraco culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
Minimal exposure			0	-	From first IFC to start	03/03/09	12/01/10	315	45.00	Delay to 1st IFC	09/10/08	02/03/09	144	20.57
			0	-				0	-				0	-
				-					45.00					20.57
2. UPPER LIMIT														
Late IFC issue (SDS?)	06/11/08	03/03/09	117	16.71	IFC process; Hilton car park	06/11/08	12/01/10	432	61.71	Delay to overall IFC completion	09/10/08	02/08/10	662	94.57
			0	-				0	-				0	-
				16.71					61.71					94.57
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period =	IM Mitigated Period		Infraco Rev.3 Period		Currently insufficient information to accurately assess this structure / structures.									
Infraco Rev.3 Period =	0	0	0	0										
Lower Limit														
Upper Limit	Data not yet available													

5A Russell Road RW – W3



A. **IFC Process:** Initial IFC issued on time (planned 21/07/08; actual 18/07/08). This original IFC addresses / satisfied 'Geotechnical TAA'. However, a subsequent IFC was issued on 08/06/09. There is no information presently available to inform culpability for this delay. As a consequence, it is (likely) that the late issue of this IFC flows from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco?

B. **Key INTC's:** From information provided Infraco issued 10 no. key INTC's in relation to this structure; INTC's 073, 092, 117, 146, 282, 284, 506, 507, 511, & 518. We are advised that it is unlikely that the majority of the foregoing may materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. INTC's 092, 117, 146, 506 & 518 were the subject of an 80.13 Instruction issued by tie on 19/03/10. We understand that the key INTC which prevented commencement was INTC 146 (IFC Drawing Change Russell Road RTW's 1, 2, 3 & 4). That INTC was notified on 14/10/08; the Estimate was provided on 14/05/09 (27 weeks later than due). **Delay by Infraco.** This was the subject of an 80.15 instruction issued on 09/09/09; 17 weeks after submission of Estimate). **Delay by tie.**

Issues attaching to the withdrawal and subsequent re-issue of INTC 092 should be the subject of further investigation.

C. **MUDFA / Utilities:** There are a number of MUDFA / Utilities issues which need addressed on the access road. These however are not an obstacle to commencement; but will require to be carried out during construction. These issues were the subject of a MUDFA to Infraco transfer. This will result in a **delay by tie. Tie culpability.**

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Understood that Expanded Ltd have been issued with an extension to their current LOI to cover the mobilisation of a piling rig to complete the piling on Wall W4, units 11 to 18. – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
- (ii) **WPP Process:** Assumed WPP in place given the fact that works have commenced. **No Delay (to date).**
- (iii) **IDC/IDR process:** IDR was in place as at 29/10/09.
- (iv) **Form 'C':** No information available on this issue. Assumed Form 'C' in place given the fact that works have commenced

E. **Construction Periods:**

5A Russell RD RW - W3					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.1	Delay
Start	19/08/2008	05/09/2010	106.86 wks	06/09/2010	106.86 wks
Finish	30/10/2009	12/10/2011	101.71 wks	28/07/2011	90.86 wks
Cal. Duration	62.57 wks	57.43 wks	-5.14 wks	46.57 wks	-16.00 wks

(iii) **Delay to Start:** The table above refers to various programme dates. Issue 3 programme shows a delay to start of 107 weeks; the IM mitigated programme also shows a delay to start of 107 weeks. Primary causes of delay to start as follows:-

- A. **IFC process:** Initial IFC issued on time (planned **21/07/08**; actual **18/07/08**). This original IFC addresses / satisfied 'Geotechnical TAA'. However, a subsequent IFC was issued on **08/06/09**. There is no information presently available to inform culpability for these delays. **Delay by SDS, SDS /tie or Infraco?**
- B. **INTC's:** We understand that the **key INTC** which prevented commencement was **INTC 146 (IFC Drawing Change Russell Road RTW's 1, 2, 3 & 4)**. That INTC was notified on 14/10/08; the Estimate was provided on 14/05/09 (**27 weeks** later than due). **Delay by Infraco**. This was the subject of an 80.15 instruction issued on 09/09/09; **17 weeks** after submission of Estimate). **Delay by tie**.
- C. **MUDFA / Utilities:** There are a number of MUDFA / Utilities issues which need addressed on the access road. These however are not an obstacle to commencement; but will require to be carried out during construction.

E. **Other:**

- **Sub-Contractor procurement:** Understood that Expanded Ltd have been issued with an extension to their current LOI to cover the mobilisation of a piling rig to complete the piling on Wall W4, units 11 to 18. – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Subject to further tie audit. **Delay by Infraco. Infraco culpability**
- **WPP process:** Permit to commence work has been received. **No Delay**.
- **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. This process is dependent upon the IFC completion – not yet in place.
- **Form 'C' Approval:** not yet identified as being an obstacle to commencement (but this still has the potential to cause delay depending on documentation collation and submission).

- (i) **Delay to Finish:** Issue 3 programme shows a decrease in duration of **circa 5 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 also shows a decrease in duration of **16 weeks** to the Rev.1 programme.

F. **tie position on area availability:**

- (i) First available date for the meaningful commencement of works to this area is governed by the completion of Russell Road RW4 Units 1- 9. (we understand that there is a BBDI to IFC issue for this work – however no details available). This allows the access road to be moved over to allow commencement on W3B & C. See Russell Road RW narrative for details of delays (INTC 146 process).

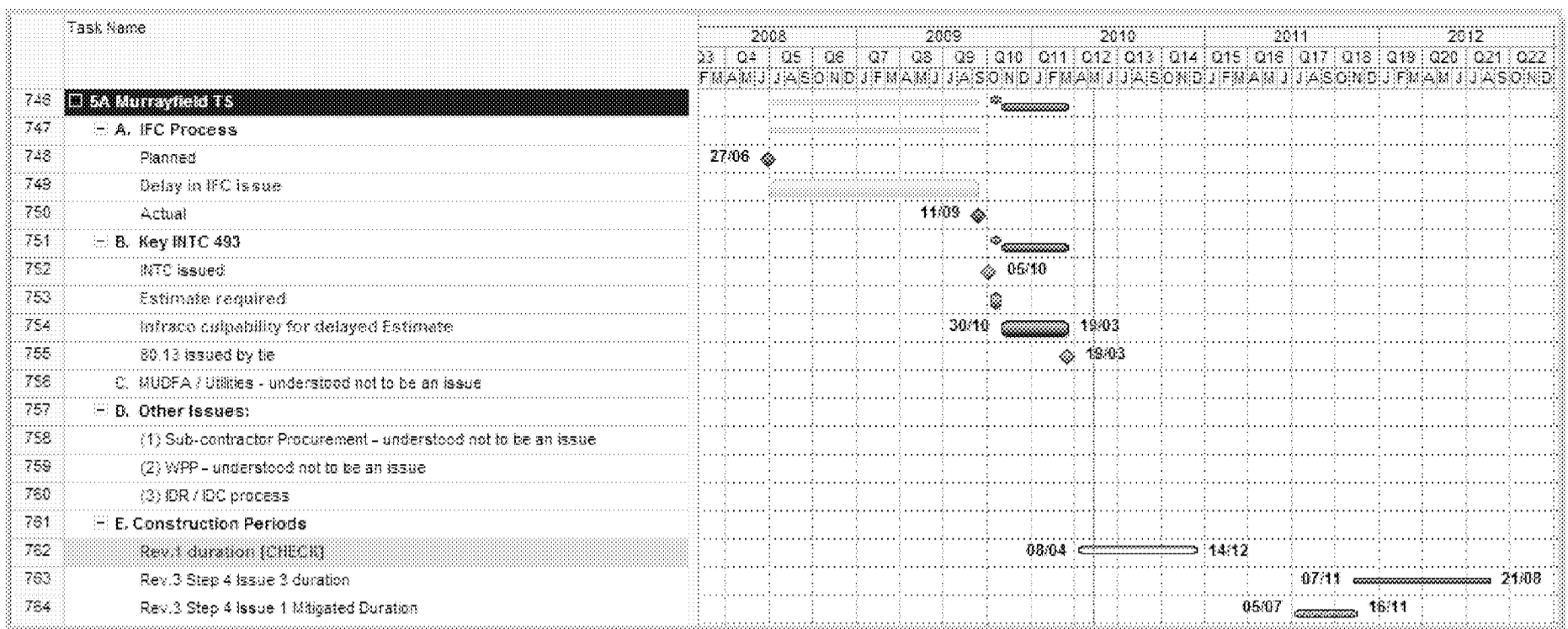
G. **Conclusion:**

- (i) **'Significant' issues/events:** In our opinion there were two main contributory factors, being (a) the INTC process in respect of INTC's 092 & 146; and (b) the subsequent completion of Russell Road RW4 Units 1-10. This however, is dependent on the completion of the new car park for the Scotrail Depot. Construction of this car park is essential as the existing car park is situated on the proposed position of W4 Units 1 – 9. Until such times as the new car park is available Infraco is unable to commence works to W4 Units 1 – 9. The corollary of this is that RW3 Walls B & C dependent on the completion of RW Units 1 – 9 cannot commence.
- (ii) **Concurrent issues:** In our opinion the other events detailed above i.e. MUDFA / Utilities and the IFC process have less of a bearing on the late commencement of this area. Whilst in isolation completion on this issue may have been a hindrance to commencement, its significance is considerably diminished by the fact that Infraco did commence. Incomplete MUDFA / Utilities issues will be more significant to the successful completion of the works in this area.
- (iii) **Considerations of dominance:** The protracted delay attaching to the INTC process on this structure has clearly affected commencement. Subsequent INTC (BBDI-IFC) may yet also affect commencement. However, in terms of dominance the delays attaching to the completion of RW 4 Units 1 – 9 have clearly subsumed the delaying effects of the above noted INTC's. It is therefore our opinion that this delay is the dominant delay to the commencement and subsequent completion of this structure.

H. **Current assessment of culpability**

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Tie culpability					Infraco culpability					Poss. SDS culpability			
	From	to	Days	Weeks	Cause	From	to	Days	Weeks	Cause	From	to	Days	Weeks
1. LOWER LIMIT														
INTC estimate period	14/10/08	10/11/08	27	3.86	Delay to estimate	10/11/08	14/05/09	185	26.43	No delay to 1st IFC			0	-
Delay to 80.15 instruction	14/05/09	09/09/09	118	16.86	Delay to INTC	19/08/08	14/10/08	56	8.00				0	-
			0	-		09/09/09	06/09/10	362	51.71				0	-
				20.71					86.14					-
2. UPPER LIMIT														
INTC estimate period	14/10/08	10/11/08	27	3.86	Delay to estimate	10/11/08	14/05/09	185	26.43	Delay to 2nd IFC	21/07/08	08/06/09	312	46.00
Delay to 80.15 instruction	14/05/09	09/09/09	118	16.86	Delay to INTC	19/08/08	14/10/08	56	8.00				0	-
			0	-		09/09/09	06/09/10	362	51.71				0	-
				20.71					86.14					46.00
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -16 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period -16 wks: notwithstanding INTC issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period -5 wks: Infraco clearly accepts the possibility for mitigation. Though currently not to the same extent as noted above. On the basis however that Infraco can mitigate to -16 wks per IM analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of -16 wks if Infraco responsible for all increased durations									
Infraco Rev.3 Period = -5 wks	Tie	Infraco	Tie	Infraco										
Lower Limit	-16.00	-16.00	-16.00	-5.14										
Upper Limit	0.00	0.00	-10.86	0.00										

5A Murrayfield TS



A. **IFC Process:** Initial IFC was 63 weeks late (planned 27/06/08; actual 11/09/09). DS advises that delays flowed from the interface between tie, SDS, the Police and CEC. The main focus of this was staircase arrangements at the Murrayfield TS. A combination of misconceptions and misunderstandings between the parties resulted in an overly protracted timeframe to resolve this issue. DS further explained that once agreement was reached tie deliberated over the formalising of said agreement. Thereafter, a slow response from SDS in issuing the drawings served to exacerbate the ongoing delay. Infraco had a very limited input into the process and as such may therefore bear minimal responsibility (depends on management of SDS). It is believed culpability on this issue is twofold: (1) tie responsibility for time lapse in formalising its position to SDS; and (2) the protracted timeframe beyond this for SDS to issue the IFC. It is therefore likely, that the late issue of this IFC flows from one or more of the following reasons:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A tie Change;
- A requirement of third parties for which tie will bear responsibility;

Delay by SDS, SDS /tie or tie? Subject to more detailed audit by tie.

