



Chapter 14

Programming and Design Delay

Factual Background

14.1 In the course of his work in compiling the Brief, Mr Armstrong introduced an initial strategic programme as early as October 1997, subsequently revised in mid March 1998, and again revised in April,⁷⁸² June and November 1998.⁷⁸³ The Brief contained detailed descriptions of, not only the Master Development Programme, but also a Design Programme, to be agreed in consultation with the Design Team, a Procurement Programme, a Construction and Commissioning Programme and a Cost Control Programme. All of these programmes foresaw practical completion in late June 2001. They were devised very much at a strategic level, initially without a site having been selected, and were well developed before the appointment of the Architect in July 1998. They were designed to provide a framework for the Project and Design Teams, and for the Construction Manager. I have no doubt that had he remained in charge, Mr Armstrong would have made every effort to stick to these programmes, or to demand explanations as to why they could not be adhered to.

14.2 By February 1999, as noted elsewhere, accommodation requirements had increased to a gross area (less car parking) of 23,000m² and dramatic increases in circulation space had

⁷⁸² SE/7/179-306 – Draft Building User Brief (April 1998) from Mr William Armstrong, 1 May 1998

⁷⁸³ SE/7/324-325 – Minute from Mr William Armstrong to Mrs Barbara Doig, 25 September 1998

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been sought. In June 1999 the SPCB became the client body and immediately began to raise issues on the design of the Chamber and to seek additional space. By September 1999 the Chamber design had been revised and the overall estimated area had increased to some 27,000m². Construction cost estimates had risen by then to an estimated £115 million or thereby.

- 14.3 November and December 1999 saw a Value Engineering exercise ostensibly designed to achieve economies in the future course of construction, but which in fact functioned as a cost-cutting exercise. Full details have been supplied by DLE.⁷⁸⁴ Stage D – Scheme Design was signed off by the client in June 2000 with overall *estimated* construction costs of £118.8 million, including £11.65 million of Design Risk,⁷⁸⁵ within a total budget of £195 million. At that time there was no finalised cost plan, no final structural solution, and much of the east side of the site acknowledged to be still in the early design stages.
- 14.4 The design process leading up to the sign off of Stage D in June 2000 had taken nearly two years. There was rudimentary compliance with design programming during 1998, as the Architect struggled both internally and with the client to translate the conceptual aspirations which had featured in the competition into the harsh reality of a Scheme Design, achievable at an identifiable price. The requirements of the Brief did not equate with the aspirations of the “new” client after the handover of the Project in June 1999, and a large number of competing demands were made for additional space and different configurations. During 1999, particularly after June, many design changes were required in order to accommodate the expanded requirements of SPCB, and these later included the very substantial revisions to the east side of the site brought about by Snr Miralles’ necessary redesign of the Chamber,⁷⁸⁶ the addition of the MSP Foyer lying to the south of Queensberry House, and the changes to the configuration of the Committee, Press, and Canongate Towers. Additional accommodation was introduced and some of the basement car parking areas were exchanged for basement accommodation and plant rooms.

Programming and the Construction Manager

- 14.5 Bovis was appointed as Construction Manager in January 1999 and with the signature of its contract assumed responsibility for master programming for the design, the procurement and the management of the construction of the Project.⁷⁸⁷

⁷⁸⁴ DL/4/001-054 – DLE Value Management Papers, 1999

⁷⁸⁵ CB/2/297 – Minutes of the SPCB Meeting of 20 June 2000

⁷⁸⁶ In part to accommodate the client’s requirements for disabled access

⁷⁸⁷ DL/9/019-069 - Memorandum of Agreement between the SPCB and Bovis, Schedule 2, Paras 1.15, 1.16, 1.17 and 1.18

