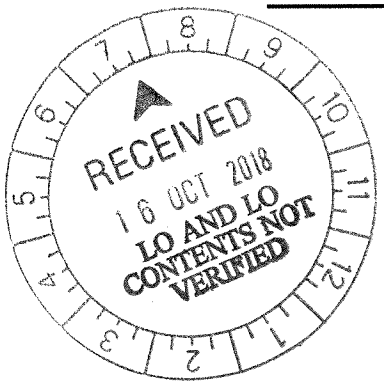
IN THE MATTER OF

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



3rd WITNESS STATEMENT

OF

JEAN-CHRISTOPHE, JACQUES-OLIVIER GILLARD

I, Jean-Christophe, Jacques-Olivier Gillard, of 20th Floor, Eight Commercial Tower, 8 Sun Yip Street, Chai Wan, Hong Kong say as follows:-

Introduction

1. I am duly authorised to make this, my third, witness statement on behalf of Intrafor Hong Kong Limited ("Intrafor").

2. I make this statement in order to respond to various matters contained in the witness statements served by other Interested Parties to the Commission.

3. Given the volume of Witness Statements served by other Interested Parties:

   (i) I have only responded to matters that, based on my current understanding of the issues being considered by the Commission, I believe are material;

   (ii) where several Witness Statements contain the same or broadly similar evidence, I have not responded to each and every Statement.

4. In the circumstances, I would ask the Commission to bear in mind that where I have not responded to a matter in another Interested Party's Witness Statement(s), it does not necessarily mean that I agree with that evidence.

5. In preparing this statement, I have been assisted by members of my team at Intrafor including those who were involved in the Project.

6. Where matters that I set out are within my own knowledge, they are true. All other matters are true to the best of my knowledge and belief.

Witness Statements served by Leighton

Witness Statement of Brett Buckland [C20800-20811]

Paragraphs 6 to 10 [C20801 -20802]

7. In these paragraphs Mr. Buckland explains, amongst other things, that:

   (i) His statement will address alleged deviations of the as-built conditions of the East diaphragm wall from the BD's approved plans, as requested in a letter from Lo & Lo to Leighton's legal advisers dated 10 August 2018.

   (ii) He further explains that the understands the letter of 10 August 2018 refers to the use of continuous reinforcement bars (i.e. not connected by couplers) to connect the EWL Slab, the eastern diaphragm wall and the OTE Slab. He defines this as the "Change".

8. Before continuing, it is important that I clarify that Intrafor was not involved with, and has no knowledge of, either the Change or the BD approved plans.

9. Intrafor was engaged on a 'construction only' basis for the diaphragm walls. Intrafor had no design responsibility or liability for the diaphragm walls or any other element of the Permanent Works. Intrafor constructed the diaphragm walls in accordance with the designs, shop drawing approvals and instructions issued to it by Leighton. As such, Intrafor was not involved with, and had no knowledge of, what designs and plans had been approved by BD or whether revisions or amendments had been sought or approved.

10. The design for the eastern diaphragm wall that was approved for Intrafor to build included the installation at the top of the wall of starter bars with couplers at each end. These couplers were for later connection by Leighton to threaded re-bar in the Slabs that would be constructed after Intrafor had finished its works.

11. Intrafor built the eastern diaphragm wall in accordance with the instructed design, and installed these starter bars with pre-assembled couplers.

12. At no time has Intrafor removed the installed starter bars or couplers. Intrafor did not undertake any works to implement the use of continuous reinforcement bars to connect the Slabs and the eastern diaphragm wall and nor did it undertake any demolition of the eastern diaphragm wall. The starter bars with couplers and the top of the eastern diaphragm wall were intact when Intrafor completed its construction work.

Paragraphs 21 to 25 [C20805 -20806]

13. Mr Buckland, in these paragraphs, describes the need to adjust the original design of the eastern diaphragm wall in order to create space for the insertion of a tremie pipe (for the pouring of concrete) between the reinforcement bars. I can confirm that there was a need to adjust the reinforcement arrangement of the working drawings at the top of the wall.

14. 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. First, the congestion would make it difficult to build and install the steel work itself together with the incorporation of reservation tubes and tremie pipe. Secondly, the amount of steel work could adversely affect the flow of concrete when poured, leading to quality concerns.

15. 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 (**Exhibit 40**).

16. I should explain, in this context that, 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. 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.