B. **Key INTC's:** From information provided Infraco issued 1 no. INTC in relation to this structure; **INTC 493 (Issue of Drawings for Murrayfield Stadium TS)**. It is unlikely however that issues attaching to this INTC will materially / critically affect Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 493:** issued by Infraco on 05/10/09 (24 days after IFC issue) Estimate should have been submitted on or around 02/11/09. As at 30/04/10 Estimate is currently outstanding i.e. 179 days later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce an Estimate for INTC 493.**
INTC 493 was the subject of an 80.13 Instruction issued by tie on 19/03/10.

C. **MUDFA / Utilities:** There are no MUDFA / Utilities issues impacting on this structure. **No Delay**

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Sub-contract let to Grahams. **Delay by Infraco; Infraco culpability.**
- (ii) **WPP Process:** Not in place as yet. **Delay by Infraco; Infraco culpability.**
- (iii) **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
- (iv) **Form 'C':** The Rev.3 programme does not contain any activity for a NR Form 'C'. Presumed not required.

E. **Construction Periods:**

5A Murrayfield TS					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	08/04/2010	07/11/2011	82.57 wks	05/07/2011	64.71 wks
Finish	14/12/2010	11/08/2012	88.00 wks	16/11/2011	48.14 wks
Cat. Duration	35.86 wks	41.29 wks	5.43 wks	19.29 wks	16.57 wks

(i) **Delay to Start:** The table above refers to various programme dates. Issue 3 programme shows a delay to start of 83 weeks; the IM mitigated programme projects an earlier delay to start of 65 weeks. Primary causes of delay to start as follows:-

- A. **IFC process:** Initial IFC was 63 weeks late (planned 27/06/08; actual 11/09/09). Culpability on this issue is twofold; (1) tie responsibility for time lapse in formalising it's position to SDS; and (2) the protracted timeframe beyond this for SDS to issue the IFC. **Delay by SDS, SDS /tie or tie? Audit detail required to establish measure of culpability.**
- B. **INTC's 493:** issued by Infraco on 05/10/09 (24 days after IFC issue) Estimate should have been submitted on or around 02/11/09. As at 30/04/10 Estimate is currently outstanding i.e. 179 days later than permitted by the Contract. **Delay by Infraco; Infraco culpability.** Delay up to 19/03/10 when tie issued clause 80.13 instruction.
- C. **MUDFA / Utilities:** **No impact** on this structure.
- D. **Other:**

- **Sub-Contractor procurement:** No sub-contract yet in place. Nothing noted specific to this TS in tie audit and Infraco Period Report No.3-1 report to 24/04/10. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco; Infraco culpability.**
- **WPP process:** Not in place as yet. **Delay by Infraco; Infraco culpability**
- **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place **Delay by Infraco; Infraco culpability.**
- **Form 'C' Approval:** Presumed not required (see 'D'(iv) above)

(ii) **Delay to Finish:** Issue 3 programme shows an increase in duration of **circa 5 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows a reduction **circa -16 weeks** to the Rev.1 programme. There is presently no justification for the Infraco increased Rev.3 duration.

F. tie position on area availability:

(i) First available date for the meaningful commencement of works to this area is governed by construction of the Murrayfield Tram Stop Retaining Wall. However, that is dependent on completion of the VE exercise on Roseburn Viaduct, which is currently predicted to complete **mid May 2010 (IFC by 09/06/10).**

G. Conclusion:

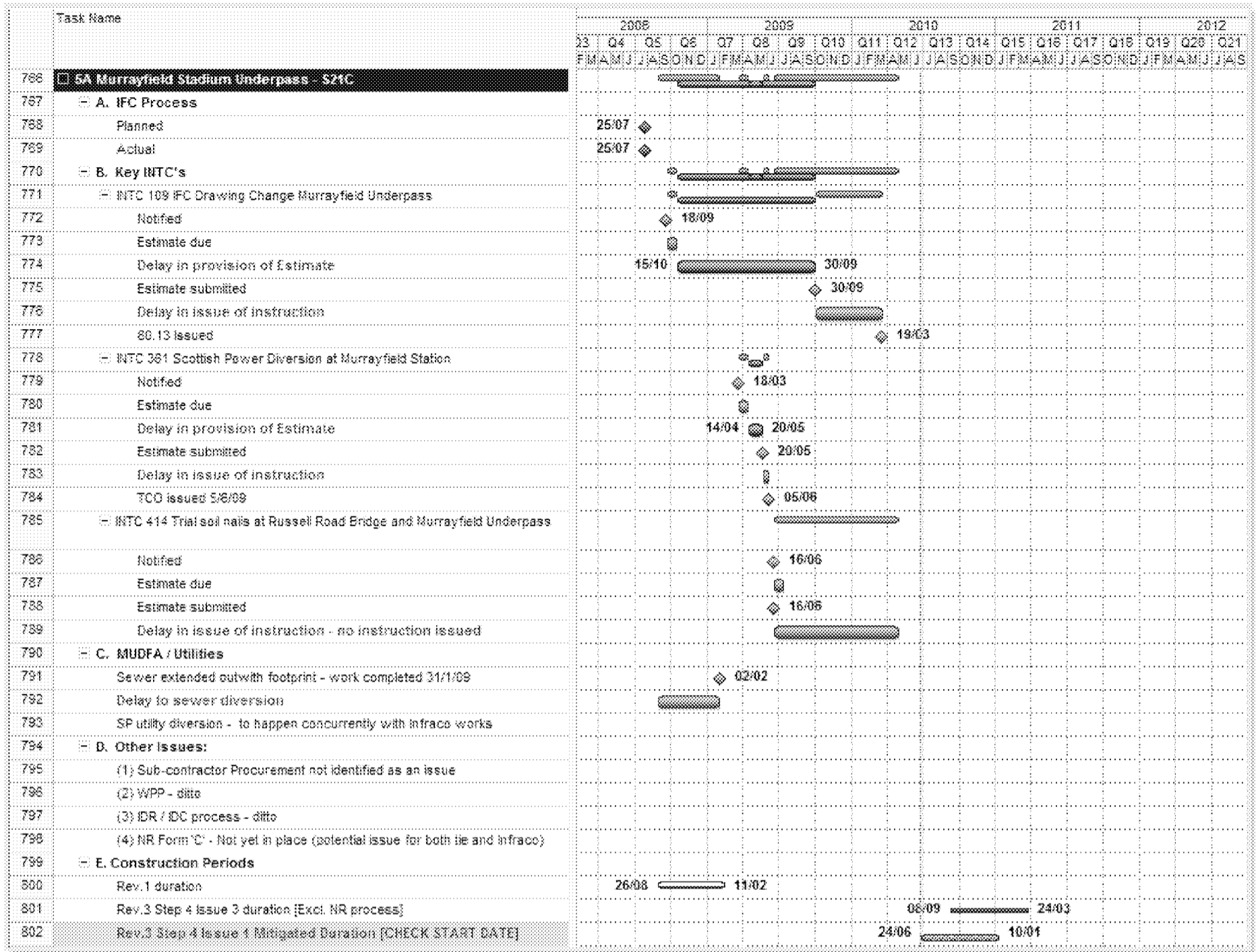
- (i) **'Significant' issues/events:** In our opinion the main obstacle to commencement on this structure is the delay to the issue of the IFC (which was 63 weeks late). This however, is subsumed by the delays attaching to Murrayfield TS RW's which is clearly the determinant / predecessor to commencement of the TS construction; and as such has greater 'causative potency' than the above. Murrayfield TS RW is itself dependent on (i) completion of the Roseburn Viaduct design (which is the subject of a 'late' VE exercise design); and (ii) the west end of the Russell Road RW4.
- (ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing, the WPP process & the IDC / IDR process) have less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G (i) above. They may however become more significant in the lead up to the area availability in July 2011. Running concurrently with this is the late provision by Infraco of Estimates for INTC 493. This is a matter for which Infraco is responsible. Delay measured to 19/03/10 (when clause 80.13 instruction issued; but unlikely to be an obstacle to actual commencement).
- (iv) **Considerations of dominance:** The protracted delay attaching to the IFC on this structure has clearly affected commencement. This however, is subsumed by the delays attaching to Murrayfield TS RW's which is clearly the determinant / predecessor to commencement of the TS construction; and as such has greater 'causative potency' than the above.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	IM culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
			0	-				0	-				0	-
			0	-				0	-				0	-
				-					-					-
2. UPPER LIMIT														
Delay from Rev 1 - Rev 3 date (Affected by RV VE)	08/04/10	07/11/11	578	82.57	Delay from Rev 1 - Rev 3 date (Affected by RV VE)	08/04/10	07/11/11	578	82.57	Delay to 1st IFC	27/06/08	11/09/08	441	63.00
			0	-				0	-				0	-
				82.57					82.57					63.00

B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]					
	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period -17 wks: Notwithstanding delays attaching to the RV VE exercise this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period +5 wks: On the basis that Infraco can mitigate to -17 wks per IM analysis then Infraco lower limit restricted to anything in excess of -17 wks tie liability remains at lower limit of -17 wks if Infraco responsible for all increased durations
	IM	Infraco	IM	Infraco	
Lower Limit	-17.00	-17.00	-17.00	-12.00	
Upper Limit	0.00	0.00	0.00	5.00	

5A – Murrayfield Stadium Underpass – S21C



A. IFC Process: Initial IFC issued on time (planned 25/07/08; actual 25/07/08). No Delay

B. Key INTC's: From information provided it appears that the Infraco issued 7 no. INTC in relation to this structure; INTC's 98, 99, 100, 101, 109, 361 & 414. We are further advised that INTC 109 (IFC Drawing Changes Murrayfield Underpass), INTC 361 (Scottish Power Diversion at Murrayfield Underpass) & INTC 414 (Trial Soil Nails at Russell Road Bridge and Murrayfield Underpass) in particular, appear to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) INTC 109: issued by Infraco on 18/09/08 (55 days after IFC issue). Estimate should have been submitted on or around 14/10/08. Estimate was received on 30/09/09; 351 days later than required. Delay by Infraco; Infraco culpability for time taken to produce Estimate for INTC 109. TC advises that this INTC was referred to DRP by BSC on 21/05/10.
- (ii) INTC 361: issued by Infraco on 18/03/09 (236 days after IFC issue). Estimate should have been submitted on or around 13/04/09. Estimate was received on 20/05/09, 37 days later Estimate yet to be provided. Delay by Infraco; Infraco culpability for time taken to produce Estimate for INTC 361. TCO issued 05/06/09; tie will be culpable for the period to instruction.
- (iii) INTC 414: issued by Infraco on 16/06/09 (326 days after IFC issue); Estimate was received on 16/06/09; [tie to CHECK if correct – refer INTC list provided by tie]. No instruction issued by tie – tie will be culpable for the period to instruction.