- 14.6 The first master programme was issued in January 1999 (Rev 1 series) with a completion date of July 2001. By May 1999 reprogramming had brought the potential completion date to January 2002, but alongside that an accelerated programme was proposed, for completion by September 2001. The latter programme was in turn initially predicated on design being completed and Stage D achieved by May 1999. That did not happen, and the Stage D review process continued, as we have seen, until June 2000. The Inquiry has seen the minutes of the fortnightly Construction Manager's meetings. By issuing reports with the same frequency, my view is that Bovis believed that it was keeping the Design Team and the Project Team appropriately informed as to the likely programming consequences of the design changes as they occurred.
- 14.7 By May 2000 Bovis had issued comprehensive design, procurement and construction programmes for the MSP building, Queensberry House and the east part of the campus. These programmes contained very little "float" or allowance for overruns, and incorporated a number of assumptions on the amount of lead-in time which was required. Self evidently, the success of these programmes was dependent not only upon the delivery of completed designs to the dates required in the Design Release Schedule, itself incorporated into the larger Tender Event Schedule, but also upon the timeous completion of the tendering and contractor-selection process, and contractor performance.
- 14.8 Alongside the delivery of designs, the Architect required to make available the drawings for each trade package, so that tendering could proceed as it was planned to do. This necessitated production of drawings to Stage G – Bills of Quantities or Stage H – Tender Action. Bovis was an adviser, not a contractor, and was subjected throughout to significant time pressure by the client. By the time the design Stage D was signed off on 19 June 2000, the design of some packages had reached the much later tender Stage J – Project Planning, but the majority of the drawing information was at Stage C or D only. It is of the nature of construction management that design and construction would be staggered in this way. As a matter of contract, it was for the Construction Manager to 'manage' the interaction of those steps, so that the design process did not find itself significantly out of step with the programming, and *vice-versa*. The Construction Manager is necessarily dependent on the actions and co-operation of others, and in particular the Architect. Conversion of Stage D material into drawings suitable for incorporation into a construction programme comprising between 60 and 70 trade packages is a very significant task for any architect, both in terms of the production of design information and in terms of management of the subsequent tenders and in programming the work.

14.9 The timescales were very short; the amount of design work was very significant; the co-ordination amongst the designers of the building and both engineers was highly complex, and where trade contractors' design was also required, the construction and design timeframes were bound to be stretched to their very limits. In theory, contractor-design ought to shorten the design phase, greater resource being applied to the design process. In practice, the dissemination of design responsibility for the more complex areas of the building meant that time scales were lengthened, as designs by trade contractors had to be approved (and were often rejected) by the Architect before being submitted for approval to the Project Team. Management of all of these variable components was a significant challenge for Bovis. The risk of any deficiencies in that management process fell on the client, and that risk was to programme as well as to cost.

Contractual Responsibilities for Programming

14.10 Bovis' obligations under its contract include:

- Preparation of a strategic development programme; and
- Preparation of a weekly development programme showing all key dates including the package procurement process.⁷⁸⁸

14.11 Bovis has its own management systems for tracking the development of packages. I heard a detailed explanation of the 'Hummingbird' computerised system, which allowed participants in the Project to contribute to the evolution of drawings in a managed way. Overall, Bovis' strategic development programmes are divided by the key elements of the Project, each of which has a detailed design procurement and construction programme. Within the Master Programme trade package tender programmes are then evolved, each having its detailed construction timetable. All of this information is demonstrated in tabular form in the Tender Event Schedule, and the detailed programmes which I have seen. This information has been freely supplied by Bovis.

14.12 I am aware that Mr Steve Briggs, commissioned by the Project Team in early 2002, criticised Bovis for failing to utilise detailed critical path analysis techniques in the preparation of all of its programmes. His report⁷⁸⁹ concluded that there was an absence of critical path analysis and "logic links". The report criticised Bovis for failing "to make any significant commitment to programming".⁷⁹⁰ Mr Briggs' analysis is a critical review, going to fundamentals such as the use of software, alleging "over-simplicity" and even that the "existing development programme

⁷⁸⁸ DL/9/019-069 - Memorandum of Agreement between SPCB and Bovis, Schedule 2, Paras 1.16 *et seq*

