IN THE MATTER OF

THE COMMISSION OF INQUIRY INTO THE DIAPHRAGM WALL AND PLATFORM SLAB CONSTRUCTION WORKS AT THE HUNG HOM STATION EXTENSION UNDER THE SHATIN TO CENTRAL LINK PROJECT

CLOSING SUBMISSIONS
OF
INTRAFOR HONG KONG LIMITED

Section	**Title**	**Pages**
I	Introduction	2-7
II	Intrafor's role in the Project	7-11
III	Intrafor's role in the Commission	11-15
IV	Intrafor's evidence	15-18
V	Media photographs & video	18-25
VI	What Intrafor was required to construct	25-36
VII	What Intrafor actually constructed	36-42
VIII	As-built drawings	42-45
IX	Intrafor completed Diaphragm Walls properly	45-50
X	Diaphragm Walls: no cause for concern	50
XI	Conclusion	50

I. INTRODUCTION

1. These Closing Submissions are made to the Commission of Inquiry ("the Commission") on behalf of Intrafor Hong Kong Limited ("Intrafor").

Background

2. Intrafor is recognised as an industry leader in ground engineering and foundation construction works that are technically challenging. Intrafor brought its substantial expertise in these areas to the Hung Hom project in order to build the diaphragm walls and barrettes.

3. Intrafor was engaged as a sub-contractor to LCAL on a 'construct only' basis. Intrafor had no responsibility for the design of the Permanent Works. Intrafor finished its construction work in August 2015.

Intrafor's submissions in over-view

4. As set out in more detail in the body of these Closing Submissions, Intrafor respectfully submits, inter alia, that:

   (i) No credible evidence or effective criticism has been forthcoming that would give rise to doubts, let alone concerns, with regards to the structures constructed by Intrafor.

   (ii) Intrafor built the Diaphram Walls and Barrettes properly and in accordance with the design that it was instructed to build to.

(iii) Buildings Department, after a lengthy and detailed review process, approved the As-Built documentation for the Diaphragm Walls and Barrettes in May 2017. In so doing, Buildings Department formally recognised, from a statutory perspective, the completion of the works carried out by Intrafor on 5 May 2017.

(iv) There has been no real criticism of, or challenge to, Intrafor's construction work, or the site supervision and inspections for Intrafor's work including the coupler connections in the Diaphragm Walls.

(v) There is no basis for concern that the couplers in the Diaphragm Walls were improperly connected or threads were unlawfully cut.

(vi) Intrafor's contemporaneous records, whilst certainly not perfect, are satisfactory, and have been the subject of generally favourable comment by a number of different parties during the hearings.

(vii) The preponderance of evidence confirms that coupler connections in the Diaphragm Walls were properly supervised and inspected.

(viii) The handful of photographs and videos taken in July 2013 (of allegedly improperly connected couplers in the Diaphragm Walls) that have appeared in the media do not cause any concern or doubt. Intrafor's detailed evidence concerning the relevant photographs and video was not challenged during the hearings. In summary:

a. The various photographs and the video do not show the couplers or the reinforcement cages in their completed state.

b. The video clip, and several of the photographs, show a mock-up in the steel yard of the reinforcement cages prior to the delivery of the cage to the work face. The cages were connected in an L frame bed in the steel yard, and were then disconnected before being transported to the work face for installation.

c. The remaining photographs show connection work in progress for the first panel to be constructed (EM98). It took five days (from 26 to 31 July 2013) for the re-enforcement cages for EM98 to be installed and properly connected at the work face.

d. The contemporaneous records for panel EM98 show that all of the connections were properly completed, and were inspected (and signed off) by Intrafor, MTR and LCAL.

(ix) There are no grounds for concern, or doubt, about the current or future safety of the Diaphragm Walls with regards to cracking or water leakage. There are no structural cracks and there is no evidence that would give rise to concerns or doubts.

a. Neither the photographs that appeared in the media prior to the Commission hearings, nor the MTR and Government inspections, evidence any grounds for concern in this regard.

b. Some degree of water seepage and of (non-structural) cracking is usual and to be expected in concrete structures.

c. The Contract makes express provision for this by setting tolerances for both cracks and water seepage.

d. Where water seepage occurs, it is, and has been, remedied by grouting or similar measures.

e. Intrafor has not seen any evidence of cracks or water leakages that are out of the ordinary or that are causes for concern.

f. No stakeholder has ever raised concerns to Intrafor or suggested that there are signs of distress in the Diaphragm Walls or structural cracks or any other cause for concern.

5. Importantly, Intrafor was not involved in any of the work that has turned out to be the primary focus of the Commission hearings. Intrafor, for example, had no involvement with the work carried out by others to:

(i) modify the diaphragm walls as constructed by Intrafor; or

(ii) trim or demolish the top of the diaphragm walls; or

(iii) modify connections between the diaphragm walls and the slabs; or

(iv) construct the slabs; or

(v) connect up the diaphragm walls to the slabs.

6. In all of the circumstances, Intrafor respectfully invites the Commission to make no adverse findings with respect to either the Diaphragm Walls as constructed by Intrafor, or to Intrafor itself.

Proposals for future record keeping systems

7. Intrafor is committed to strengthening still further its own internal systems to ensure that it continues to deliver high quality construction services. Intrafor is currently implementing a number of changes in its own procedures to strengthen, for example, the custodianship of records and simplify the production of panel record summaries.

8. Intrafor would welcome the possibility of Hong Kong introducing for major projects (and possibly on a wider basis) some form of real-time digital record keeping system (using a smart phone application or similar) for matters such as inspection results, release of holds, and the like.

9. Such a system might help with the traditional challenges of record keeping on a busy construction site. It is also possible that it might assist in managing a more recent challenge on site: the ever-increasing use of de-centralised communication systems by individuals for work matters.

10. Much of the daily communication on site (including for matters such as requests for inspection etc) increasingly takes place by messaging systems such as 'WeChat', and 'WhatsApp' rather than by email or paper. This represents a real systemic challenge as these platforms are even harder to manage centrally during the project than email, and even harder still to collate and search after completion of the project if a need arises to carry out retrospective fact finding. It may be that the

development of a project based 'real-time' app-system for key records might help in this respect.

11. Intrafor would, however, submit that the investment and costs associated with the introduction and implementation of such a system should be borne by the Employer and not passed down the line to the main contractor or, worse still, to the sub-contractors.

II. INTRAFOR'S ROLE IN THE PROJECT

The Sub-Contract for the Diaphragm Walls

12. Intrafor was engaged as a sub-contractor by LCAL. A copy of the Sub-Contract is in Exhibit 11 to Mr. Gillard's 1st Witness Statement[1].

13. A general overview of the scope of Intrafor's Sub-Contract Works can be found in Part B of Second Schedule of the Subcontract[2].

14. Intrafor's Sub-Contract Works were limited to 'construction only' of the diaphragm walls, barrettes and associated works. Intrafor constructed its Sub-Contract Works in accordance with the design and instructions given to it by LCAL.