INTC 109 was the subject of an 80.13 Instruction issued by tie on 19/03/10. Infraco Period Report No 3-1, to 24 April 2010 notes "Change from BDDI to IFC have yet to be agreed". TC currently advises that tie responded to Infraco on 14/04/10 disputing Infraco's Estimate in regard to INTC 109. Referred to DRP on 21/05/10. There therefore remains the potential that issues attaching to this process may yet prevent / compromise commencement.

C. MUDFA / Utilities: There are two main MUDFA / Utilities issues impacting on this structure; (1) Sewer extended outwith footprint of the proposed works to MSU; and (2) Scottish Power utility diversion. The sewer diversion was the subject of a MUDFA to tie transfer. This work was completed in January 2009. Delay by tie; tie culpability exists as the late completion of these works would have been an obstacle to the 'Rev 1' commencement date of 26/08/08. The Scottish Power utility diversion was the subject of a MUDFA to Infraco transfer. This work will be undertaken by Infraco concurrently with construction of the Underpass. This issue appears to have arisen on 03/02/09 and was not concluded until 05/06/09 when tie issued TCO 065 instructing Infraco to proceed with the works. Delay by tie; tie culpability.

D. Other Issues:

- (i) Sub-Contractor Procurement: On 08/01/09 Infraco requested permission to sub-contract works to Grahams for work between Haymarket Terrace and Murrayfield Underpass. This permission was granted on 25/02/09 – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. Delay by Infraco; Infraco culpability.

- (ii) WPP Process: No information available.
- (iii) IDR/IDC process: Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place [**Discuss**]
Delay by Infraco; Infraco culpability.
- (iv) Form 'C': not yet in place. This may yet become a hindrance to commencement. It is anticipated that Infraco will have been relying on lack of instruction on INTC's. **Delay by Infraco; Infraco culpability (but may be excusable if tie culpable for any INTC related delays).** TC confirms that Form C for Trial Soil Nails was signed off by NR on 28/05/10.

E. Construction Periods:

5A Murrayfield Stadium Underpass - S21C					
	Rev.1	Rev.2/Issue 3	Delay	IM Mitigated Rev.2	Delay
Start	25/08/2008	08/09/2010	106.14 wks	24/06/2010	95.29 wks
Finish	11/02/2009	24/03/2011	110.14 wks	10/01/2011	99.71 wks
Cal. Duration	24.29 wks	28.29 wks	4.00 wks	28.71 wks	4.43 wks

- (i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **106 weeks**; the IM mitigated programme projects an earlier delay to start of **95 weeks**. Primary causes of delay to start as follows:-
 - A. IFC process: Initial IFC **issued on time** (planned **25/07/08**; actual **25/07/08**). **No Delay.**
 - B. INTC's 109, 361 & 414: Delays by Infraco in issue of INTC's and subsequent provision of Estimates. **Delay by Infraco; Infraco culpability.** As at 30/04/10 delays extant on INTC 414. Delay on INTC 109 up to 19/03/10 when tie issued clause 80.13 instruction. TCO issued for INTC 361 on 05/06/09 (not in Master INTC list) **tie culpability for late instruction on INTC's.**
 - C. MUDFA / Utilities: There are two main MUDFA / Utilities issues impacting on this structure; (1) Sewer extended outwith footprint of the proposed works to MSU; and (2) Scottish Power utility diversion. The sewer diversion was the subject of a MUDFA to tie transfer. This work was completed in January 2009. **Delay by tie; tie culpability** exists as the late completion of these works would have been an obstacle to the 'Rev 1' commencement date of 26/08/08. The Scottish Power utility diversion was the subject of a MUDFA to Infraco transfer. This work will be undertaken by Infraco concurrently with construction of the Underpass. This issue appears to have arisen on 03/02/09 and was not concluded until 05/06/09 when tie issued TCO 065 instructing Infraco to proceed with the works. **Delay by tie; tie culpability.**
 - D. Form 'C': not yet in place. This may yet become a hindrance to commencement. It is anticipated that Infraco will have been relying on lack of instruction on INTC's. **Delay by Infraco; Infraco culpability (but may be excusable if tie culpable for any INTC related delays).**TC confirms Form C for Trial Soil Nails was signed off by NR on 28/05/10.
 - E. Other:
 - **Sub-Contractor procurement**: On 08/01/09 Infraco requested permission to sub-contract works to Grahams for work between Haymarket Terrace and Murrayfield Underpass. This permission was granted on 25/02/09. **Delay by Infraco; Infraco culpability.**
 - **WPP process**: Not in place as yet. **Delay by Infraco; Infraco culpability**
 - **IDR/IDC process**: Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
 - **Form 'C' Approval**: Not yet in place. **Delay by Infraco; Infraco culpability.**
- (ii) Delay to Finish: Issue 3 programme shows an (minor) increase in duration of **4 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 also shows an increase in duration of **circa 4 weeks** to the Rev.1 programme.

F. **tie position on area availability**: First available date for the meaningful commencement of works to this area is governed by two separate issues; (1) the sewer extension (completed in January 2009); and (2) repositioning of the pitches at Murrayfield Stadium which was completed December 2008. **These matters will be tie liability.** The latest date for completion on the above was the date of the TCO issued against INTC 361 on 05/06/09. This in effect became the first date at which meaningful commencement could take place.

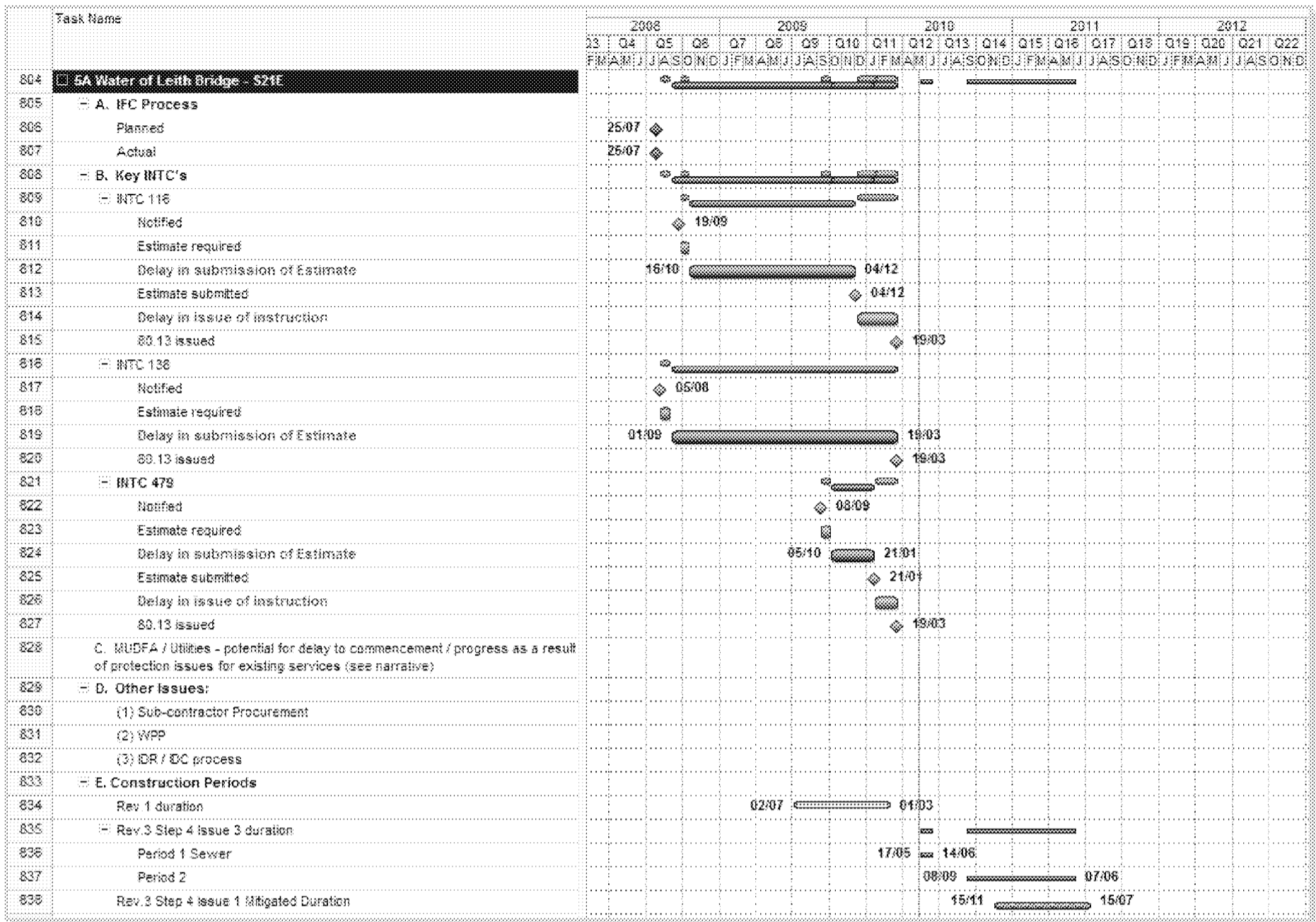
G. Conclusion:

- (i) **'Significant' issues/events**: In our opinion there were four main contributory factors, being (1) the INTC process; (2) extension of sewer outwith footprint of the proposed works to MSU; (3) Scottish Power utility diversion; and (d) repositioning of the pitches at Murrayfield Stadium. Taking those events in chronological order:-
 - (1) Infraco delays in issuing **INTC's 109, 361 & 414** from the IFC issue date are significant (see Preamble). The subsequent timeframe taken by Infraco to provide compliant Estimates following the issue of the INTC are matters for which Infraco is responsible. Delays in issue of instruction INTC's are matters for which tie is responsible.
 - (2) Running concurrently with this is the late completion of the sewer extension; a matter for which Infraco is responsible.
 - (3) It is also our understanding that there was an obligation on tie to complete the repositioning of pitches at Murrayfield Stadium in advance of the MSU works. The delay in completion of this exercise is a matter for which **tie** is responsible. Work completed December 2008; after MSU planned to start. Concurrent with MUDFA/utility delay.
- (ii) **Concurrent issues**: In our opinion other events detailed above (i.e. the sub-contractor procurement timing & WPP process) have much less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above.
- (iii) **Considerations of dominance**: The significant delays attaching to the INTC process on this structure have clearly affected commencement. Commencement however, was compromised by; (1) the sewer extension impacting on this structure; and (2) repositioning of the pitches at Murrayfield Stadium. These three issues are the dominant causes of delay on this particular structure. Both are likely to have a similar 'causative potency' in that both provide significant obstacles to area and workface availability for the meaningful commencement of works.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	He culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
MUDFA (Sewer)	26/08/08	02/02/09	160	22.86	Late INTC notice	02/02/09	18/03/09	44	6.29				0	-
Delay; From INTC 109 estimate to 80.13 instruction	30/09/09	19/03/10	170	24.29	Delay; INTC 361 estimate	14/04/09	20/05/09	36	5.14				0	-
			0	-	Later than available start	24/06/10	08/09/10	76	10.86				0	-
				47.14					22.29					-
2. UPPER LIMIT														
Delay; Rev 1 start to MUDFA (Sewer)	26/08/08	02/02/09	160	22.86	Delay; sewer complete to INTC 109 estimate	02/02/09	30/09/09	240	34.29				0	-
Est. Period (INTC 361)	18/03/09	13/04/09	26	3.71	Delay; 80.13 instruction to Rev 3 start	19/03/10	08/09/10	173	24.71				0	-
TOO period (361)	20/05/09	16/06/09	27	3.86										
Delay in instruction	16/06/09	24/06/10	373	53.29				0	-				0	-
			0	-				0	-				0	-
				83.71					59.00					-
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +4.43 wks	IM Mitigated Period				Infraco Rev.3 Period				IM mitigated period +4wks: this is likely to be MUDFA / Utilities, BODI/IFC issues and / or consequential 'knock on' issues from other structures. . Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. Infraco Rev.3 period +4.43 wks: On the basis that Infraco can mitigate to 4 weeks per IM analysis then Infraco lower limit restricted to anything in excess of 4 wks. tie liability remains at lower limit of 0.43 wks <u>if</u> Infraco responsible for all increased durations					
Infraco Rev.3 Period = +4.00 wks	He	Infraco	He	Infraco	He	Infraco	He	Infraco						
Lower Limit	0.00	0.00	0.43	0.00										
Upper Limit	4.43	4.43	4.43	4.00										