17. I was not at the meeting of 29 April 2013, and we have not been able to locate any minutes or notes of the meeting. It is therefore not clear to me whether a decision was taken at the meeting to delete the U-Bars or whether Atkins was giving a provisional indication. In any event, it would have been for Atkins to consider and confirm the design and engineering. It was their design.

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

19. On 11 June 2013 Intrafor provided Leighton 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.

20. 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. Intrafor was not involved in the design of the diaphragm walls and had no access to the design and engineering calculations and assumptions. In theory, this sort of solution would also likely 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 the Slab at all.

21. Intrafor, as Leighton's sub-contractor, was not directly involved with all of Leighton's subsequent dealings with either MTR or MTR's Detailed Design Consultant (Atkins). I therefore cannot comment on the detailed chronology in Mr Buckland's exhibit BB-1.

22. 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.

23. On 5 July 2013, David Wilson confirmed in an email 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."*

24. The final revised design for the arrangements at the top of the eastern diaphragm wall, that Intrafor was required to construct, successfully resolved the 'buildability' problems, and also eased the congestion at the top of the wall. First, the two rows of re-bar in the original design became three rows in the final design, with space left for tremie pipes. Secondly, T40-150 U bars were removed.

25. Intrafor produced revised draft Shop Drawings and Bar Bending Schedules for panel EM98 that reflected the final design. These were approved by Leighton on 19 July 2013 **(Exhibit 41)** and by MTR, with minor un-substantive comments, on 24 July 2013 **(Exhibit 42).**

26. 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.

27. I am not aware of, and cannot comment on, whether the 2013 changes in the arrangements for the top of the wall required, or received, approval from BD. I also am not aware of, and cannot comment on, whether corresponding changes were made to the re-bar arrangements for the Slabs so that the threaded re-bar would match the revised arrangements at the top of the eastern diaphragm wall.

28. The final revised design for arrangements at the top of the wall in Panel EM98 was adopted for r all of the panels on the eastern diaphragm wall. Intrafor therefore constructed the eastern diaphragm wall from 2013 to 2015 in accordance with the final revised design's arrangements for the top of the wall.

29. On 23 September 2014, 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?" **(Exhibit 40)**

30. Simon Intrafor replied by email on 24 September 2014, 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 12.44pm."

It is apparent when reviewing the attached emails that reference to an email of 5 July 2014 at 12.44 was a typographical error,and should read 5 July 2013.

31. We have not been able so far to establish what prompted Leighton's email of 24 September 2014 or whether there was any further follow up action.

32. On 14 January 2015, however, 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

33. As I have explained above, 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 as the top of the wall.

34. Intrafor was asked to install T40-150 U bars as the top of the wall for the panels constructed after Panel EM 98. 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.

35. 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*".

36. 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."

37. I understand, in part 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 to 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.

38. 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 Leighton, MTR and Atkins to address. It was not a matter that directly involved Intrafor. 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.

39. On 24 April 2015 **(Exhibit 43)**, Leighton instructed Intrafor by email:

".. 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)."

40. Leighton's email also enclosed various material including:

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

- 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.

- 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.

- 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."

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

42. As I have explained in paragraphs 60 to 65 of my 2nd Witness Statement, Intrafor installed the rebar cages for Panels EM104, EH105, EH108 and EH109 in accordance with the shop drawings in April and May 2015 and was similarly instructed to pour the concrete to a lower level.

43. 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.

44. I understand from reading materials made available during the Commission process that:

- From about April or May 2015, an issue arose between BD and MTR in relation to an alleged deviation from, and non-conformity with, the BD approved drawings for the design of the top of the eastern diaphragm wall.

- BD considered that the removal of the U-bars at the top of the wall was a deviation and non-conformity with the approved design.

- BD ultimately closed out the non-conformity to its satisfaction.

- BD did not require the top of the eastern diaphragm wall to be demolished or for anchors to be installed into the top of the eastern diaphragm wall.

- BD considered that any engineering issues could be resolved without modification to the diaphragm wall.

45. I wish to emphasise, however, that Intrafor was not directly involved with these matters and that I have no knowledge of them. I set out my understanding above as background only.

46. I can, however, confirm that:

(i) Intrafor was never asked to demolish any part of the eastern diaphragm wall, and has never done so.

(ii) Intrafor was never asked to install anchors in the top of the eastern diaphragm wall, and has never done so.