15. The contractually agreed division of responsibilities between LCAL and Intrafor can be seen from the "Scope Matrix" that forms a part of the Sub-Contract [Exhibit 11 to Mr. Gillard's 1st Witness Statement[3]].

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1 F1135 - 1304
2 F1156 - 1157

16. Intrafor had no responsibility or liability for matters such as:

- the design or engineering of the Diaphragm Walls or for any other aspect of the Permanent Works;

- the supply, or quality, of the couplers or threaded re-bar procured by LCAL for installation by Intrafor in the diaphragm walls.

Statutory obligations

17. MTR was responsible for obtaining the necessary statutory approvals and consents needed for the Diaphragm Wall works. This included:

(i) Obtaining Building Department's approval /acceptance for the design drawings before construction.

(ii) Obtaining, if and where necessary, Building Department's approval / acceptance for design changes to the Approved Drawings.

(iii) Obtaining Building Department's approval/acceptance for the as-built documentation and works by way of the BA14 submissions process.

18. Accordingly, it was MTR who liaised and communicated directly with Buildings Department. Intrafor was not directly involved with this communication.

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[3] F1211 - 1217

19. Intrafor did, however, still have various statutory duties and related obligations. For example:

(i) Intrafor, as the Registered Specialist Contractor for Foundations Works, signed a series of undertakings [4] to the Building Authority confirming that it would:

"…undertake the works in strict compliance with standards in accordance with or equivalent to those required under the Buildings Ordinance and Regulations, recognizing the special requirements for railways, as stipulated in the exemption letter dated 5 December 2012."

(ii) Intrafor was required to comply with the relevant aspects of the Building Department's additional requirements for the installation and connection of couplers. See Appendices VIII (ductility couplers) and IX (non-ductility couplers) of Building Department's letter of 25 February 2013[5], and also the Quality Supervision Plan ("QSP") for ductility couplers prepared by BOSA and approved by Buildings Department[6].

(iii) Intrafor provided as-built information and prepared as-built elevations to assist MTR with the BA14 submissions process. Intrafor's Authorised Signatory also signed as-built drawings (which had been prepared by MTR and/or LCAL) for BA14 submission.

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4 See for example H10/4393, 4405, 4410, 4412, 4414

5 F2/ 1364 -1390

6 F2/1321-1337

Intrafor did not build the slabs or connect them to Diaphragm Walls

20. Intrafor's scope of work was limited to the Diaphragm Walls (including the barrettes and associated works). Intrafor had no involvement with the construction of any of the slabs.

21. Intrafor also did not connect the slabs to the Diaphragm Walls. The connection of the slabs to the Diaphragm Walls was carried out by LCAL after Intrafor had completed its construction works.

22. Intrafor's only requirement, with regards to the slab connections, was to install, inside the diaphragm walls, a number of starter bars with a coupler on either one or both ends[7]. These starter bars with couplers are securely tied in place, to ensure that they do not move during the concreting process. Checking this is a part of Intrafor's supervision process[8].

23. The installed couplers were also protected from damage by Intrafor before Intrafor poured the concrete for the relevant part of the Diaphragm Wall. Intrafor kept the protective cover (a red plastic cap) in place on the coupler. Intrafor then put a thick (in the region of 30mm) sheet of polystyrene and a 5mm thick board over the coupler to protect it. The polystyrene and board were held in place with tying wire. The size of the polystyrene and board covering would depend upon how many couplers were being protected. Where there was just one coupler to protect, the polystyrene and board would be approximately 1 metre square. It was

7 See, inter alia, Mr. Gillard 1st witness statement §§ 165-169 [F1/74-75]

8 Mr. Chui Tim Choi, director of Hung Choi. [T/Day 11/ 164/4-165/12]

thus not just the head of the coupler that was covered and protected from the concrete pouring[9].

24. These starter bars enabled LCAL subsequently to connect the slabs reinforcement to the Diaphragm Walls. In order to make these connections, LCAL had to:

- expose the relevant couplers by breaking out some of the concrete on the face of the diaphragm wall and removing the box-out (the polystyrene and board);

- remove the protective caps from the couplers and making sure they were clear of foreign material;

- screw the threaded re-bars of the slabs into the couplers provided in the diaphragm wall;

25. Intrafor was not responsible for exposing the couplers or the connections.

III. INTRAFOR'S ROLE IN THE COMMISSION

26. Intrafor has played a very limited role in the Commission. Indeed, Intrafor has not spoken at the hearings[10] since the end of day 3 (24th October 2018) when its only witness concluded his evidence.

27. This is, respectfully submitted, not entirely unexpected or surprising.

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[9] Mr. Chui Tim Choi, director of Hung Choi. [T/Day 11/ 157/12-163/6]

[10] Save to indicate that it had no questions or submissions to make.

28. The primary focus of the hearings has been on matters that do not involve Intrafor, and upon which Intrafor cannot comment or give evidence.

29. Intrafor, for example, had no involvement with, or knowledge of, matters such as:

(i) The alleged demolition of the top of the Diaphragm Walls[11].

(ii) The so-called "second design change" or any other alterations, or further work carried out, to the Diaphragm Walls as completed by Intrafor[12].

(iii) TQs 33 and 34, which were never communicated to Intrafor[13]

(iv) The construction of the slabs.

(v) The connection of the slabs to the Diaphragm Walls.

30. The only matters with which Intrafor can assist the Commission with relate to, or arise out of, the Diaphragm Walls as constructed and completed by Intrafor. These matters were dealt with at the very start of the substantive hearing, with Intrafor being the first party to give evidence.

31. The COI's counsel explained, at the Procedural hearing on 24 September 2018, the rationale for Intrafor's evidence being taken first:

11 See, inter alia, Mr. Gillard 1st witness statement §§ 291-298 [F1/100-101]
12 See, inter alia, Mr. Gillard 1st witness statement §§ 291-298 [F1/100-101]
13 See Mr. Gillard 3rd witness statement §§ 47 -62 [F34/24268-22271].

"Sir, so far as Intrafor going first is concerned, there are principally two reasons for that. First of all, chronologically, Intrafor being responsible for the construction of the diaphragm walls, chronologically, that came first, before we get on to considering the slabs.

Secondly, perhaps more importantly, it appears to the Commission's legal team that Intrafor have become an involved party principally by reason of certain photographs that have been published in the press and newspaper articles in respect of such photographs. And whilst of course certain matters will no doubt need to be explained and explored with Intrafor, the impression -- it is no more than that at the moment -that the Commission's legal team has formed at the moment is that none of the other involved parties is apparently seeking to criticise Intrafor in any material respect. Consequently, it seems to us, the Commission's legal team, that if that very preliminary analysis is correct, it's at least possible that Intrafor has a relatively limited role to play in this Inquiry.

That's another reason, or primary reason, why we think they should go first."