5A - Water of Leith Bridge - S21E



- A. **IFC Process:** Initial IFC issued on time (planned 25/07/08; actual 25/07/08). Although no subsequent IFC's have been issued, some additional drawings were reissued on 03/07/09 reflecting changes to piling arrangement and removal of bat boxes. (Refer INTC's 138 & 479) below. **No material delay**
- B. **Key INTC's:** From information provided it appears that the Infraco issued 4 no. INTC in relation to this structure; INTC's 116, 138, 426 & 479. We are further advised that INTC 116 (IFC Drawing Changes Water of Leith Bridge), INTC 138 (Pile Sewer Conflict) & INTC 479 (Sewer Lining at Water of Leith Bridge) in particular, appear to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-
 - (i) **INTC 116:** issued by Infraco on 19/09/08 (56 days after IFC issue). Estimate should have been submitted on or around 15/10/08. Estimate was received on 04/12/09; 415 days later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 116.
 - (ii) **INTC 138:** issued by Infraco on 05/08/08 (11 days after IFC issue). Estimate should have been submitted on or around 29/08/08. As at 30/04/10, 609 days later Estimate yet to be provided. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 138
 - (iii) **INTC 479:** issued by Infraco on 08/09/09 (45 days after IFC issue). Estimate should have been submitted on or around 02/10/09. Estimate was received on 21/01/10; 111 days later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 479.
- All of the above were the subject of an 80.13 Instruction issued by tie on 19/03/10.** Infraco Period Report No 3-1, to 24 April 2010 notes "Change order for protection of existing utilities has yet to be agreed". TC currently advises that Infraco has yet to submit INTC specifically addressing this issue. There therefore remains the potential that issues attaching to this process may yet prevent / compromise commencement. **Delay by Infraco; Infraco culpability**
- C. **MUDFA / Utilities:** There are a number of MUDFA / Utilities issues impacting on this structure. Central pier of the Water of Leith Bridge clashes with the existing sewer. Consequent to this, in conjunction with sewer lining measures, piled foundations have been redesigned to avoid sewer clash. (Refer INTC's 138 & 479 above). TC advises that further protection measures are necessary for Scottish Power cables and Gas mains in close proximity to the works. As noted in the last paragraph of 'B' above, these issues are yet to be processed and as such have the potential to prevent / compromise commencement. Although there is **tie culpability** attaching to this issue, **Infraco culpability** exists in regard to its dilatory approach to the provision of INTC's / Estimates for same. Particularly in regard to the protection of existing utilities.
- D. **Other Issues:**
 - (i) **Sub-Contractor Procurement:** Understood that Infraco intend to sublet this structure to Expanded Ltd – see tie audit and Infraco Period Report No.3-1 report to 24/04/10. No sub-contract yet in place. Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco; Infraco culpability.** The significance of this issue will increase as the first available date for this structure nears.
 - (ii) **WPP Process:** Not in place as yet. **Delay by Infraco; Infraco culpability.**
 - (iii) **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
 - (iv) **Form 'C':** Not yet in place. **Delay by Infraco; Infraco culpability.**

- (v) **Methodology:** Infraco yet to submit methodology for protection of services and installation of sewer liner.

E. Construction Periods:

5A Water of Leith Bridge - S21E					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	02/07/2009	17/05/2010	45.57 wks	15/11/2010	71.57 wks
Finish	01/03/2010	07/06/2011	66.14 wks	15/07/2011	71.57 wks
Cal. Duration	34.71 wks	55.29 wks	20.57 wks	34.71 wks	0.00 wks

- (i) **Delay to Start:** The table above refers to various programme dates. Issue 3 programme shows a delay to start of **45 weeks**; the IM mitigated programme projects a later delay to start of **72 weeks**. Primary causes of delay to start as follows:-
- IFC process:** Initial IFC **issued on time** (planned **25/07/08**; actual **25/07/08**). **No Delay**.
 - INTC's 116, 138 & 479:** Delays by Infraco in issue of INTC's and subsequent provision of Estimates. **Delay by Infraco; Infraco culpability.** Delay up to 19/03/10 when tie issued clause 80.13 instruction. Some (minor) **tie culpability** in process.
 - MUDFA / Utilities:** There are a number of MUDFA / Utilities issues impacting on this structure. Central pier of the Water of Leith Bridge clashes with the existing sewer. Consequent to this, in conjunction with sewer lining measures, piled foundations have been redesigned to avoid sewer clash. (Refer INTC's 138 & 479 above). TC advises that further protection measures are necessary for Scottish Power cables and Gas mains in close proximity to the works. As noted in 'B' above, these issues are yet to be processed and as such have the potential to prevent / compromise commencement. Although there is **tie culpability** attaching to this issue (this also relates to potential delay to progress), **Infraco culpability** exists in regard to its dilatory approach to the provision of INTC's / Estimates for same.
 - Other:**
 - **Sub-Contractor procurement:** Understood that Infraco intend to sublet this structure to Expanded Ltd Not clear if LOI issued covering this work or area. Subject to further tie audit. **Delay by Infraco; Infraco culpability.**
 - **WPP process:** Not in place as yet. **Delay by Infraco; Infraco culpability**
 - **IDR/IDC process:** Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place. **Delay by Infraco; Infraco culpability.**
 - **Form 'C' Approval:** Not yet in place. **Delay by Infraco; Infraco culpability.**
- (ii) **Delay to Finish:** Issue 3 programme shows an increase in duration of **circa 21 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 shows no increase in duration to the Rev.1 programme. There is presently no justification presented for the Infraco increased Rev.3 duration. Please see notes above re potential for delay due to protection of existing utilities.

- F. **tie position on area availability:** First available date for the meaningful commencement of works to this area is governed by the completion of reinforced earthworks on both Murrayfield Pitches RW and Baird Drive RW is required to form the underside of the bankseat to WoL Bridge. Baird Drive however, has been subject to protracted delays flowing from BDDI – IFC Changes (refer Baird Drive Summary Chart / Narrative above). Infraco Period Report No 3-1, to 24 April 2010 predicts Baird Drive commencement on 17 May 2010. (Murrayfield Pitches RW's does not feature in the current analysis).

Commencement of works to this structure will also depend on agreement on protection measures necessary for Scottish Power / SGN utilities in close proximity to the works. As noted in 'B' above, these issues are yet to be processed and as such have the potential to prevent / compromise commencement.

G. Conclusion:

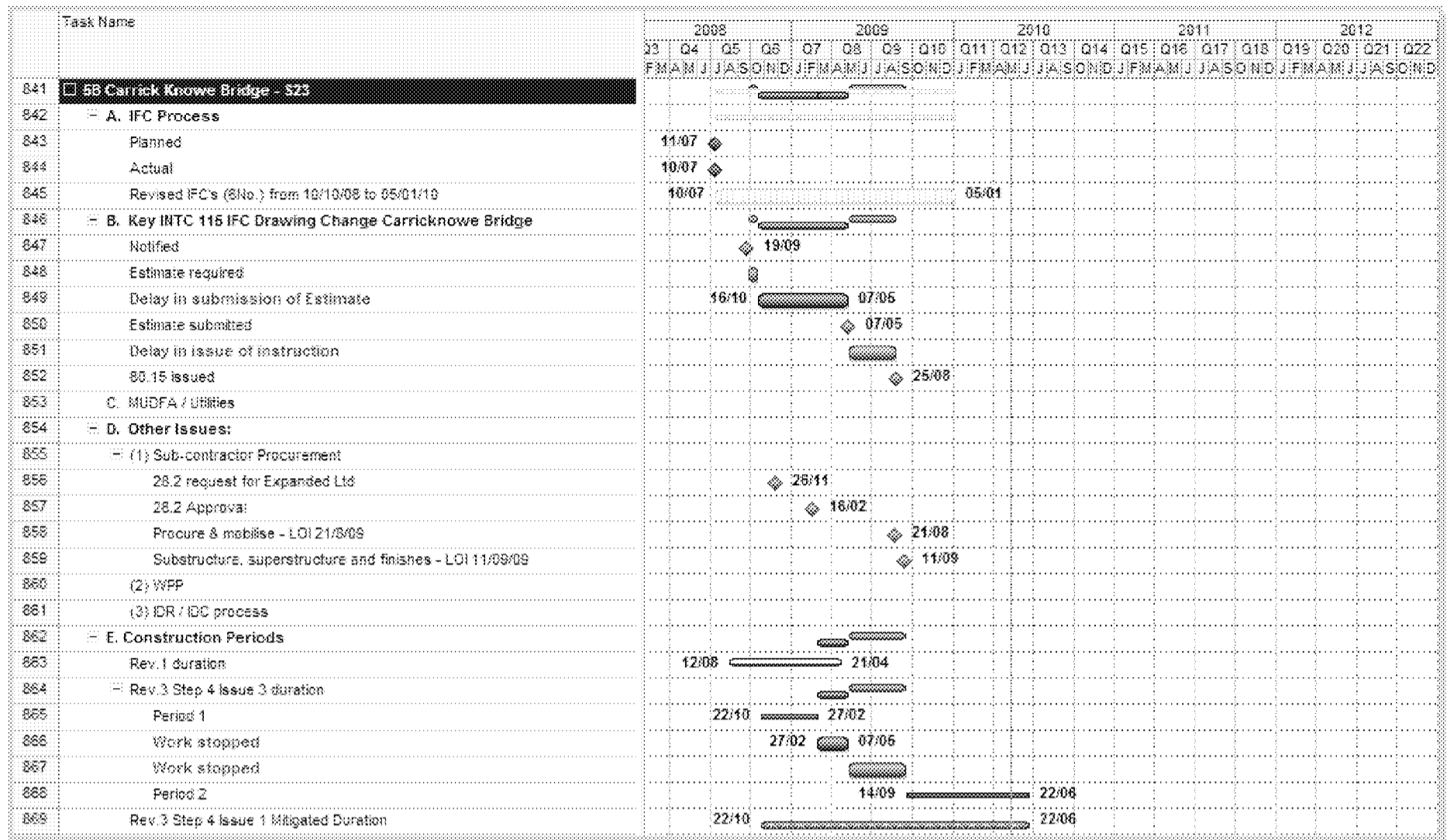
- (i) **'Significant' issues/events:** In our opinion there were four main contributory factors, being (a) the INTC process; (b) non agreement on protective measures needed for utilities in close proximity to the works; (c) incomplete reinforced earthworks on both Murrayfield Pitches RW and Baird Drive RW's required to form the underside of the bankseat to WoL Bridge and (d) failure to sign off Form 'C' approval. Taking those events in chronological order:-
- Infraco delays in issuing **INTC's 116, 138 & 479** from the IFC issue date and the subsequent timeframe taken by Infraco to provide compliant Estimates following the issue of same, are matters for which Infraco is responsible. Beyond **21/01/10** however, tie's review and inaction on the Estimate for INTC 479 ran until **19/03/10** (when the 80.13 instruction was issued). This may be a period for which tie bears the responsibility. Running concurrently with this Infraco has yet to submit (INTC) proposals for protective measures for utilities known to be in close proximity to the works. This is a matter for which Infraco is responsible. Following the issue of the 80.13 instruction Infraco *should* be obliged to commence the works. Commencement however, was further compromised by incomplete reinforced earthworks on both Murrayfield Pitches RW and Baird Drive RW's required to form the underside of the bankseat to WoL Bridge. For responsibility for this issue (refer Baird Drive Summary Chart / Narrative) above. Finally the potential to commence is further compounded by Infraco not yet having submitted NR Form 'C' for approval.
- (ii) **Concurrent issues:** In our opinion other events detailed above (i.e. the sub-contractor procurement timing & WPP process) have much less of a bearing on the late commencement of this area. Whilst in isolation these issues may have been critical to commencement their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability. (Date dependant on the issues noted at G(i) above).
- (iv) **Considerations of dominance:** The significant delays attaching to the INTC process on this structure have clearly affected commencement. The delays have in effect three constituent parts (1) Infraco's delay in issuing an INTC from the IFC issue date; (2) the protracted timeframe taken by Infraco to provide a compliant Estimate following the issue of the INTC; and (3) tie's delay in issuing an 80.13 beyond that date. Following the issue of the 80.13 instruction Infraco is obliged to commence the works. The late approval of the Form 'C' may also have restricted access to this area.

