COMMISSION OF INQUIRY INTO CONSTRUCTION WORKS AT AND NEAR THE HUNG HOM STATIN EXTENSION UNDER THE SHATIN TO CENTRAL LINK PROJECT

WITNESS STATEMENT OF CHAN KIT LAM
FOR
MTR CORPORATION LIMITED

I, **CHAN KIT LAM**, of AECOM, 8/F, Tower 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, Hong Kong, **WILL SAY AS FOLLOWS:-**

1. I am the same Kit Chan (the former Construction Manager ("**CM**")) who gave two witness statements on 13 September 2018 and 12 October 2018 for 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 (the "**Original Inquiry**").

2. I first joined MTRCL in July 2010 as the CM for the South Island Line Project (Contracts 903, 907 and 908), and I remained in that position until November 2013. Thereafter:-

   (i) From December 2013 to November 2014, I was the CM for the West Island Line Project (Contract 704);

   (ii) From November 2014 to May 2016, I was the CM for the Shatin to Central Link Project ("**SCL Project**") (Contract 1112). I was also appointed as the Competent Person Representative ("**CP Representative**") for Contract 1112 in December 2014;

   (iii) From June 2016 to December 2016, I was the CM for the South Island Line Project (Contract 901);

   (iv) From December 2016 to March 2018, I was the CM for the Express Rail Link Project (Contract 811B).

3. In or around June 2018, I was assigned by AECOM, a consultant to MTRCL, to work on the construction of the Exhibition Centre Station of the SCL Project. In or around late July 2018, I was asked to assist in dealing with queries raised by the Commission of Inquiry in the Original Inquiry.

4. I obtained a Bachelor's Degree in Applied Science from the University of Toronto, Canada in 1978. I am a Registered Professional Engineer of the Engineers Registration Board of Hong Kong (since February 2010) and a member of the Hong Kong Institute of Engineers (since June 1985). I was also a member of the Institution of Civil Engineers, UK (December 1982 to December 2017).

5. I am providing this witness statement in response to the matters relating to Issue 3 raised in a letter dated 22 March 2019 to Messrs. Mayer Brown (solicitors for MTRCL) titled "*Commission of Inquiry into the Construction Works at and near the Hung Hom Station Extension under the Shatin to Central Link Project (Request for Witness Statements – HHS)*" (the "**HHS Letter**" [BB1/34-44]) from Messrs. Lo & Lo (solicitors for the Commission of Inquiry). Issue 3 is identified in the HHS Letter as the "*lack of RISC forms, inspection and supervisory records and deviations at NAT, SAT and HHS*".

6. For the reasons stated in paragraphs 9 to 13 below, my response in this witness statement only relates to the issues in HHS, except on the deviation issues in all of the NAT (Items 3.14 to 3.18 of Messrs. Lo and Lo's letter dated 22 March 2019 on NAT ("**NAT Letter**" [BB1/1-22])), SAT (Items 2.14 to 2.18 of Messrs. Lo and Lo's letter dated 22 March 2019 on SAT ("**SAT Letter**" [BB1/23-33])) and HHS which I have been recently involved in and will also cover for all three areas in my statement.

7. I understand that other witnesses of MTRCL will address other questions under Issue 3 in relation to NAT and SAT. Unless otherwise specified, item numbers referred to in this statement are to the corresponding paragraphs in the HHS Letter.

8. While I am aware of the matters raised in the NAT, SAT and HHS Letters based on my first-hand observations and personal involvement in the SCL Project, and I confirm that the contents of this statement are true to the best of my knowledge and belief, there are occasions when I can only speak to matters by reference to MTRCL's documents due to the lapse of time, in which case I believe the contents of those documents are true and correct.

My involvement in NAT, SAT and HHS under Contract 1112

9. Before I left Contract 1112 in May 2016, I had been involved in the construction works at the NAT, SAT and HHS.

10. For NAT, only 5 pours had completed concreting by the time I left Contract 1112. I was primarily involved in temporary works and excavation works for some of the bays in NAT before I left Contract 1112.