32. Whilst the COI's Counsel's observations were preliminary only, they have turned out, it is respectfully submitted, to have been prescient and well founded. None of the other parties have sought to criticise Intrafor in any material respect.

33. Further, it is respectfully submitted that:

(i) There has been no real criticism of, or challenge to, Intrafor's construction work, or the site supervision and inspections for

Intrafor's work including the coupler connections in the diaphragm walls.

(ii) No credible evidence or effective criticism has been forthcoming that would give rise to doubts, let alone concerns, with regards to the structures constructed by Intrafor.

34. That this is the case can be illustrated by reference to the reports of, and evidence given by, the independent structural engineering experts. None of these experts identified problems or causes of concern with regards the Diaphragm Walls.

35. The structural engineering experts appointed by MTR and by the Commission both commented favourably on Intrafor's work, and on the Diaphragm Walls themselves.

36. Professor McQuillian, appointed by the Commission, addressed the Diaphragm Walls at paragraphs 102 to 105, and 126 of his report. He concluded at paragraphs 104 and 105:

"*104. The supervision, inspection and sign off-records for the D Walls appear to have been of high quality as evidenced by the generally high tolerance levels achieved with coupler placement. Not many couplers appear to have been misaligned or off-the-level at depth, which demonstrates a reasonably high degree of accuracy.*

105. There is no evidence of any structural or serviceability problems with the D-walls. The only instance of dampness [Appendix III-11] is well within the specified tolerance level."

37. Professor McQuillian further concluded, at paragraph 126, that there are no safety issues or concerns with the Diaphragm Walls, and that there has been code compliance.

38. Similar conclusions were reached by Dr. Glover, appointed by MTR, at paragraph 10.7 of his report:

"*In my opinion, currently there is no case for opening-up the NSL slab or the Diaphragm Wall since there is no evidence to suggest that these structures were not built in accordance with the accepted design, there have been no allegations of illegally cut threaded bar in either structure and the structural utilisations are low. Any opening up of these structures would require considerable demolition of the installed rail works and the structures and extend the delay to the project further for no obvious benefit."*

39. Neither Professor McQuillian nor Dr. Glover expert were cross-examined by any party on their opinions in relation to the Diaphragm Walls.

40. The structural engineering experts appointed by Government, China Technology and LCAL [14] did not address Intrafor's work or the Diaphragm Walls themselves.

IV. INTRAFOR'S EVIDENCE

Intrafor's witness of fact

[14] For the avoidance of doubt, see Mr. Southward's oral clarification concerning paragraph 7.4.3 regarding TQ 34 at the start of his evidence on day 42. [T/ day 42/ 98/13 – 99/11].

41. The Commission heard evidence from Intrafor's Mr. Gillard on 23 and 24 October 2018.[15]

42. Mr. Gillard is a director of Intrafor and holds ultimate responsibility for the management and operation of Intrafor, including all projects where Intrafor is involved.

43. Mr Gillard had been involved with the Hung Hom project from the start of Intrafor's involvement[16]. He visited the site generally twice a month, and at a bare minimum once a month. On these visits he would go to both the steel fabrication yard and also the areas where the Diaphragm Walls were being installed[17].

44. Mr. Gillard had submitted three witness statements:

    (i) His first Statement dated 15 August 2018 [F1/32- 102.1].

    (ii) His second Statement dated 9^{t} October 2018 [F34/19761-19772.1]

    (iii) His third Statement dated 16 October 2018 [F35/24260-24272.1].

45. Mr. Gillard was a credible and reliable witness. His evidence was not undermined or in any way tainted during cross-examination. It is respectfully submitted that his evidence should be accepted by the Commission and given full weight.

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15 See T/Day 2/ 128/1 – 168/2 and T/Day 3/ 1/6 – 89/22.
16 Mr. Gillard's 1st Statement § 2[F1/32]
17 See T/Day 2/ 155/14 – 156/4

46. Mr. Gillard's evidence was supported by a substantial volume of supporting documents and exhibits. It was also generally corroborated by those of MTR's and LCAL witnesses who gave evidence on issues relevant to the Diaphragm Walls and/or Intrafor's involvement with the Project. See for example §§7.1 to 7.2 of MTR's Kobe Wong [B16/13658].

Intrafor's steel fixing sub-contractor

47. The Commission also heard from two witnesses from Intrafor's steel fixing sub-contractor Hung Choi:

(i) Mr. Wong Yiu-mo (Hung Choi's site foreman for steel fixing).

(ii) Mr Chui Tim-choi (a Director of Hung Choi).

48. These witnesses were called by the Commission as Hung Choi is not, and has never been, an Interested Party before the Commission.

49. Mr. Wong Yiu-mo gave evidence on 24 October 2018. He submitted three witness statements in advance:

(i) His first statement of 21 September 2018 [I/100-107].

(ii) His second statement of 3 October 2018 [I/111-122]

(iii) His third statement of 16 October 2018 [I/124-135]

50. Mr Chui Tim-choi gave evidence on 5 November 2018. He submitted one witness statements in advance:

(iv) His statement of 21 September 2018 [I/19-22].

51. Both Mr. Wong and Mr Chui were also credible and reliable witnesses. Their evidence was not undermined by cross-examination. It is respectfully submitted that the Commission should accept their evidence and give full weight to it.

52. Mr. Wong's and Mr Chui's evidence did not reveal any problems or causes for concern in relation to the Diaphragm Walls or Intrafor's works. The evidence corroborated and supported Intrafor's own case and evidence.

V. THE MEDIA PHOTOGRAPHS

53. As highlighted above, Intrafor became involved in the Commission as an Interested Party largely because of a short video clip and a handful of photographs that were circulated in the media in mid 2018.

54. The Commission itself in its first letter to Intrafor (of 25 July 2018) referred to a number of specific articles that had appeared in HK01 and in in the Apple Daily, and sought responses and information from Intrafor.[18]

55. Intafor responded to the Commission's queries by way of paragraphs 47 to 97 of Mr. Gillard's 1st statement [F1/40-51]. Mr. Gillard gave further

[18] See pages 3 to 6 of Lo & Lo's letter of 25 July 2018 [F1/ 3-6]

evidence in this regard during his brief examination in-chief on day 2 of the evidence. This further evidence can be found at [T/Day 2/136/11 – 154/16].

Incorrect allegations of couplers not properly connected

56. The video and photographs that have been circulating in the press in relation the Diaphragm Walls simply do not show problems with Intrafor's works or couplers not properly connected in the completed Diaphragm Walls.

The video clip

57. The video of a worker using a wrench[19] shows reinforcement cages arranged horizontally in an L-frame platform in the steel yard. It does not show the reinforcement cages arranged vertically in their final, fixed, position. This horizontal arrangement of the cages is visible as is the L frame platform. In addition, the yellow beam visible is a beam in the steel yard.

58. The press articles say that the video was taken in July 2013. This seems likely although it should be noted that Intrafor does not have the metadata from the video to be able to confirm the date.