⁷⁸⁹ CB/4/418-439 - Holyrood Project: Programme Review from Mr Steve Briggs, February 2002

⁷⁹⁰ CB/4/434 *ibid*, Para 9.1

is of little use...". He criticised the method of measuring progress, and concluded that "the key impediment to completion was the ongoing late release of design information".⁷⁹¹

- 14.13 In my view Mr Briggs' highly critical report is to some extent anomalous; although the actual flow of design information was criticised, that criticism was made by Mr Briggs against a series of Bovis programmes which were themselves severely impugned by him, and his report did not, as it appears to me, contain any analysis or review of the design information flow requirements themselves. He called for a review of the system by which design information is programmed. I am bound to say that I am somewhat sceptical of Mr Briggs' conclusion⁷⁹² which identifies the "late release of design information" as a "key impediment" to the timely achievement of Programme 5B. That programme was itself described by Mr Briggs as an "... (un) acceptable programme for the completion of the works".⁷⁹³ In other words, it was curious of him to criticise the Architect for the late delivery of design information if the very programme against which that delivery requirement was being measured was itself unrealistic. However, Mr Briggs was a professionally qualified observer, and he appears to have covered all the salient details, including the Construction Management Agreement.
- 14.14 Trade Package 2605 (Assembly Frame) was identified by Mr Briggs as the culprit package, and I know from the evidence of Mr Stewart and Mr Lewis that the steel work and structural solution to the Assembly Frame taxed the finest engineering designers in the world, before a solution was achieved. All that being said, I have also to have regard to the very detailed information flow requirements of Bovis, which were clearly articulated at a much earlier date and set out in unmistakable terms,⁷⁹⁴ along with the proposed meeting dates to review progress.⁷⁹⁵ EMBT/RMJM Ltd signed up to Series 4, revision 4B⁷⁹⁶ without qualification, but very detailed letters such as those sent on 14 November 2001⁷⁹⁷ and 1 March 2002⁷⁹⁸ make it abundantly clear that the Architect was (in the eyes of Bovis) significantly failing to keep up. The second of these letters is an alarming series of detailed complaints, coming as it does from the very experienced Bovis Design Manager, Mr Craig Paterson. I have regard to the fact that TP2605 necessitated no fewer than 1161 Architect's Instructions (AIs). I am satisfied that these were necessary to achieve the final finished product. What I detect is a lack of co-

⁷⁹¹ CB/4/421 *ibid*, Para 1.3.6

⁷⁹² CB/4/439 *ibid*, Para 10.6

⁷⁹³ CB/4/435 *ibid*, Para 9.6

⁷⁹⁴ BV/1/781-795 – Bovis Programme Review Paper, Key Procurement Dates and Dates of Pre-tender and Construction Meetings

⁷⁹⁵ *ibid*

⁷⁹⁶ BV/1/798 – Letter from Mr John Kinsley to Mr Alan Mack, 23 March 2001

⁷⁹⁷ BV/1/799-804 – Letter from Mr Eddie McGibbon to Mr John Kinsley, 14 November 2001

⁷⁹⁸ BV/1/807-810 – Letter from Mr Craig Paterson to Mr John Kinsley, 1 March 2002

ordination and understanding, particularly between EMBT/RMJM Ltd and Bovis, as to the need for and timing of these Als.

- 14.15 Oddly, the Project Team did not pass Mr Briggs' report to Bovis. However, I can safely conclude that the gist of Mr Briggs' remarks was indeed made known to Bovis. Mr Curran said in evidence:

"The report was presented to the Progress Group in February 2002. We then instigated an immediate programme review with Bovis bringing them into the comments that Steve (Mr Briggs) had made trying to get them to embrace and improve upon what was being said here. They recognised a lot of the areas for improvement. They then decided to provide additional planning resources on site. We increased the number of site-based planners from one to three. So, again, this was allowing them to produce better information."⁷⁹⁹