Commencement however, may be compromised by non agreement on protective measures for utilities known to be in close proximity to the works and the incomplete reinforced earthworks on both Murrayfield Pitches RW and Baird Drive RW's, required to form the underside of the bankseat to WoL Bridge. These issues are the dominant causes of delay on this particular structure. Both are likely to have a similar 'causative potency' in that both provide significant obstacles to area and workface availability for the meaningful commencement of works.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability				Cause	Infraco culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
			0	-	Delay; Rev 1 start to delay to estimate INTC 138	02/07/09	19/03/10	250	37.14				0	-
					tie instruction delay for 116				-15.00					
			0	-	Delay; INTC 138 instruction to commencement	19/03/10	17/05/10	59	8.43				0	-
			0	-				0	-				0	-
									30.57					
2. UPPER LIMIT														
Delay; From INTC 116 estimate to 80.13 instruction	04/12/09	19/03/10	105	15.00	Delay; Rev 1 start to delay to estimate INTC 138	02/07/09	19/03/10	250	37.14				0	-
			0	-	Delay; INTC 138 instruction to commencement	19/03/10	17/05/10	59	8.43				0	-
			0	-				0	-				0	-
				15.00					45.57					
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = 0 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period 0 wks: No mitigation considered possible. Rev 1 construction duration still considered achievable. Affected by protracted delays attaching to Baird Drive RW's. Infraco Rev.3 period +21 wks: Infraco clearly considers slippage likely. On the basis however, that Infraco can maintain the original Rev 1 programmed duration as per IM analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of 0 wks if Infraco meets planned duration of the Rev 1									
Infraco Rev.3 Period = +21 wks	tie	Infraco	tie	Infraco										
Lower Limit	0.00	0.00	0.00	0.00										
Upper Limit	0.00	0.00	0.00	21.00										

5B Carrick Knowe Bridge – S23



A. **IFC Process:** Initial IFC was on time (planned 11/07/08; actual 11/07/08). Although the initial IFC date was achieved, DS advises that this structure was the subject of multiple revisions thereafter. Revisions were presented on 10/10/08, 19/08/09, 01/09/09, 23/10/09, 16/12/09 and 05/01/10 respectively. With respect to delays attaching to the revisions noted (or indeed the reason for revising same) there is no information presently available to inform culpability (see Preamble). Potential reasons for the late issue of IFC's to this area include:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco?

B. **Key INTC's:** From information provided it appears that the Infraco issued 7 no. INTC in relation to this structure; INTC's 115, 308, 322, 437, & 502. We understand that INTC 115 is likely to have materially / critically affected Infraco's ability to (re)commence works on 14/09/09. Details are as follows:-

- (i) **INTC 115:** issued by Infraco on 19/09/08. Estimate should have been submitted on or around 15/10/08. Estimate was received on 07/05/09; **204 days** later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 115
- (ii) **INTC 308:** issued by Infraco on 23/02/09. Estimate should have been submitted on or around 18/03/09. As at 30/04/10, 540 days later, Infraco has yet to provide an estimate. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 308. No instruction issued by tie – **tie will be culpable for the period to instruction. (TC advises inconsequential issue INTC relates to Infraco claiming 1 hr delay).**
- (iii) **INTC 322:** issued by Infraco on 23/02/09. Estimate should have been submitted on or around 19/03/09. Estimate was received on 12/06/09, **85 days** later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 322; **tie will be culpable for the period to instruction.** (TC confirms there was no delay in regard to this issue. Temporary Works were checked and given go ahead by Tony Gee).
- (iv) **INTC 437:** issued by Infraco on 08/07/09. Estimate should have been submitted on or around 03/08/09. Estimate was received 08/07/09 **on time. tie will be culpable for the period to instruction.** (TC advises that this INTC relates to the toe of the North Approach Ramp being outwith the LOD. No delaying impact on structure or North Approach Ramp).
- (v) **INTC 502:** issued by Infraco on 19/10/09. Estimate should have been submitted on or around 12/11/09. Estimate was received 06/11/09, **on time. tie will be culpable for the period to instruction.** (TC advises inconsequential issue, INTC relates to a minor delay to blinding on the North Abutment Base Slab amounting to [10.3m3]).

None of the above were the subject of an 80.13 Instruction issued by tie on 19/03/10. Infraco Period Report No 3-1, to 24 April 2010 notes "Issues and concerns. None". This appears to suggest that none of the above are likely to prevent / compromise ongoing progress / completion. However it is notable that **INTC 115 became the subject of a reference to DRP and an 80.15 instruction (on 25/8/09).** This had the effect of stopping the works late Feb. 2009, until re-commencement on 14/09/09.

C. **MUDFA / Utilities:** no MUDFA issues impacting on this structure.

D. **Other Issues:**

- (i) **Sub-Contractor Procurement:** Expanded Ltd; LOI as at 21/08/09 to procure & mobilise. Expanded Ltd substructure, superstructure & finishes LOI 11/09/09. Subject to further tie audit. **Delay by Infraco; Infraco culpability.**

- (ii) WPP Process: Substantive WPP's recorded in DAC charts (assumed in place).
- (iii) IDC/IDR process: In place. **No Delay**

E. Construction Periods:

5B Carrick Knowe Bridge - S23					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	12/08/2008	22/10/2008	10.14 wks	22/10/2008	10.14 wks
Finish	21/04/2009	22/06/2010	61.00 wks	22/06/2010	61.00 wks
Cal. Duration	36.14 wks	87.00 wks	50.86 wks	87.00 wks	50.86 wks

Precise start date not clear; Prior information advised 22/10/08; Permit to commence issued 06/11/08. As-built required.

- (i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **10 weeks** as does the IM mitigated programme. Primary causes of delay to start as follows:-
 - A. IFC process: Initial IFC **was on time** (planned **11/07/08**; actual **11/07/08**).
 - B. INTC's: no impact on commencement
 - C. MUDFA / Utilities: no impact on commencement
 - D. Other:
 - **Sub-Contractor procurement**: Expanded Ltd LOI as at 21/08/09 to procure & mobilise. Expanded Ltd substructure, superstructure & finishes LOI 11/09/09. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
 - **WPP Process**: Substantive WPP's recorded in DAC charts assumed in place..
 - **IDC/IDR process**: In place. **No Delay.**
 - **Infraco delay in commencement**: to date no information as to cause of delayed start has been obtained. tie PM personnel believe this was merely slow reaction to workforce availability by Infraco. **10 week delay; Delay by Infraco. Infraco culpability.**
- (ii) Delay to Finish: Issue 3 programme shows a circa **51 week** increase in duration over the timescale in Rev.1 programme (as does the IM mitigated view of Issue 3). That increase in duration includes a period of **28 weeks when work on this structure stopped** pending resolution of INTC 115. Delayed from 27/02/09 to 14/09/09). Split culpability for that period. **Infraco (delayed Estimate) 10 weeks (27/2/09 to 07/05/09). tie (delayed 80.15 instruction) 18 weeks (08/05/09 to 14/09/09). Re-mobilisation period split at present 1 week per party.**