59. If the video was taken in July 2013, it shows the trial assembly (mock up) of the reinforcement cages in the steel yard for Panel EM 98:

(i) Panel EM98 was the very first panel to be constructed.

[19] A1/114-116

(ii) It was decided to try to pre-fabricate all of the cages for EM98 in the steel yard, including the cages with triple layers of re-bar. It was hoped that this might add to the efficiency of the construction process by allowing more work to be done in the steel yard rather than at the diaphragm wall work face.

(iii) The intention was to pre-fabricate the cages in a horizontal position using the L framed beds that were installed in the steel yard for this purpose. The prefabricated cages would then be connected, whilst still horizontal, so that the connections aligned. Once everything aligned, the cages would be disconnected from each other, and transported individually to the work face. Once at the work face, the pre-fabricated cages would be re-connected in a vertical arrangement.

(iv) Difficulties were, however, encountered in connecting the couplers when the cages were in the horizontal position. These difficulties were more pronounced when it came to trying to unscrew the couplers to disconnect the cages.

(v) These difficulties were caused by a number of factors. One was the effect of the weight of the cage (particularly where there were three layers of reinforcement) when in the horizontal position (as opposed to the vertical position in the diaphragm walls), which tended to cause alignment issues. The second was steel congestion, particularly in the cages with three layers of reinforcement, which caused difficulties for the workers carrying out the work. These issues made it

difficult to disconnect the cages before transporting them from the steel yard to the work face for re-connection in the vertical arrangement.

(vi) As a result of these issues, pre-fabrication of triple layer cages was only carried out for panel EM98. After that, Intrafor built the triple layer cages in-situ whilst using pre-fabrication for single and double layer cages.

60. It is thought that the video most probably shows cages being disconnected and not connected because of the direction in which the worker is turning the wrench.

61. In any event, even if the video did show the connection of cages in the steel yard, this still does not show the cages in their installed or completed state. The cages would have to be disconnected, transported to the work face, and re-connected in their vertical arrangement.

62. Mr. Gillard's evidence in relation to the video is further supported by the evidence of Hung Choi's Mr Wong Yiu Mo in his second and third witness statements.

63. Mr. Wong believed that he was one of the men that can be seen in the video at between 0:11 and 0:12 standing in the foreground[20]. Mr. Wong's evidence corroborates Mr. Gillard's explanations. See §§3-11 of Mr. Wong's 3rd statement [I/133-135].

Stills taken from the video clip and/or photographs taken at a similar time

[20] See Wong Yiu Mo 2nd Witness Statement § 2 [I/117-118] and 3rd Witness Statement §3 [I/133]

64. There are a number of photographs that also show the re-bar cages arranged horizontally in the L-framed beds in the steel yards. These appear to be stills from the video clip or are photographs taken at a similar time. Examples of these photographs include the second and third photographs in the Hong Kong 01 article of 18 July 2018 [A1/74-87].

65. These photographs do not show the reinforcement cages in their installed or completed state. Instead, they show the reinforcement cages in the steel yard prior to them even being transported to the work face for installation.

Two photographs of the reinforcement cages vertically aligned

66. The two photographs showing cages partially connected in their vertical arrangement[21] were taken in July 2013 as the panel reference "EM98" can be seen on one of the photographs, showing the location for the reservation pipe.

67. It is not known what day or time the photographs were taken. The installation and connection of the cages for Panel EM98 took place from 26 July to 31 July 2013. There would have been times during this period where connections were not yet fully made but could be made easily by slackening and lowering the bars above.

68. All of the couplers and connections were fully completed and inspected, before Intrafor was permitted to pour the concrete. A full set of

[21] A1/116

inspection records for Panel EM98 has been produced that confirms this. Further, particular attention was paid to this panel as it was the first one.

69. The metal tying wire around the cage does not show that the works are complete. It is a tie wire that holds the reinforcement bars in place because the cage was pre-fabricated in the steel yard. All cages for Panel EM98 were pre-fabricated.

70. Intrafor did not unlawfully cut or shorten steel bars, and is not aware of others having done so[22]. There is no evidence whatsoever to suggest that any unlawful cutting took place in relation to the Diaphragm Walls. Hung Choi have also confirmed that they did not unlawfully cut steel bars[23].

Photographs with water seepage

71. Two articles in the Apple Daily of 30 May 2018 are said to show water leakage at the Diaphragm Walls [A1/32-40, 48-51].

72. Intrafor's evidence in relation to these photographs is at paragraphs 91 to 97 of Mr. Gillard's 1st Statement [F1/50-51].

73. Whilst some of the photographs do show apparent water marks from seepage, it is not possible to ascertain from the photographs the extent of the water seepage let alone to identify the source or cause of the water seepage.

[22] See inter alia §§ 178 and 179 of Mr. Gillard's 1st statement [F1/76]

[23] See §13 of Mr. Wong's 1st statement [I/106-107]

74. In one photograph [F2/1306], for example, there is an apparent water mark that suggests that water may have seeped down the wall from the top. Assuming that this is what is shown, there is no way from the photograph to ascertain whether this water is coming through the Diaphragm Wall or whether it seeping through the platform slab. It is also not possible to ascertain how much water has leaked, when and for how long based on that photographs.

75. Some water seepage is usual and to be expected in concrete structure. This is recognised in the Contract, which provides for tolerances for water seepage. Intrafor has attended site since the completion of the diaphragm walls to address Non-Conformance Reports. Where instances of water seepage have been identified in the Diaphragm Wall, remedial measures have been taken by, for example, applying grout to any minor cracks.

76. As has been mentioned above, Professor McQuillian concluded in paragraph 105 of his report:

"There is no evidence of any structural or serviceability problems with the D-walls. The only instance of dampness [Appendix III-11] is well within the specified tolerance level."

77. Intrafor has not seen signs, nor been notified, of structural cracks in the diaphragm wall or any other signs of distress in the Diaphragm Walls.

78. At no point has any stakeholder in the Project ever suggested or notified Intrafor that there are structural concerns in relation to the cracking or water seepage.

79. There is no evidence whatsoever to support the suggestion that the reason why cracks have appeared on the diaphragm walls is due to steel bars not being properly screwed into the couplers.

Conclusions

80. The video and photographs that have been circulating in the press in relation the diaphragm walls simply do not show problems with Intrafor's works or the Diaphragm Walls.

81. It is of some note that no party at the Commission sought to cross-challenge either Mr. Gillard or Mr. Wong in relation to their evidence regarding the video and photographs.

82. The allegations in the various press and media articles are erroneous and without foundation.

83. No credible evidence or effective criticism has been forthcoming that would give rise to doubts, let alone concerns, with regards to the structures constructed by Intrafor.

VI. WHAT INTRAFOR WAS REQUIRED TO CONSTRUCT

The Diaphragm Walls in over-view

84. Intrafor was required to construct two diaphragm walls: the East Wall ("EW") and the West Wall ("WW"). Each diaphragm wall is approximately 20 to 60 metres high and over 430 metres long.