- 14.16 In her evidence, Ms Davidson explained that, while Bovis was aware of its thrust, the report was not actually given to them.⁸⁰⁰ The view was that it had been prepared quickly, that it probably had not identified all "the nuances and subtleties" of what Bovis was doing and that it contained some fairly strong language. She thought the effect of giving it to Bovis would have been that of "throwing a hand grenade into the whole operation." It was considered best that Mr Briggs' expertise should be drawn on by having him work with Bovis, and she thought this proved successful in that, when he reported back in May, substantial progress had been made towards a new programme, Revision 6. As she said:

"A judgment was taken at that time, effectively, about the best way to keep moving things forward and the best way to influence Bovis' programming. We decided to do that through influence rather than through throwing a report on the table and jumping up and down at them. It was a judgment."

She was in no doubt that in retrospect it was the right judgment.

- 14.17 It is a matter of judgment whether that was the correct decision, in light of the evident delays which had occurred up to that point. I am bound to be circumspect in reviewing the decisions of professional people who had an intimate acquaintance with the Project, which had by then developed its own unstoppable momentum, but I am not able to resist the impression that there was a cautious approach by Project Management to this difficult subject, which is itself somewhat wreathed in mystery and jargon. Mr Mack had been consistently bullish in reporting to the HPG about the programmes for the Project, but had repeatedly been shown to be over optimistic. It seems to me that more could have been done to inject realism into the programming effort, so as to take proper and full account of the problems which the Construction Manager acknowledged himself to have been facing, and also to force

⁷⁹⁹ Evidence of Mr Paul Curran on 23 March 2004, Para 394

⁸⁰⁰ Evidence of Ms Sarah Davidson on 31 March 2004, Para 249

recognition of the elevated expectations of the new client body, which had by then adopted and endorsed the layman's approach, namely that despite all the evident difficulties it was entitled to know the likely end date, and the likely areas of cost overrun. These are not unreasonable aspirations for a client, and they should not have been in part defeated by such a degree of unwarranted optimism in the programming of the works.

- 14.18 It was not until 27 March 2002 that Mr Briggs presented himself before the HPG, and he reiterated that design information flow was, in his view, "a recurring theme".⁸⁰¹ Curiously, Mr Mack, who attended the same meeting later, was not asked about Mr Briggs' comments nor shown his report, but the HPG voiced its concerns in private, with Mr Manson stating that he was "extremely doubtful" that completion dates could be met. He was of course correct. By 10 April 2002 Mr Mack's assurances were repeated⁸⁰² subject to the caveat that information flow, i.e. drawings, must be maintained, and that there were no changes to design. Mr Wright asked that the new programme should incorporate an indication of where design information was still outstanding, only to be told by Mr Mack that the "only unknown" was in relation to the specialist glazing.⁸⁰³
- 14.19 Programme revisions from Series 3C (July 2000) to Series 7B (February 2004) are fully set out in Exhibit 7⁸⁰⁴ of the Auditor General's Report of June 2004. The risk workshops carried out in July 2000 and November 2000 identified potential risks totalling some £51.51 million.⁸⁰⁵ Of that figure, a high percentage was for items which were categorised as "highly likely" or "fairly likely" to occur, and to have a potential impact on programme. I observe the contrast between the relatively precise result of this technical risk review, and the constantly ambitious nature of Bovis' reporting of programming.

Delays in the Programme

- 14.20 I have no doubt that much difficulty was experienced in achieving a flow of design information consistent with the optimistic programmes prepared by Bovis. I am also in no doubt that the design flow was from time to time a source of serious frustration. However, I am far from clear that "design flow" as described to me by Mr Mack, Mr Curran and Ms Davidson was achieved any less quickly than it could ever have been, given the complexity of the designs with which all concerned had to grapple. In consideration of this problem, the tension among time, cost and quality is very well illustrated, in that it is plain that if the time criterion is set too tightly, it is likely to follow that the design flow will fail to meet expectations. In addition if as a result of