F. **tie position on area availability**: Work face available as originally programmed.

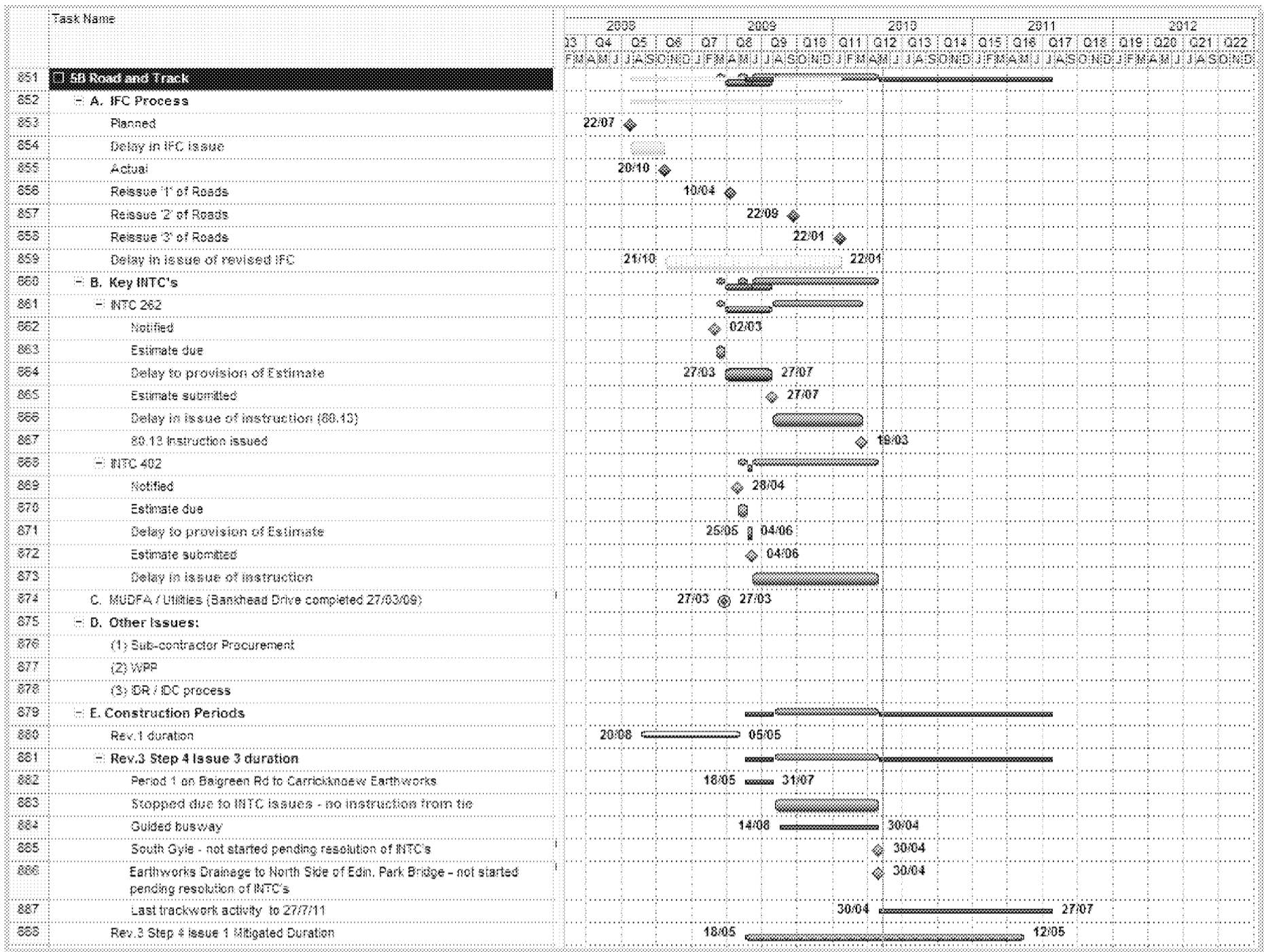
G. Conclusion:

- (i) **'Significant' issues/events**: In our opinion the main delaying factors appear to be (a) late start by Infraco (circa **10 week** delay) (b) the INTC process associated with INTC 115 (**28 week** delay to progress); and (c) an unexplained increase in structure duration (**23 weeks**) some of which may relate to the extensive list of INTC's applicable to this structure.
- (ii) **Concurrent issues**: In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area.
- (iii) **Considerations of dominance**: see (i) above.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	In culpability					Infraco culpability					Poss. SDS culpability			
	From	To	Days	Weeks	Cause	From	To	Days	Weeks	Cause	From	To	Days	Weeks
1. LOWER LIMIT														
			0	-	Lack of reaction to IFC	12/08/08	22/10/08	71	10.14	No delay	11/07/08	11/07/08	0	-
			0	-	Less INTC Est. Period			-18	- 2.57				0	-
									7.57					-
2. UPPER LIMIT														
INTC 115 estimate period			18	2.57	Lack of reaction to IFC	12/08/08	22/10/08	71	10.14				0	-
			0	-				0	-				0	-
				2.57					10.14					-
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +51 wks	IM Mitigated Period		Infraco Rev.3 Period		IM mitigated period +51wks: this is likely to be initial slow reaction to workforce availability, consequent dilatory progress by Infraco and BDD/IFC issues. Works stopped works pending resolution of INTC 115. Culpability mainly Infraco.. Infraco Rev.3 period +51 wks: On the basis that Infraco can mitigate to 51 wks as per (both) it's and IM's analysis then Infraco lower limit restricted to anything in excess of 11 wks. tie liability remains at lower limit of 17 wks if Infraco responsible for all increased durations. (Breakdown detailed opposite).									
Infraco Rev.3 Period = +51 wks	In	Infraco	IFC	Infraco										
Lower Limit	18.00	11.00	18.00	11.00										
Upper Limit	40.00	33.00	40.00	33.00										
Observations on Actual Progress		In	Infraco											
Analysis of ongoing progress, considered in 'Delay to Finish' periods detailed above.		-18.00	-11.00											
*Split culpability as follows:- Infraco initial delay to start of 10 wks, subsequent delay to provision of estimate also 10 wks. Tie 18 wks to issue 80.15 instruction. Period for mobilisation split between tie / Infraco 1 wk each. (Breakdown detailed in CKB summary narrative).														

5B Road & Track



A. **IFC Process:** Initial IFC was 13 weeks late (planned 22/07/08; actual 20/10/08). This initial IFC appeared to have addressed Trackworks. Subsequent IFC's however, were necessary to incorporate Roads drawing updates. The first Roads reissue took place on 10/04/09 followed by further reissues on 22/09/09 & 22/01/10 respectively. We are advised that delays to the initial IFC can be attributed to poor design by SDS. DS advises that "Delay in production follows poor SDS design – original design 9 days late not complete; nevertheless CEC reviewed and granted TAA subject to comments 16 days late. SDS then took 2 months incorporating some comments – further issues necessary to close other legitimate CEC comments". With respect to delays attaching to the Roads reissues there is no information presently available to inform culpability for delay to the foregoing (see Preamble). It is notable however, that as both Trackform and Roads (normally) require the further integration of Infraco design there is a responsibility on Infraco to provide information to SDS for incorporation on time. (It is not known if this did happen). Potential reasons for the late issue of IFC's to this area include:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
 - A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
 - A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
 - A tie Change;
 - A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
 - A requirement of CEC for which tie will bear responsibility;
- Delay by SDS, SDS /tie or Infraco?**

B. **Key INTC's:** From information provided it appears that the Infraco issued 2 no. INTC's in relation to this structure; **INTC's 262 & 402**. We are further advised that both **INTC 262 (IFC Drawing Changes for Section 5B Track Drainage)** and **INTC 402 (Addition of Starter and Capping Layers in Section 5B)** appear to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 262:** issued by Infraco on 02/03/09. Estimate should have been submitted on or around 26/03/09. Estimate was submitted by Infraco on 27/07/09. This is 17weeks later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 262.**
- (ii) **INTC 402:** issued by Infraco on 28/04/09. Estimate should have been submitted on or around 22/05/09. Estimate was submitted by Infraco on 04/06/09. This is 2 weeks later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 262**

Both estimates have been the subject of much debate since receipt of estimates attaching. As at 30/04/10 agreement has yet to be reached on both issues. It is notable that tie issued an 80.13 instruction on INTC 262 on 19/03/10. **tie liability for delay in issuing 80.13 instruction.** INTC 402 has yet to be instructed as at 30/04/10.

C. **MUDFA / Utilities:** We are advised that works on Bankhead Drive were dependant on the completion of MUDFA / Utility works in that area. These works were completed on **27/03/09**. Given issues attaching to the INTC process completion of these works had little effect on progress. **Delay by tie.**

D. **Other Issues:**

- (v) **Sub-Contractor Procurement:** Understood that Crummock are contracted to carry out some work at the Busgate in Section 5B (see tie audit and Infraco Period Report No.3-1 report to 24/04/10). Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
- (vi) **WPP Process:** Assumed WPP in place given the fact that works have commenced. **No Delay.**
- (vii) **IDC/IDR process:** IDR was in place as at 26/11/09.

E. **Construction Periods:**

5B Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	20/08/2008	18/05/2009	38.71 wks	18/05/2009	38.71 wks
Finish	05/05/2009	27/07/2011	116.14 wks	12/05/2011	105.29 wks
Cal. Duration	37.00 wks	114.43 wks	77.43 wks	103.57 wks	66.57 wks

(i) **Delay to Start:** The table above refers to various programme dates. Issue 3 programme shows a delay to start of **39 weeks**; the IM mitigated programme also shows a delay to start of **39 weeks**. Primary causes of delay to start as follows:-

A. **IFC process:** The initial IFC appeared to address Trackworks. Subsequent IFC's however, were necessary to incorporate Roads drawing updates. The first Roads reissue took place on 10/04/09 followed by further reissues on 22/09/09 & 22/01/10 respectively. We are advised that delays to the initial IFC can be attributed to poor design by SDS. With respect to delays attaching to the Roads reissues there is no information presently available to inform culpability. **Delay by SDS, SDS /tie or Infraco?**

B. **Key INTC's:**

INTC 262: issued by Infraco on **02/03/09** (19 weeks after first IFC issue). Estimate should have been submitted on or around **26/03/09**. Estimate was submitted by Infraco on **27/07/09**. This is **17 weeks** later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 262.**

INTC 402: issued by Infraco on **28/04/09** (27 weeks after first IFC issue). Estimate should have been submitted on or around **22/05/09**. Estimate was submitted by Infraco on **04/06/09**. This is **2 weeks** later than permitted by the Contract. **Delay by Infraco. Infraco culpability for time taken to produce Estimate for INTC 262**

Both estimates have been the subject of much debate since receipt of estimates attaching. As at 30/04/10 agreement has yet to be reached on both issues. It is notable that tie issued an 80.13 instruction on INTC 262 on 19/03/10 (delay of **34 weeks**). **tie liability for delay in issuing 80.13 instruction.** INTC 402 has yet to be instructed (a current delay of **47 weeks**).

C. **MUDFA / Utilities:** We are advised that works on Bankhead Drive were dependant on the completion of MUDFA / Utility works in that area. These works were completed on 27/03/09. Given issues attaching to the INTC process completion of these works had little effect on progress. **Delay by tie.**

F. **Other:**

- **Sub-Contractor procurement:** Understood that Crummock are contracted to carry out some work at the Busgate in Section 5B. see tie audit and Infraco Period Report No.3-1 report to 24/04/10. Subject to further tie audit. **Delay by Infraco. Infraco culpability**
- **WPP process:** Permit to commence work has been received. **No Delay.**
- **WPP Process:** Assumed WPP in place given the fact that works have commenced. **No Delay.**
- **IDC/IDR process:** IDR was in place as at 26/11/09. **No Delay.**

(ii) **Delay to Finish:** Issue 3 programme shows an increase in overall duration of **circa 77 weeks** over the timescale in Rev.1 programme. IM mitigated view of Issue 3 also shows an increase of **67 weeks** in duration compared with the Rev.1 programme. It appears that those increases include **39 weeks** of delay due to lack of INTC instruction (01/08/09 to 30/04/10).

Having regard to Infraco's 'Rev3 Issue 3' programme it is notable that activities which were previously running concurrently are now much less so. All separate activity durations are longer – due to 'Additional Earthworks and Drainage activities'. Previous advice confirmed that additional duration required for drainage and earthworks was necessary. TC confirms that view still holds. The extent to which durations should be extended requires further information from Infraco (the current increased durations are not substantiated).

F. **tie position on area availability:**

- (i) Observations on area availability, identifies four potential workfaces attaching to 5B Road & Track. They are as follows:-
 - a. **Balgreen Road to Carrick Knowe Earthworks:** commencement is dictated by completion of substantive works to Carrick Knowe Bridge to allow commencement of Balgreen Road to Carrick Knowe Earthworks. This is a position articulated by Infraco (to maintain access to CKB) but disputed by tie. Works started on 18/05/09 and stopped as at 31/07/09 pending resolution of **INTC's 262 & 402**. It is unlikely that Infraco will conclude that works undertaken were in effect 'meaningful'.
 - b. **Guided Busway from Carrick Knowe Bridge to South Gyle access Bridge:** the construction of new bus stops / bus lanes designed to take bus route off the line of the proposed Guided Busway. This work was completed prior to Infraco to commence of the works as at 14/08/09 on the Guided Busway from Carrick Knowe Bridge to South Gyle Access Bridge. This work is continuing;
 - c. **South Gyle Access Bridge to Edinburgh Park (along Bankhead Drive):** commencement dictated by resolution of **INTC's 262 & 402**. This was subject of an 80.13 instruction on 19/03/10. Works yet to commence
 - d. **Earthworks Drainage to North Side of Edinburgh Park Bridge:** commencement dictated by resolution of **INTC's 262 & 402**. This was subject of an 80.13 instruction on 19/03/10. Works yet to commence.