85. The diaphragm walls comprise primary (hit) and secondary (miss) panels that are constructed in panels. There are 253 panels in total.

86. Intrafor also individually jointed them using preformed stop ends. A water stop is cast in at the joints.

General overview of the main construction sequence

87. In very general terms, the construction sequence for a diaphragm wall panel involves the following steps:

(i) The ground is excavated to the required depth and dimensions.

(ii) The stability of the excavation trench is achieved by excavating in a Bentonite slurry (which is a mud like compound that provides temporary stability to the excavated area).

(iii) Steel reinforcement cages – some of which were pre-fabricated and some of which were built in-situ – are installed in the excavated area.

(iv) There is full time supervision and checking of this process and of the connection of the couplers by Intrafor. There are also inspections by LCAL and MTR. These are "witness points".

(v) The completed and connected reinforcement cages are inspected. This "hold point" must be released before Intrafor can proceed to the next stage.

(vi) Once the hold point has been released, concrete is poured, through a "tremie pipe", to fill the excavated area from the bottom of the excavation up. The concrete displaces the Bentonite, which is then recycled or disposed of.

(vii) This process is repeated for each panel. Completed panels are joined by Intrafor and a waterstop installed.

(viii) Once all of the diaphragm wall panels have been completed, the construction of the diaphragm wall is also complete.

(ix) Intrafor then has to carry out various proof testing and perform pumping tests to draw down the ground water level to permit excavation without flooding by others. The successful completion of these pumping tests marks the completion of Intrafor's works.

Building and installing the steel reinforcement cages

88. As the installation of the steel reinforcement cages (see above) is one of the areas of consideration for this Commission, it may be helpful to make some additional observations.

89. At tender stage, Intrafor recognised that the installation of the reinforcement cages for the diaphragm walls would be challenging from a construction perspective. This was because of a combination of factors:

(i) The height of the diaphragm walls required multiple reinforcement cages to be assembled and connected together vertically.

(ii) There was limited head-room at the work site, which would impact upon the lifting options for the reinforcement cages during assembly installation. This in turn would limit the height of the reinforcement cages themselves, requiring a larger number of shorter cages (rather than a smaller number of taller cages) to be used in some locations.

(iii) The reinforcement design that Intrafor was instructed to construct involved different types of reinforcement cages to be used: some with a single layer of 50 mm diameter vertical rebar, others with a double layer of vertical re-bar, and others with a triple layer.

(iv) The double and triple layers of re-bar made access for workers difficult and also made the re-bar in the cages very heavy.

90. Having recognised these challenges at an early stage, Intrafor provided, in the approved Method Statements, for various alternative methods for the assembly and installation of the reinforcement cages.

91. The overall intended approach was to:

(i) build the reinforcement cages that had a triple layer of re-bar in-situ at the work face; and

(ii) prefabricate the reinforcement cages that had a single or double layers of re-bar on the designed for purpose L-Frame beds set up in a steel yard separate from the work face.

92. The prefabrication of single and double layer cages was intended to make the construction process more efficient by allowing as much work as possible to be done in advance in the steelyard.

93. The pre-fabrication process involved:

(i) Pre-fabricating and connecting all required single and double layer cages in series on the L-Frame work beds in accordance with the design that Intrafor was instructed to construct to. Whilst on the L-Frame work beds, the cages are arranged horizontally and not vertically.

(ii) Once all of the relevant cages were built and fitted together, each cage would then be disconnected.

(iii) The disconnected cages would be transported individually from the steel yard to the work face.

(iv) Once these individual cages arrived at the work face, they would be re-connected vertically one at a time, under full time continuous supervision by Intrafor.

(v) Each of the connections between two cages would be individually checked by Intrafor and then inspected by LCAL and MTR. Only after these inspections had been satisfactorily passed would the cages would be lowered into the excavation hole trench and the next cage connected.

(vi) Where the design called for a cage with a triple layer of re-bar, this would be built and connected in-situ. These connections were also supervised, and individually checked and inspected.

The design that Intrafor was required to construct

94. As explained above, Intrafor was engaged on a construction only basis. Intrafor had no responsibly for the design of the Permanent Works. Intrafor was required to construct the Diaphragm Walls in accordance with its statutory duties and the design and instructions provided to it.

95. It is understood that the ultimate responsibility for the design of the Permanent Works rested with MTR and its consultant Atkins.

96. Intrafor, however, as LCAL's sub-contractor received the design, approval for shop drawings, and related instructions from LCAL.

Intrafor's concerns that the original design was not buildable

97. Mr Gillard in his third statement explained the concerns that Intrafor had, before construction began, with regards to the buildability of aspects of the design it was provided with.

98. From as early as April 2013, Intrafor had been concerned about the spatial constraints and rebar congestion in the Atkins designed steel work details at the top of the diaphragm walls. The concern was that the congestion would make it difficult to carry out the actual construction because:

(i) The congestion would make it difficult to build and install the steel work itself together with the incorporation of reservation tubes and tremie pipe.

(ii) The amount of steel work could adversely affect the flow of concrete when poured, leading to quality concerns.

99. Intrafor brought their concern about buildability to LCAL's attention, and ultimately to MTR's and Atkin's attention.

100. There is for example, a reference in an internal Intrafor email of 5 July 2013 to a discussion at a meeting on 29 April 2013 where Atkins agreed that the U-Bars at the top of the wall is not necessary[24].

101. If acceptable from a design and engineering perspective, the deletion of U-Bars at the top of the wall would ease the congestion, aid construction, and permit incorporation of reservation tubes and tremie pipe.

102. Intrafor's concern related to the construction process. Design and engineering were for Atkins and others to address. Intrafor had no involvement with the design or engineering.

[24] [F35/24274-24286]

103. In June 2013, when reviewing the details of the first panel (EM 98), Intrafor again raised a concern to LCAL about congestion of steelwork at the top of the wall.

104. In addition, Intrafor identified that the design was not buildable because there was insufficient space for the insertion of the tremie pipe required for concrete pouring. This was because the design involved two rows of equally spaced re-bar across the whole length and width of the panel. The spacing between the re-bar was not sufficient for a tremie pipe to be inserted. Intrafor alerted LCAL to this.

105. On 11 June 2013 Intrafor provided LCAL with a shop drawing detailing a possible alternative way of arranging the starter bars at the top of the wall and the omission of the U-Bars in order to create space for a tremie pipe. This illustrated the creation of tremie pipe space by re-distributing the offending starter bars to a new additional third row of starter bars.

106. This sort of arrangement of re-bar would solve the 'buildability' problem associated with the tremie pipe but Intrafor had no way of knowing whether it would work from an engineering perspective as:

(i) Intrafor was not involved in the design of the diaphragm walls and had no access to the design and engineering calculations and assumptions.

(ii) This sort of solution would also require an equivalent change in the location of the threaded re-bar in the Slabs – otherwise the couplers and threaded re-bar would misalign when it came to connecting

them together. Intrafor had no involvement with, or knowledge about, the Slabs.