⁸⁰¹ CB/4/470-476 – Minutes of HPG Meeting of 27 March 2002, Para 22

⁸⁰² CB/4/479-485 - Minutes of HPG Meeting of 10 April 2002, Para 20

⁸⁰³ CB/4/479-485 - Minutes of HPG Meeting of 10 April 2002, Para 21

⁸⁰⁴ Auditor General for Scotland's Report of June 2004, Exhibit 7, Page 19

⁸⁰⁵ DL/2/074-084 – Draft Risk Review Analysis from Mr McAndie to Dr Gibbons, 2 November 2000

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time parameters having been set too tightly, construction cannot proceed in accordance with the programme, then there will clearly be a cost penalty, as has been the case.

- 14.21 Borrowing again from the Auditor General's June 2004 report, Exhibit 18 ⁸⁰⁶ shows the slippage in completion of the main parts of the building between September 2000 and the present date. He concluded that the average total delay across the Project was 20 months in a 41 month period. In the result the building has been completed, so far as to allow occupation, in August 2004.
- 14.22 According to Bovis, the key document against which success or failure of the programming effort should be measured is the Tender Event Schedule.⁸⁰⁷ This shows that the main areas of critical delay were TP2205 (Assembly substructure concrete), TP3320 (Foyer frame and glazing), TP3350 (Specialist glazing), TP3525 (Assembly Windows) and TP 2605 (Assembly Frame). A number of these and other packages were awarded with Provisional Sums, significant Trade Contractor design components, or suffered significant variation after the tenders were awarded. Even if tender-issue dates were achieved, the duration of much of the work was prolonged. Design finalisation could not happen if the programme did not allow sufficient time for that design work to be carried out.
- 14.23 By way of example, TP2605 (Assembly Frame) was originally programmed from November 2000 to December 2001, but in fact stretched from January 2001 until March 2003, and underwent 1800 variations. A significant number of these variations occurred after the original completion date of December 2001. TP3320 (Assembly Foyer Frame and Glazing Stage 2) was originally programmed between November 2001 and April 2002, and suffered 117 variations, taking from August 2001 until April 2004. TP3350 (Assembly Specialist Glazing Stage 1), TP3525 (Assembly Windows) and TP3645 (Assembly Roofing (Stage 2) suffered comparable overruns.⁸⁰⁸
- 14.24 In coming to a view about why the Project did not meet its estimated completion dates, I have regard to a number of matters. It is well understood that Stage D – Scheme Design in June 2000 was not an entirely settled design. Mr Stewart made the point forcibly⁸⁰⁹ that while the extent of client-generated changes may have been reasonable, it was the timing of those changes which caused difficulties with the programme. Architectural instructions given in the course of construction, to maintain quality and achieve design harmony, are properly described as 'design development', but there are many other reasons for the issue of AIs, and on TP2605

⁸⁰⁶ Auditor General for Scotland's Report of June 2004, Page 38

⁸⁰⁷ BV/1/040-044 – Bovis Progress Report No 57 – Tender Event Schedule, 14 July 2003

⁸⁰⁸ Auditor General for Scotland's Report of June 2004, Pages 78 to 89

⁸⁰⁹ WS/42/001-032 – Mr Brian Stewart's First Witness Statement, March 2004, Para 67

at least 16% had no time or cost implications. 25% were necessitated by the re-allocation of other work into TP2605, and 8% were to take account of changes to work already carried out. Mr Stewart contended⁸¹⁰ that client-driven design change continued throughout the Project, and provided examples, which I accept.⁸¹¹ In addition, part of the Bovis material⁸¹² lists a very large number of Architect-inspired changes during 2003, right across the Project. I can assume that all of these had client approval, and they ranged from the major, with significant cost implications, to the very minor and those with no cost consequences.