G. **Conclusion:**

(i) **'Significant' issues/events:** In our opinion the main delaying factor on 5B Road & Track is the resolution of **INTC 262 (IFC Drawing Changes for Section 5B Track Drainage) & INTC 402 (Addition of Starter and Capping Layers in Section 5B)**. See chart and 'B' above. Split liability (majority

resting with tie due to lack of instruction). In addition, increased earthworks and drainage workscope will result in increased activity durations (the extent of which Infracore has yet to demonstrate).

- (ii) **Concurrent issues:** In our opinion the other event detailed above i.e. MUDFA / Utilities has less of a bearing on the late commencement of this area. Whilst in isolation completion on this issue may have been a hindrance to commencement, its significance is considerably diminished by the fact that Infracore did commence. Incomplete MUDFA / Utilities issues will be more significant to the successful completion of the works in this area.
- (iii) **Considerations of dominance:** Delays attaching to agreement on **INTC 262 (IFC Drawing Changes for Section 5B Track Drainage) & INTC 402 (Addition of Starter and Capping Layers in Section 5B)** have clearly affected (meaningful) progress in this area. The delays have in effect three constituent parts (1) Infracore's delay in issuing an INTC from the IFC issue date (2) the protracted timeframe taken by Infracore to provide a compliant estimate following the issue of the INTC; and (3) the time taken by tie to issue an 80.13 instruction following receipt of the estimate. Works are currently progressing along the Guided Busway. However, no progress has been made on either Bankhead Drive or to the North Side of Edinburgh Park Bridge. It is also notable that following initial progress at Balgreen Road to Carrick Knowe, works stopped pending resolution of INTC's 262 & 402. This demonstrates that delays attaching to agreement on **INTC 262 (IFC Drawing Changes for Section 5B Track Drainage) & INTC 402 (Addition of Starter and Capping Layers in Section 5B)** have clearly affected (meaningful) progress in this area.

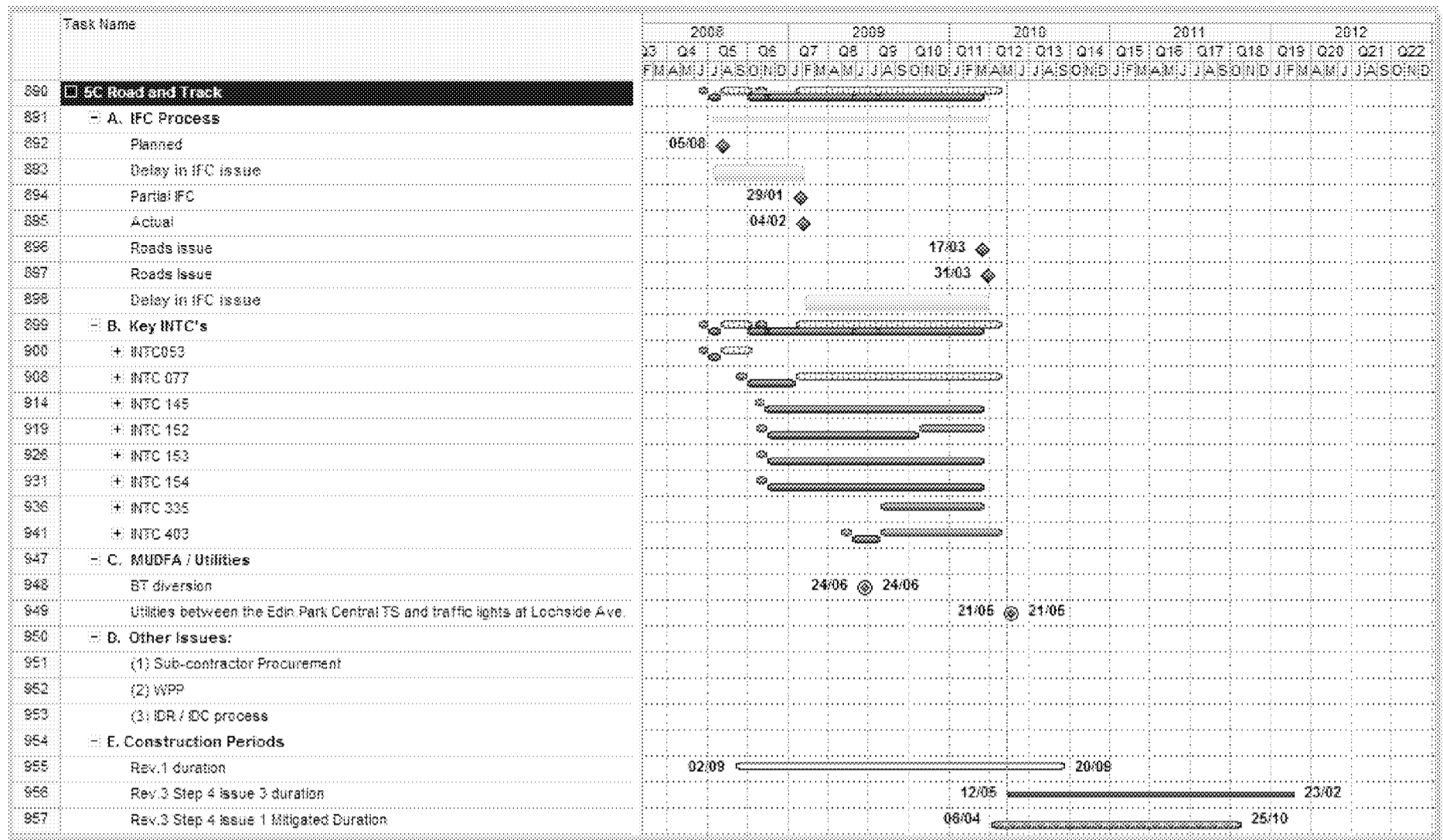
As such, in our opinion the delay to the INTC process in 5B Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section. **Note:** as yet 30/04/10 INTC 402 had not been instructed by tie under an 80.15 instruction (i.e. delaying commencement).

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	Tie culpability				Cause	Infracore culpability				Cause	Poss. SDS culpability			
	From	to	Days	Weeks		From	to	Days	Weeks		From	to	Days	Weeks
1. LOWER LIMIT														
			0	-	Lack of Infracore reaction to workforce availability after	10/04/09	18/05/09	38	5.43	Delay to 1st IFC	20/02/08	20/10/08	61	8.71
			0	-				0	-				0	-
			0	-				0	-				0	-
									5.43					8.71
2. UPPER LIMIT														
INTC 262 estimate period	02/03/09	27/03/09	25	3.57	Delay to commencement of Balgreen Road to CKB	20/08/08	18/05/09	271	38.71	Delay to last IFC pre-start	20/08/08	10/04/09	253	33.29
INTC 402 estimate period	26/04/09	18/05/09	20	2.86				0	-				0	-
Period to INTC notice	20/08/08	02/03/09	194	27.71				0	-				0	-
				34.14					38.71					33.29
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = +67 wks	IM Mitigated Period			Infracore Rev.3 Period			IM mitigated period +67wks: this is likely to be INTC issues ranging from delays to provision of estimates (by Infracore) through to delays in issue of instructions thereafter (by tie). Additional works attaching to these INTC's also impact in the form of increased earthworks / drainage. Infracore have also introduced different working sequences. Culpability not clear; range of possibilities - upper / lower limits recognise extremes of liability. Infracore Rev.3 period +77 wks: On the basis that Infracore can mitigate to 67 wks as per IM's analysis then Infracore lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of *39 wks (for details on this 39 wk period - see chart opposite) <i>if</i> Infracore responsible for all increased durations. (Clarification required on legal position regarding tie delay to instruct).							
Infracore Rev.3 Period = +77 wks	tie	mitigated		tie	mitigated									
Lower Limit	39.00	0.00		39.00	10.00									
Upper Limit	67.00	38.00		67.00	32.00									
Observations on Actual Progress	tie	mitigated												
Analysis of ongoing progress, considered in 'Delay to Finish' periods detailed above.	-39.00													

*Partial tie culpability attaching to INTC 402 ref. Balgreen Rd to CKB. Period 31/7/09 to 30/04/10

5C Road & Track



A. **IFC Process:** Initial IFC was 26 weeks late (planned 05/08/08; actual 04/02/09). Although this is noted as being the first IFC date DS advises that there was a partial IFC issued on 29/01/09 addressing Track Vertical Alignment in isolation. Subsequent IFC's however, were necessary to incorporate Roads drawing updates. The first Roads reissue took place on 17/03/10 followed by a further reissue on 31/03/10. With respect to delays attaching to the Roads reissues there is no information presently available to inform culpability for delay to the foregoing (see Preamble). It is notable however, that as both Trackform and Roads (normally) require the further integration of Infraco design there is a responsibility on Infraco to provide information to SDS for incorporation on time. (It is not known if this did happen). DS also advises that further IFC's are required for tie instructed change to adoption lines at Lochside Avenue. This is a matter for which tie is responsible. Potential reasons for the late issue of IFC's to this area include:-

- Late issue by SDS (in its simplest form a CE under 65(t) – which may in turn permit the application of clause 65.12.2);
- A material breach by SDS (again in its simplest form a CE under 65(u) – which may in turn permit the application of clause 65.13);
- A failure of Infraco to provide the Infraco Design to SDS in accordance with the Consents Programme and Schedule. Part 14 (clause 19.19 refers);
- A tie Change;
- A failure of Infraco in respect of its management of SDS or another breach by Infraco (e.g. failure to properly manage the CEC interface);
- A requirement of CEC for which tie will bear responsibility;

Delay by SDS, SDS /tie or Infraco?