107. Intrafor, as LCAL's sub-contractor, was not directly involved with all of LCAL's subsequent dealings with either MTR or Atkins.

108. Intrafor participated in some discussions, and produced various revisions to draft shop drawings for review. Intrafor's involvement in this regard related to 'buildability' and not the underlying design or engineering.

109. On 5 July 2013, David Wilson of Atkins confirmed in an email[25] concerning Panel EM98:

"….. *Other items*

- *The attached mark up suggests that U bars may be required at the top of the wall. That is not the case."*

110. The Atkins final revised design for the arrangements at the top of the eastern diaphragm wall resolved the 'buildability' problems:

(i) Two rows of couplers in the original design became three rows in the final design, with space left for tremie pipes.

(ii) T40-150 U bars were removed.

111. Intrafor produced revised draft Shop Drawings and Bar Bending Schedules for panel EM98 that reflected the final design. These were

[25] [F35/24274-24286]

approved by Leighton on 19 July 2013[26] and by MTR, with minor un-substantive comments, on 24 July 2013[27].

112. Intrafor constructed Panel EM 98 in accordance with the approved Shop Drawings and Bar Bending Schedules. The cages were pre-fabricated in the steel yard and then moved to the work face. The cages were installed between 26 and 29 July 2013, and concrete poured on 1 August 2013.

113. It would now seem, as a result of the evidence received by the Commission, that the changes in Atkin's design were approved by MTR's construction team and may or may not have been approved by MTR's design co-ordination team. Intrafor was not, however, involved with the detailed liaison with MTR or Atkins.

114. Whilst Intrafor was working with LCAL in relation to the buildability of the designed reinforcement arrangements, Intrafor was aware of the possibility that some changes to reinforcement arrangements might necessitate consultation with Buildings Department. Mr. Gillard's evidence was that he had seen emails in relation to some aspects of the design where Intrafor had raised this question, and also emails indicating at various times in June and July 2013 that there were discussions between MTR/LCAL and Buildings Department on aspects of the reinforcement design. Mr. Gillard also gave evidence that he had not been able to identify whether the resolution of the "buildablity" problems were raised in this manner or not[28].

[26] [F35/24287-24288]
[27] [F35/24289-24297]
[28] See corrigendum to §27 of Mr. Gillard's 3rd statement {F35/24272.1 – 24272.2]

115. The final revised design for arrangements at the top of the wall in Panel EM98 was adopted, and approved. for all of the panels on the eastern diaphragm wall. This was the design that Intrafor was required to construct the Eastern Wall to from August 2013 to January 2015.

Insertion of some T40 U-bars from January 2015 onwards

116. On 23 September 2014[29], Ryan Kow of Leighton emailed Simon Fung of Intrafor asking:

"*Is there any email related to the U-bar in all D-Wall panels? We understand that there are U-Bar required based on the BD Drawing, but we hope to get more information on the related item, eg your discussion with MTR/LCAL? Any related evidence?"*

117. Simon Fung of Intrafor replied by email on 24 September 2014[30], attaching various emails and noting:

"*Please find attached emails for your information.*
We discussed in the meeting of 29 April 13, Atkins agreed that U-Bar at the wall top is not necessary. (refers to email dated 05-July-13 6.25pm)

Dave (Atkins) agreed that U-Bar at the top of the wall is not necessary. (refers to email dated 05-July-14[31] 12.44pm."

[29] [F35/24274-24286]
[30] [F35/24274-24286]
[31] It is apparent that the reference to an email of 5 July 2014 at 12.44 was a typographical error, and should read 5 July 2013

118. On 14 January 2015, Intrafor was instructed, at site, to add T40-150 U bars at the top of the wall for Panel EH45. This was confirmed by an email from Edward Mok to Intrafor and MTR sent on the same day. Intrafor advised in a reply email later on 14 January 2015 that, based on the in-situ conditions, only 12 T40-150 U bars could be added at the top of the cage. Intrafor explained that too high a concentration of re-bar at the top of the wall would have a bad effect on the flow of concrete. After receiving this email Intrafor proceeded to incorporate T40-150 U Bars in the shop drawings

119. Intrafor was not involved in the design of the Diaphragm Walls. Intrafor was not a party to whatever prompted the instruction to add T40-150 U bars at the top of the wall.

120. Intrafor was asked to install T40-150 U bars at the top of the wall for the panels constructed after Panel EH45. Intafor did so. The number of T40-150 U bars installed varied between panels depending upon how many Intrafor could squeeze in without adversely affecting the flow of concrete.

121. It is now understood that the omission of the U-Bars (the so-called first design change) was the subject of a consultation and discussion process between MTR/Atkins and Buildings Department in the middle of 2015, and that Buildings Department ultimately gave their consent/approval to it. Intrafor was not aware of, or involved with, this process.

VII. <u>What Intrafor actually constructed</u>

122. Intrafor constructed the Eastern Diaphragm Walls in accordance with the revised designs set out in Section VII as it was instructed to do.

123. There was, however, an exception to this: the concrete pour levels for five panels: EM104, EH105, EH106, EH108, and EH109.

124. The circumstances with respect to the concrete pour levels for these five panels are addressed in:

(i) Paragraphs 60 to 65 of Mr. Gillard's 2nd Witness Statement [F34/19771 – 19772] and its corrigendum [F34/19772.1]

(ii) Paragraphs 39 to 46 of Mr. Gillard's 3rd Witness Statement [F35/24266 – 24268].

125. On 2 March 2015, Ryan Kow of Leighton forwarded to Simon Fung of Intrafor a copy of a report prepared by Atkins dated 25 February 2015 under cover of an email that read "*Enclosed please find the design report for coupler check for the following panels". EH105, EH107, WM58, WM 125m WH131, NH2*".

126. The Atkins report of 25 February 2015 stated in its introduction:

"*..... However as the slab reinforcement has been made continuous over the Dwll support without proper anchorage into the Dwall for panel EH107, it is proposed to demolish the top portion of Dwall and add the required number and diameter of rebar as per the design drawings and*

achieve the full anchorage length with the Dwall vertical reinforcement. For details refer to attached sketch.

As for panel EH 105 as the Dwall reinforcement do not have the required anchorage length with the slab reinforcement to transfer the forces, it is proposed to demolish the top portion of Dwall and add the required number and diameter of rebar as per the design drawings and achieve the full anchorage length with the Dwall vertical reinforcement. For details refer to attached sketch."

127. It appears, from reading materials made available during the Commission process, that the concern in the report was that, the revised design did not provide proper anchorage of the slab reinforcement in some of the diaphragm walls. The solution then apparently being considered by Atkins was to demolish the top of the wall, install appropriate anchorages for the slab, and then re-cast the top of the wall.

128. The report concerned a potential design and engineering issue and not any problem with Intrafor's workmanship or construction. This was a matter that therefore was for LCAL, MTR and Atkins to address. It was not a matter that directly involved Intrafor.