(iii) No party has ever suggested to Intrafor that any part of the eastern diaphragm wall needed to be demolished by reason of Intrafor's workmanship or any other reason associated with Intrafor.

Paragraphs 26 to 28 [C20806 -20807]

47. In these paragraphs, Mr Buckland refers to Technical Queries 33 and 34 (exhibit BB-3) raised between Leighton and Atkins.

48. Intrafor was not sent Technical Queries 33 and 34 at the time that they were issued on 22 July 2015. Indeed, as far as I have been able to establish, the first time that Intrafor has seen them is during the Commission process.

49. Technical Query 33 attaches a sketch showing an alternative scheme for the top of the diaphragm wall.

50. I can confirm that Intrafor was never instructed to construct or modify the diaphragm wall in accordance with this, or any related, scheme. Technical Query 33 itself indicates that the query arises out of OTE slab dimensions in some locations.

51. Technical Query 34 refers to an attached sketch. This sketch shows (1) hacking off concrete at D-Wall, (2) extending T1 rebar on the far side of the D-Wall, (3) casting the hacked off portion and EWL Slab in one go.

52. Technical Query 34 asks Atkins as follows:

"Referring to Sketch No. Sk-0034-001, it is noted that *the level of the couplers at EH74 is approximately 70mm lower than the EWL slab rebars.*

1) Please advise if the proposal in the attached sketch is feasible.

2) Advise the minimum thickness of the hacked-off portion at D-Wall.

Atkins' response was:

"We have no adverse comment to your proposal to trim down the d-wall and replace the top layer of rebar with a full length bar (without any coupler) as shown per attached sketch."

53. I can confirm that Intrafor was never instructed to construct or modify the diaphragm wall in accordance with this, or any related, scheme.

54. I do not fully understand the note in Technical Query 34 that "*..the level of the couplers at EH74 is approximately 70mm lower than the EWL slab rebars..*". I can confirm, however, that:

(i) Technical Query 34 was never sent to Intrafor.

(ii) No NCR or contra-charge or claim was ever raised by Leighton against Intrafor for couplers at EH74.

(iii) A difference of 70mm would appear to be within tolerance as the contractual tolerance is 75mm.

(iv) No NCR or claim was ever raised by Leighton against Intrafor for demolition of the top of the eastern diaphragm wall.

<u>Paragraphs 32 to 44 [C20808 -20811]</u>

55. Intrafor has no knowledge of, or involvement with, the matters addressed in these paragraphs.

Witness Statement served by MTR

Witness Statement of Wong Chi Chung of MTR [B167-179]

In response to paragraph 53 [B179]

56. Mr. Wong says in this paragraph that he saw trimming of the east diaphragm wall during his monthly site walks in 2015 and 2016, and was told by staff of site that this was to rectify defects at the top of the wall from the casting of concrete. He says that such trimming was common when using tremie concrete and so he did not ask further questions.

57. I am not aware of any significant defects at the top of the wall from the casting of concrete or the precise nature of the trimming carried out by Leighton after Intrafor completed the diaphragm walls.

58. However trimming of overcast concrete is necessary when pouring concrete using a tremie pipe. The reason for this is that concrete displaces the Bentonite sludge that is used in the excavation to maintain stability of the excavation.

59. In order to ensure good, unpolluted concrete at the design cut-off level the concrete is cast to a level 700-1000mm higher than the design cut off level. The top 700-1000mm of concrete may be polluted with Bentonite (any such pollution is readily visible) but the concrete below the design cut off level can be assured to be good, unpolluted, concrete. The "over cast" concrete can either be left in place or trimmed down to the design cut off level.

Witness Statement of Leung Fok Veng of MTR [B239-258]

In response to paragraphs 34-38 [B 248 – 249]

60. I refer to, and repeat, the matters that I have set out above, in response to Mr. Buckland's statement.

Witness Statement of Chan Kit Lam of MTR [B262-287]

In response to paragraphs 20(i) [B269], 29 -36 [B272-274], 40-41 [B277-278]

61. I refer to, and repeat, the matters that I have set out above, in response to Mr. Buckland's statement.

62. In addition, I would add that I do not understand the basis upon which it is said, in paragraphs 40-41, that the misalignment of the top most layer of couplers on the excavation face of the eastern diaphragm wall led to a remedial proposal of replacing couplers with through bars. As I have mentioned above, Intrafor was not sent a copy of Technical Query 34, nor have NCRs or back charges or claims been raised against Intrafor. Certainly, I am not aware of any suggested problem with Intrafor's workmanship or construction. As Intrafor was not involved with the design or engineering or with the Slabs at all, I cannot comment further.