B. **Key INTC's:** From information provided it appears that the Infraco issued 8 no. INTC in relation to this structure; INTC's 053, 077, 145, 152, 153, 154, 335 & 403, We are further advised that the aforementioned INTC's are likely to have materially / critically affected Infraco's ability to commence works in accordance with the Rev 01 programme. Details are as follows:-

- (i) **INTC 053:** issued by Infraco on 06/06/08 (in advance of IFC issue). Estimate should have been submitted on or around 02/07/08. Estimate was received on 28/07/08; 26 days later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 053. Revised Estimate issued 08/10/08. TCO issued 10/10/08.
- (ii) **INTC 077:** issued by Infraco on 29/08/08 (in advance of IFC issue). Estimate should have been submitted on or around 24/09/08. Estimate was received on 16/01/09, 114 days later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 077; **tie will be culpable for the period to instruction.**
- (iii) **INTC 145:** issued by Infraco on 13/10/08 (in advance of IFC issue). Estimate should have been submitted on or around 06/11/08. As at 30/04/10, 540 days later, Infraco has yet to provide an estimate. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 145. No instruction issued by tie – **tie will be culpable for the period to instruction.**
- (iv) **INTC 152:** issued by Infraco on 16/10/08 (in advance of IFC issue). Estimate should have been submitted on or around 11/11/08. Estimate was received on 21/10/09, 344 days later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 152; **tie will be culpable for the period to instruction.**
- (v) **INTC 153:** issued by Infraco on 16/10/08 (in advance of IFC issue). Estimate should have been submitted on or around 11/11/08. As at 30/04/10, 535 days later, Infraco has yet to submit an estimate. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 153; **tie will be culpable for the period to instruction.**
- (vi) **INTC 154:** issued by Infraco on 16/10/08 (in advance of IFC issue). Estimate should have been submitted on or around 11/11/08. As at 30/04/10, 535 days later, Infraco has yet to submit an estimate. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 154; **tie will be culpable for the period to instruction.**
- (vii) **INTC 335:** issued by Infraco on 27/07/09 (173 days after IFC issue). Estimate should have been submitted on or around 20/08/09. Estimate was received on 27/07/09, on time. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 335; **tie will be culpable for the period to instruction.**

(viii) INTC 403: issued by Infraco on **28/04/09** (83 days after IFC issue). Estimate should have been submitted on or around **22/05/09**. Estimate was received on **27/07/09**, **66 days** later than required. **Delay by Infraco; Infraco culpability** for time taken to produce Estimate for INTC 403; **tie will be culpable for the period to instruction**.

INTC's 145, 152, 153, 154 & 335 were the subject of an 80.13 Instruction issued by tie on 19/03/10. Infraco Period Report No 3-1, to 24 April 2010 notes "*Trackwork, Earthworks, Drainage Changes from BDDI to IFC have yet to be agreed*". There therefore remains the potential that issues attaching to the foregoing may yet prevent / compromise commencement.

C. **MUDFA / Utilities**: There are two main MUDFA / Utilities issues impacting on this structure; (1) BT diversion carried out under MUDFA (completed **24/06/09**); and (2) private and public utilities between the Edinburgh Park Central TS and the traffic lights at Lochside Avenue (which were transferred to Infraco). tie notes that Infraco took an inordinate amount of time to expedite said issues. This resulted in tie cancelling its order with Infraco and contracting the works separately to Clancy Docwra. Forecast completion on these works is expected on or around **21/05/10**. These issues have clearly prevented / hindered commencement (of certain areas) within this area. Although there is clear **tie culpability** attaching to this issue, **Infraco culpability** exists in regard to its dilatory approach to the provision of INTC's / Estimates for same.

D. **Other Issues**:

- (i) Sub-Contractor Procurement: Infraco Period Report No.3-1 report to 24/04/10 notes that Infraco intends to sublet the remaining structures on Sections 5A, B and C to Expanded Ltd. We have not yet been advised that works on 5C in particular will extend to 5C Road & Track. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
- (ii) WPP Process: No information available.
- (iii) IDC/IDR process: Not yet in place. It is not clear whether Infraco will be permitted by tie to commence without this paperwork in place [**Discuss**] **Delay by Infraco; Infraco culpability.**

E. **Construction Periods**:

5C Road and Track					
	Rev.1	Rev.3 Issue 3	Delay	IM Mitigated Rev.3	Delay
Start	02/09/2008	12/05/2010	88.14 wks	06/04/2010	83.00 wks
Finish	20/09/2010	23/02/2012	74.43 wks	25/10/2011	57.14 wks
Cal. Duration	107.00 wks	93.29 wks	-13.71 wks	81.14 wks	-25.86 wks

(i) Delay to Start: The table above refers to various programme dates. Issue 3 programme shows a delay to start of **88 weeks**; the IM mitigated programme also shows a delay to start of **83 weeks** (but that was based on Issue 1 not Issue 3). Actual delay to start will be longer than above due to INTC resolution process. Primary causes of delay to start as follows:-

- A. IFC process: Initial IFC was **26 weeks late** (planned **05/08/08**; actual **04/02/09**). Although this is noted as being the first IFC date DS advises that there was a partial IFC issued on **29/01/09** addressing Track Vertical Alignment in isolation. Subsequent IFC's however, were necessary to incorporate Roads drawing updates. The first Roads reissue took place on **17/03/10** followed by a further reissue on **31/03/10**. With respect to delays attaching to the above there is no information presently available to inform culpability for delay to the foregoing (see Preamble). **Delay by SDS, SDS /tie or Infraco?**
- B. INTC's 053, 077, 145, 152, 153, 154, 335 & 403: Delays by Infraco in issue of INTC's and subsequent provision of estimates. **Delay by Infraco; Infraco culpability.** Delay on INTC's 145, 152, 153, 154 & 335 up to 19/03/10 when tie issued clause 80.13 instruction. **tie culpability for late instruction on INTC's.**
- C. MUDFA / Utilities: There are two main MUDFA / Utilities issues impacting on this structure; (1) BT diversion carried out under MUDFA (completed 24/06/09); and (2) private and public utilities between the Edinburgh Park Central TS and the traffic lights at Lochside Avenue (which were transferred to Infraco). tie notes that Infraco took an inordinate amount of time to expedite said issues. This resulted in tie cancelling its order with Infraco and contracting the works separately to Clancy Docwra. Forecast completion on these works is expected on or around 21/05/10. These issues have clearly prevented / hindered commencement (of certain areas) within this area. Although there is clear **tie culpability** attaching to this issue, **Infraco culpability** exists in regard to its dilatory approach to the provision of INTC's / Estimates for same.

D. Other:

- **Sub-Contractor procurement**: Infraco Period Report No.3-1 report to 24/04/10 notes that Infraco intends to sublet the remaining structures on Sections 5A, B and C to Expanded Ltd. We have not yet been advised that works on 5C in particular will extend to 5C Road & Track. Subject to further tie audit. **Delay by Infraco. Infraco culpability.**
 - **WPP Process**: No information available.
 - **IDC/IDR process**: Not yet in place. **Delay by Infraco. Infraco culpability**
- (ii) Delay to Finish: Issue 3 programme shows a circa 13 week reduction in duration compared with the timescale in Rev.1 programme. IM mitigated view of Issue 3 also shows a reduction but of 26 weeks. Having regard to Infraco's 'Rev3 Issue 3' programme it is notable that there are now three separate activities now running concurrently for longer periods. Notably however, all of these separate activity durations are longer. This appears to result from 'additional' earthworks and drainage activities. TC accepts that some increase in duration should be recognised but might be reduced on further analysis of durations.

F. **tie position on area availability**:

(i) First available date for the meaningful commencement of works to this area is governed by two separate issues; (1) the completion of private and public utility transfers, currently forecast to complete on or around 21/05/10; and (2) BDDI – IFC changes attaching to INTC's 145, 152, 153, 154 & 335 which were the subject of an 80.13 instruction on 19/03/10. Although the latest date for completion on the above attaches to the completion of private and public utility transfers. It is notable that this issue only relates to one section of the 5C Road & Trackworks. tie therefore contends that under its obligation to mitigate Infraco could have made progress in other areas within 5C Road & Track. It was therefore the issue date of 19/03/10 for INTC's 145, 152, 153, 154 & 335 which was the first date at which meaningful commencement could take place.

G. Conclusion:

(i) **‘Significant’ issues/events:** In our opinion there were three main contributory factors, being (a) the IFC process; (b) the INTC process; and (c) late completion of MUDFA/utilities. Taking those events in chronological order:-

The IFC was programmed to be issued on **05/08/08**; this process was not fully complete until the final roads reissue on **31/03/10 (86 weeks late)**. It is not clear if commencement depended on this late reissue or whether earlier IFC’s were sufficiently complete to facilitate progress. Nevertheless delays beyond the issue of the initial IFC on **04/02/09** are matters which may have affected commencement. Responsibility for said delays is uncertain. In our opinion however, the main delaying factor was the protracted INTC process attaching to **145, 152, 153, 154 & 335**. Infraco is culpable for delays in notification and the subsequent provision of estimates attaching to same. tie is likely to be responsible for late instructions attaching. Running concurrently with the above was the late completion of MUDFA / Utility works particularly with respect to the currently incomplete private and public utility transfers. This is a matter for which tie is responsible.

(ii) **Concurrent issues:** In our opinion the other events detailed above (i.e. the sub-contractor procurement timing and the WPP process) have less of a bearing on the late commencement of this area. This is evident from the actual (partial) commencement in October 2008. Whilst in isolation these issues may have been critical to commencement, their significance is considerably diminished by the occurrence of the events in G(i) above. They may however become more significant in the lead up to the area availability in July 2010.

(iii) **Considerations of dominance:** The protracted delay attaching to the IFC in this area is likely to have affected commencement. This however, is subsumed by the delays attaching to the INTC process. These delays have in effect three constituent parts (1) Infraco’s delay in issuing an INTC from the IFC issue date (2) the protracted timeframe taken by Infraco to provide a compliant estimate following the issue of the INTC; and (3) the time taken by tie to issue an 80.13 instruction following receipt of the estimate. This process was not complete until such times as tie issued the 80.13 instruction on 19/03/10.

Although works to private and public utility transfers is not yet complete. We are advised that this issue only relates to one section of the 5C Road & Trackworks. tie therefore contends that under its obligation to mitigate Infraco could have made progress in other areas within 5C Road & Track.

As such, in our opinion the delay to the INTC process in 5C Road & Track is the dominant / critical factor affecting commencement and hence completion in this intermediate section.

H. Current assessment of culpability

A. DELAY TO START: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
	tie culpability					infraco culpability					Poss. SDS culpability			
	From	to	Days	Weeks	Cause	From	to	Days	Weeks	Cause	From	to	Days	Weeks
1. LOWER LIMIT														
INTC process	01/09/08	07/11/08	66	9.43	INTC Est. Delay	25/09/08	15/01/09	113	16.14	Delay to IFC	02/09/08	29/01/09	149	21.29
			0	-				0	-				0	-
			0	-				0	-				0	-
				9.43					16.14					21.29
2. UPPER LIMIT														
INTC 077 to Start	16/01/09	12/05/10	481	68.71	INTC's Est. 145 to 80.13	07/11/08	19/03/10	497	71.00	Delay to IFC	02/09/08	29/01/09	149	21.29
INTC 077 Est. Period	29/08/08	24/09/08	26	3.71	Late start after 80.13	19/03/10	12/05/10	54	7.71				0	-
			0	-				0	-				0	-
				72.43					78.71					21.29
B. DELAY TO FINISH: Current view on culpability [analysis of Lower and Upper Limits of culpability]														
IM Mitigated Period = -26 wks	IM Mitigated Period				Infraco Rev.3 Period				IM mitigated period -26 wks: notwithstanding INTC issues extant, this assessment is considered achievable on the basis of reasonable mitigation on the part of Infraco. Infraco Rev.3 period -14 wks: Infraco clearly accepts the possibility for mitigation. Though currently not to the same extent as noted above. On the basis however that Infraco can mitigate to -14 wks per IM's analysis then Infraco lower limit restricted to anything in excess of 0 wks. tie liability remains at lower limit of -26 wks if Infraco responsible for all increased durations					
Infraco Rev.3 Period = -14 wks	tie	Infraco	tie	Infraco	tie	Infraco	tie	Infraco						
Lower Limit	-26.00	-26.00	-26.00	-14.00	-26.00	-14.00	-26.00	-14.00						
Upper Limit	0.00	0.00	-12.00	0.00	0.00	0.00	0.00	0.00						