129. Intrafor was not instructed in March 2015 to take any action. Further, Intrafor was never instructed to carry out any demolition to the top of the walls, and never did so.

130. On 24 April 2015[32],Leighton instructed Intrafor by email:

[32] [F35/24298-24345]

"*.. Please be informed that we have agreed with MTR regards the concrete cut-off level in panel EH 106, taken into account the problem with the re-bar anchorage length for slab connections.*

Conclusion, MTR and LCAL agreed to reduce the concrete cut-off level to +1.0mPD.

Therefore, for EH106, please cast the concrete up to +2.0mPD only, we need to make sure the concrete quality below +1.0mPD. (Discussed with CL on phone on 24/4/15 evening)."

131. LCAL's email also enclosed various material including:

(i) The sketch drawings produced by Atkins in its report of 25 February 2015 for future panels in area C of the eastern diaphragm wall.

(ii) These sketch drawings were marked with manuscript notes showing that the top of the wall required to be demolished to a sufficient depth to allow tension anchorages to be retrospectively installed for the slab.

(iii) A copy of an internal Leighton's email between Ryan Kow and Kingsley Lam of 19.05: 24 April 2015, which itself had below it a thread of emails between Leighton, MTR and Atkins.

(iv) This email quoted the introduction from Atkins' report of 25 February 2015 concerning demolition of the top of the D- Wall. It then noted:

> "*Note that EH 105 has not even concreted now, and their proposed scheme is to demolish the top portion of D-Wall till the required anchorage length. Let's say +2.82mPD – 1870mm for this case. We believe that same scheme shall be apply for EH106."*

132. In accordance with this instruction, Intrafor installed the reinforcement cage for Panel EH 106 to its full designed height (+2.8mPD) but only poured concrete to a level of 2.0mPD.

133. The position with regards to Panels EM104, EH105, EH108 and EH109 is the same. Intrafor installed the rebar cages for these panels to the full design height in accordance with the approved shop drawings. Intrafor was similarly instructed to pour the concrete for these Panels to a lower level.

134. The relevant instructions were not given formally by way of site instructions (an un-related example of the type of formal site instructions issued on the project can be seen at F2/136). They were given by email (for example, an email from Leighton of 24 April 2015 [F35/24298-24345] and orally (see for example the reference to a telephone call on the evening of 24 April 2015 in the email of 24 April 2015 [F35/24299] for EH106, and the manuscript note on the concrete pour record of 30 May 2015 [F34/23985] for EM104.

135. LCAL's instructions to pour the concrete for these panels to a lower level was not an instruction to vary the design of the Permanent Works.

136. The instructions for Intrafor to pour the concrete for the five panels was a change to the pouring arrangements. The Design Cut-Off Level for the panels remained unchanged at +2.8mPD. That this is the case is apparent from a number of factors including:

(i) The email of 24 April 2015 and its attachments, which made it clear that the reason for the lower pour level was the possibility that MTR's DDC (Atkins) might require further anchorages to be incorporated into the steel work at the top of the panels.

(ii) Intrafor was not instructed to remove or cut off the top of the re-bar cage that was protruding from the top of the concrete.

(iii) If a further pour of concrete was not later undertaken, there would have been either a void between the top of these panels and the slabs or the slabs would have had to have been stepped down to meet the lower concrete level for the panels. Neither would appear to make rational engineering sense.

(iv) When Intrafor completed its physical work on site, the panels remained with the top of the cages protruding from the lower cast concrete.

137. Intrafor therefore installed the cages for these panels to the full design height but only poured the concrete to a lower level. Intrafor was never asked either to cut the exposed cages or to pour further concrete up to the full height. The panels remained with exposed parts of cage when Intrafor completed and handed over the diaphragm walls.

138. Intrafor did not know, when Mr. Gillard gave his evidence on 23 and 24 October 2018, what had ultimately happened to panels EM104, EH105, EH106, EH108, and EH109. It is, however, apparent that LCAL ultimately poured the concrete up to full height as otherwise there would be a gap between the top of these panels and the slab.

VIII. As-built drawings

BA14 As-built Submissions to Buildings Department

139. MTR was responsible for the submission of As-Built Drawings and other As-Built records to the Buildings Department as a part of the BA 14 process.

140. MTR / LCAL produced the As-Built Drawings although Intrafor's Authorised Signatory signed them. Intarfor also provided LCAL /MTR with various as-built data, records, and elevations as a part of the process.

141. The As-Built Submissions for BA14 were divided into 6 Batches. Batches 1- 5 were submitted between January and July 2015, and were rejected by Buildings Department in the period May to September 2015.

142. The reasons for these rejections were, for the most part, a number of discrepancies, errors, and missing information in the material that had been submitted by MTR and/or non-conformity[33].

[33] See, inter alia, §§ 65-69 of Mr, Gillard's 3rd Statement [F35/24271-24272].

143. Following these rejections, MTR and Leighton carried out a lengthy and detailed process, which Intrafor also participated in, to resolve the relevant discrepancies and issues. This process is described in paragraphs 38 to 49 of Mr. Gillard's 2nd Witness Statement. MTR then made re-submissions for Batches 1-5. Batch 6 was submitted in January 2016.

144. Following the re-submission of Batches 1-5 and the Submission of Batch 6, there was a continuing series of communications between MTR and LCAL, which also involved Intrafor, to close out any remaining discrepancies, errors and clarifications. This involved making amendments, which had been agreed by MTR and LCAL, and checked by Intrafor's Authorised Signatory. This included hand marked amendments directly on the As-Built Drawings at Building Department's offices, and signed by the Intrafor's Authorised Signatory[34].

145. All 6 Batches were accepted by the Buildings Department in May 2017. Buildings Department also acknowledged a Completion Certificate for the whole of the Diaphragm Wall works on 5 May 2017.

As-Built Drawings for Panels EM104, EH105, EH106, EH108, and EH109

146. LCAL prepared a series of as-built drawings for the permanent diaphragm wall showing RC details for hit and miss panels for BD Submission. These drawings were signed off as built by Intrafor.

147. In accordance with the decision by LCAL and MTR to refer to "Actual Cut Off" levels in all of the as-built drawings, all these drawings include reference to Actual Cut Off Levels. This includes for the five panels which Intrafor cast to the lower levels. Copies of the drawings and

[34] See, the corrigendum to §68 of Mr, Gillard's 3rd Statement [F35/24272.2].

references for the five panels are in Attachment IV [see B5/ TS20837, TS20838, TS20840, TS20842, TS20844, TS208879, TS208884, TS208887[35]].

148. The references to Actual Cut Offs, which is where the cut off for the Permanent Works needs to be, for these five panels is, in hind sight confusing, and, without further explanation of the sort given above, as has now been provided above, seems to be inconsistent with the other signed as-built records, and Panel Record Summary Sheets that accurately show the levels of reinforcement and concrete as-constructed on site by Intrafor.