14.25 Differentiating between a 'client-driven change' and a change initiated by the Architect and approved by the client in order to achieve design ambition is beyond the scope of this Inquiry, but in my judgment it does not very much matter. Of 178 Change Request Forms submitted by the client since 29 September 1999, I have been told that 116 were approved at a total cost of only some £600,000.⁸¹³ These change requests were costed using the CRFs, but I understand that that costing took no account of any consequential effect on programme, or trade package interfaces. After the approval of Stage D in June 2000, the amount of client-generated change was said to have been relatively minimal. For the client to seek to take credit for 'only' 178 CRFs after Stage D may not disclose the entire picture. When the client seeks to compare this number favourably with the number of Architect-generated changes, and then approves these as they come forward, I have to ask whether it has been fully recognised that a building of this complexity procured using construction management is likely to generate a higher than normal requirement for design changes and consequential Architect's Instructions.

14.26 It is apparent to me from the evidence that the expected design flow failed to keep pace with the programme demanded by the client and proposed by Bovis. Was that failure the sole responsibility of the Architect? Some was, and arose in my view from the indifferent co-ordination and communication between Edinburgh and Barcelona, which was uneven, working well at times but poorly at others. However, the mismatch between design flow and programmed expectations leads me to ask who was really in charge following Stage D in June 2000? Snr Miralles' death in July was bound to have had an adverse effect on the work. It will not do for the client (in whatever manifestation) to simply blame the professional teams, nor for the professional team members to blame one another. I am of the view that it ought to have been more completely understood by the client that high quality design work takes time, and that the programme itself was unrealistic given the complexities of the design especially after Mr Briggs' report in February 2002. Bovis too should have understood that. By the same

⁸¹⁰ *ibid*, Para 63 *et seq*

⁸¹¹ *ibid*, Para 66

⁸¹² BV/1/562 - The Consultant Submission Record or 'CSR Summary'

⁸¹³ WS/36/001-035 – Mr Paul Curran's Witness Statement, 17 February 2004, Para 46

token, the Architect should not have signed up to programmes which it could not honour and ought, in my view, to have been more vociferous in relation to the time actually needed to achieve designs which could be programmed accurately. The programme was propelled by the client's obsession with early completion. Irreconcilable objectives were being set. Donald Dewar, the SPCB and later the HPG all wanted to maintain the character and integrity of the Miralles concept for the Parliament. What appears to have been incompletely grasped, if at all, throughout the Project was that if the quality and unique complexity of the building was of overriding importance, the programme and the timing of completion would be affected significantly and extra cost would inevitably occur.

- 14.27 Having considered all the programming evidence,⁸¹⁴ it is my view that Bovis, in constructing its programmes, probably appreciated as well as anybody the buildability consequences of the highly complex and non-standard designs which were emerging from the Design Team. In my view, its programmes reflected the political imperative for early completion. Bovis reported to the client with a degree of optimism which was often not justified. My criticism is of the way in which timetabling and programme have been reported to the client. Bovis may blame the flow of design information, but no-one has questioned the Architect's ability to find design solutions, nor indeed to design a building of the highest quality; it is only the speed with which those solutions have been delivered that has come in for criticism. Yet the Architect signed up to the Bovis programmes. The Auditor General's assessment was that "the main cause of the slippage is delays in design of a challenging Project delivered against a tight timetable, using an unusual procurement route."⁸¹⁵ I agree.

⁸¹⁴ See for example: CB/4/970-974 – HPG minutes of 21 November 2001; CB/4/984-988 - HPG minutes of 5 December 2001. By 17 January 2002 Programme Revision 5B was issued to reflect slippage to TP2605 (Assembly Frame). CB/4/578-583 - HPG minutes of 14 August 2002; CB/4/170-176 - Bovis Report on proposed Strategic Programme Revision 6B Update on 4 April 2003; CB/4/177-182– HPG Minutes of 23 April 2003; and CB/4/1052 – Memo from Ms Judith Proudfoot to Mr Paul Grice, 4 June 2003

⁸¹⁵ Auditor General for Scotland's Report of June 2004, Page 39