In response to paragraph 59 [B283]

63. I wish to clarify that a water stop is cast in at each joint of the diaphragm wall panels.

Witness Statement of Ho Ho Pong James of MTR [B320-354]

In response to paragraphs 57-69 [B338-344]

64. I refer to, and repeat, the matters that I have set out above, in response to Mr. Buckland's statement and in response to paragraphs 40-41 of Mr Chan Kit Lam's statement.

Witness Statement of Lok Pui Fai of Buildings Department [H2187-2213]

In response to paragraphs 32-34 [H2198-2199] and Exhibits LPF 8 and LPF 9

65. In paragraph 32 of his statement and his Exhibit LPF-8, Mr. Lok refers to various CoC Submissions made by MTR to BD in relation to the diaphragm walls.

66. I should first explain that these CoC submissions are the same submissions that I described, in paragraphs 38 to 49 of my 2nd Witness Statement, as 'As-Built' submissions / packages sent by MTR to BD.

67. As Mr. Lok correctly summarises in his table set out in his paragraph 32, the first round of submissions made by MTR for Batches 1 to 5 inclusive were rejected by BD in the

period May to September 2015. I note that copies of the submissions for Batches 1 to 6 are in exhibit LP-8

68. 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. 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 is the process that I have described in paragraphs 38 to 49 of my 2nd Witness Statement. MTR then made re-submissions for Batches 1-5, which were accepted by BD. Batch 6 was accepted without re-submission as the findings in the review process for Batches 1 to 5 was applied to Batch 6 but before its first submission. I note that copies of the as-built plans for Batches 1 to 6 are in exhibit LP-9

69. I also see from the letters issued by BD to MTR (in LPF-8) rejecting Batches 1 to 5, that a further issue that appears to have caused rejection was BD's concerns regarding the alleged deviation from the BD approved drawings related to the reinforcement details at the top of some Eastern walls along gridline M including the omission of the U Bars (which I have addressed in response to Mr. Buckland's statement). This held up the selection of panels for proof testing.

70. I can confirm, however, that when the proof testing was carried out, the results were satisfactory.

71. As Mr Lok notes in paragraph 34, a Certificate of Completion for the whole diaphragm wall package was acknowledged by BD on 5 May 2017.

Dated this 16th day of October 2018

Jean-Christophe, Jacques-Olivier Gillard

Corrigendum to the Witness Statement of Jean-Christophe,

Jacques-Oliver Gillard dated 16th October 2018 ("**3rd Statement**")

Page	**Paragraph**	**Content**
F24261	8	Amend ", and has no knowledge of, either the Change or the BD approved plans" to "the Change in relation to the BD agreed plans under the Instrument of Exemption"
F24261	9	Amend ", and had no knowledge of, what designs and plans had been approved by BD or whether revisions or amendments had been sought or approved" to "any consultation process with BD under the Instrument of Exemption regarding revisions or amendments to the BD agreed plans"
F24264	27	Amend "required, or received, approval from BD" to "required consultation with, or received agreement from BD. Whilst Intrafor was working with Leighton in relation to the buildability of the designed reinforcement arrangements, Intrafor was aware of the possibility that some changes to reinforcement arrangement might necessitate consultation with BD. I have seen emails in relation to some aspects of the design where Intrafor has raised this question, and also emails indicating at various times in June and July 2013 there were discussion between MTRC/Leighton and BD on aspects of the reinforcement design. I have not been able to identify whether the

		resolution of the buildability problems with the tremie pipe and congestion were raised in this manner or note"
F24272	68	Delete: ", which were accepted by BD"
F24272	68	Add: "I have become aware that following the re-submissions of Batches 1 to 5 and the submission of Batch 6 in January 2016, there was a continuing series of communications between MTR and Leighton, which also involved Intrafor, to close out any remaining discrepancies, errors or clarifications. I understand that this involved making amendments which had been agreed by MTR and Leighton, and checked by Intrafor's AS, which included hand marked amendments directly on the As-built Drawings at BD's offices, and signed by Intrafor's AS. The Batches were accepted by BD in May 2017." at the end of Paragraph 68