149. The Panel Record Summary Sheets signed by Intrafor and submitted to BD as a part of the same Batch 6 as-built submission shows the accurate physical Tops of Reinforcement and Concrete Top Level as constructed on site. These correctly record that the concrete had not yet been poured to the Actual Cut off Level needed for the design of the Permanent Works, and that, as built by Intrafor, the re-bar cage was protruding from it. There was no attempt by Intrafor to mislead or misrepresent the as-built work that it had done.

150. With hindsight the confusion and apparent inconsistency should have been avoided by including an appropriate explanatory note on the drawings making the situation clear, and cross-referring to the Top of Reinforcement and Concrete Top Level as constructed by Intrafor.

[35] Intrafor understands that there is no longer prohibition on using these documents outside the COI as they are in evidence.

151. Further details in relation to this issue can be found by the Commission in Intrafor's detailed response 2(vi) in its letter to Development Bureau dated 27 December 2018. [H26/45244-25338]

In conclusion

152. In part, the issue in relation to the as-built drawings for Panels EM104, EH105, EH106, EH108, and EH109 arose because LCAL and MTR were making changes to the tops of the Diaphragm Walls after Intrafor had completed its construction of the Walls and concurrently with an ongoing As-Built approval submission for Intrafor's completed construction.

153. There is probably greater scope for confusion where As-Built submissions are proceeding at the same time as other ongoing work to the same part of the structure. This is an issue that might benefit from a different approach in future complex projects.

154. The process for obtaining Building Department's acceptance for all of the As-Built Drawings and records for the Diaphragm Walls took in excess of 2 years, and was painstakingly detailed.

155. It is submitted that the result of this process is that there is a satisfactory set of As-Built Drawings for the Diaphragm Wall works that has been accepted by Buildings Department.

IX. Intrafor completed Diaphragm Walls properly

Intrafor's works have been completed

156. Intrafor commenced work at the site in May 2013.

157. Intrafor installed the pre-fabricated steel reinforcement cages for the first panel of the diaphragm walls (EM 98) between 26 July 2013 and 31 July 2013. Once the cages and connections for this panel had passed inspections, Intrafor was permitted to pour the concrete.

158. Intrafor then built the rest of the panels from August 2013 until June 2015. The final panel of the diaphragm walls (EH 78) was completed on 27 June 2015.

159. Following the completion of the final panel, Intrafor carried out pumping tests to draw down the ground water level to permit excavation without flooding between the end of June 2015 and 14 January 2016. This marked the completion of Intrafor's work.

160. Building Department acknowledged the completion of the Diaphragm wall package on 5 May 2017.

161. There have been no major defects or snags notified in respect of Intrafor's works. Such snags as have been notified have been remedied.

Supervision and inspection of Intrafor's Works during construction

162. The preponderance of evidence confirms that coupler connections in the Diaphragm Walls were properly supervised and inspected.

163. No criticism of Intrafor's supervision or inspection of the construction of the Diaphragm Walls has been voiced in the Commission.

164. The recently retired Director of Highways, Mr. Chung Hum Wah, in response to a question from Mr. Pennicott QC, for example said on Day 35 [T/Day35/121/25-122/7]:

"Q. At the moment, Mr Chung, I would, with respect, ask you just to focus on my question, because, so far as I can tell, having looked at (a), (b), (c), (d) in paragraph 43(1) of your witness statement, and the various documents that you there refer to, there is no criticism of the supervision of the construction of the diaphragm walls by Intrafor. Do you agree?

A. Indeed, there was no criticism."

165. Intrafor maintained the coupler records required under the QSP, and also the cage to cage connection records. See for example paragraphs 13- 49 in Mr. Gillard's 2nd statement and also see his oral testimony on Day 2 [T/day 2 / 162/2 – 168/14].

166. These have been produced to the Commission save for a number of sheets that could not be found. In this regard, Intrafor is taking steps to revise its document management procedures in order to strengthen the system for custodianship of documents, and to reduce the possibilities of documents being lost. Further details can be seen response 2(iv) in Intrafor's letter to Development Bureau of 27 December 2018.

167. These contemporaneous records, whilst certainly not perfect, are, it is submitted, satisfactory, and have been the subject of generally favourable comment by a number of different parties during the hearings.

168. Mr. Adrian Rooney, formerly General Manager of the MTR, for example commented on the Intrafor records a number of times on Day 28. For example:

(i) "*Q. But for present purposes, for illustrative purposes, we are going to try to focus on one, and it is EH76. Could we please, first of all, see bundle F19, page 13272.*

Mr Rooney, this is what we know is a summary sheet prepared by Intrafor, and in this instance signed off by Intrafor and Leighton but not MTR, but don't worry about that. We know that some of these records are signed by all three parties, some by two and some by one. But don't worry about that. That's a point of detail.

What Intrafor do here, on this summary sheet, is collect together information which can be gathered from a whole series of documents that are attached to this summary sheet. I don't know whether this is something you've seen before, but --

A. To be honest, I haven't seen this particular format, but I've seen similar formats before for diaphragm wall, yes.

Q. All right. If we go to page 13279 -- we can probably blow up a part of that for you -- what it is, Mr Rooney, just to tell you what it is, is –

A. It looks a very good record.
Q. -- rebar by rebar -- sorry, cage-by-cage signing-off sheet, effectively.

A. I understand. It looks very good."

[T/Day 28/20/19 –21/22]

(ii) *"…A. To go to that level of detail, it's extremely admirable, and in respect to the D-wall records, they are an extremely comprehensive set of records, probably some of the best, to be honest, that I've seen.*

MR PENNICOTT: Yes. I don't think, and if I may say so, Mr Rooney, I don't think there's anything between us on that. Certainly from my perspective, I agree with you about the D-wall records, and that's why I've taken you to them --

A. I understand."

[T/Day 28/35/4 –13]

169. Mr. Leung Fok Veng, MTR's design manager, confirmed, on day 26 [T/day 26/106/18 -107/1], that he had no problems in collecting the information for checking of the splicing assembly during the BA14 submission for the Diaphragm Walls.

170. It would undoubtedly be better if there were not missing signatures from various of the cage to cage connection records and from various of the coupler records.

171. However, the evidence is that, even where there are missing signatures, the inspections of the individual connections and couplers took place. This was confirmed by Mr. Gillard in his witness statements and also in his live testimony. See for example, §59 of Mr. Gillard's 2nd statement, and also Day 3 [T/day 3/ 62/2/-25] . It is also corroborated by MTR's Wong Chi Chui at paragraphs 7.1 and 7.2 of his statement [B10/13658].

X. Diaphragm Walls: no cause for concern

172. There is no evidential or other basis for concern with regards to the Diaphram Walls either now or in the future.

XI. Conclusion

173. In all of the circumstances, Intrafor respectfully invites the Commission to make no adverse findings with respect to either the Diaphragm Walls as constructed by Intrafor, or to Intrafor itself.

Julian Cohen
Counsel for Intrafor
22 January 2019