11. As for SAT, I had overseen the casting of 16 pours of concrete before I left Contract 1112.

12. As regards HHS, most of the accommodation blocks had been completed by the time I left. Further, most of the underpasses and approximately half of the track slabs had finished concreting by the time I left. However, construction of the trough walls was still ongoing.

13. For NAT, SAT and HHS, I dealt with the following subordinates on a regularly basis:

    (i) Joe Tsang and James Ho, who were the Senior Construction Engineers at the time;

    (ii) Pedro So, Dick Kung, Kobe Wong and Victor Tung who were the Senior Inspectors of Works at different periods when I was on Contract 1112.

14. As for the staff of Leighton Contractors (Asia) Limited ("**Leighton**"), I usually dealt with either Mr. Ian Rawsthorne, Mr. Joe Tam, Mr. Marco Chan or Mr. Malcolm Plummer.

General:

Item 1.1: By way of background, describe and explain generally the construction works at HHS, in particular, the rebar fixing and concreting works and describe the timeline for the construction and completion thereof

15. The major construction works in HHS commenced in around December 2014 and were completed by May 2017. The construction works in HHS generally are comprised of:-

    (i) Construction of stabling siding tracks (including inspection and heavy cleaning tracks) enclosed in trough walls;

(ii) Construction of the North Fan Area ("**NFA**") where the train tracks merge and connect the siding tracks with the EWL main line in the NAT area;

(iii) Construction of two launching and retrieval tracks ("**L&R tracks**") which connect the tracks in the stabling siding area with the EWL main line in the SAT area;

(iv) Underpinning of the existing Hung Hom station podium structure;

(v) Construction of 8 accommodation blocks; and

(vi) Construction of two underpasses under the stabling sidings to provide for access to the siding tracks.

16. Due to the extensive geographical scope of the works in HHS, the steps and procedures of the construction of different structures in HHS are set out in various Method Statements submitted by Leighton. I set out below a table setting out these Method Statements and the corresponding Inspection and Test Plans ("**ITPs**") (including references to the specific hold points for rebar fixing inspection and pre-pour checking in the ITPs) as submitted by Leighton:-

Area	**Method Statement (CSF Reference)**	**Inspection and Test Plan**	**ITP – "Rebar fixing" and "Pre-Pour Check" hold points**
Track slab	[Item 4 of 3rd List] 1112-CSF-LCA-CS-000442	[Item 4 of 3rd List] H2601-ITP-LCA-CON-186-00	Item 8 (Inspect rebar fixing) Item 9 (Pre-pour check)
Underpass	[Item 3 of 3rd List] 1112-CSF-LCA-CS-000369	[Item 3 of 3rd List] H2601-ITP-LCA-CON-147-00	Item 14 (Inspect re-bar fixing and any cast-in items) Item 15 (Pre-pour check)
NFA	[Item 6 of 3rd List] 1112-CSF-LCA-CS-000198 (pile cap)	[Item 6 of 3rd List] H2601-ITP-LCA-CON-216-00	Item 8 (rebar fixing for pile cap construction) Item 9 (Concrete operation)
Accommodation blocks	[Item 2 of 3rd List] 1112-CSF-LCA-CS-000281 (substructure)	[Item 2 of 3rd List] H2601-ITP-LCA-CON-107-00	Item 9 (Inspect rebar fixing) Item 10 (Pre-pour check)
	[Item 1 of 3rd List] 1112-CSF-LCA-CS-000159 (superstructure)	[Item 1 of 3rd List] H2601-ITP-LCA-CON-106-00	Item 9 (Inspect rebar fixing) Item 10 (Pre-pour check)

	[Item 5 of 3rd List]	[Item 5 of 3rd List]	
Underpinning (North and South)	1112-CSF-LCA-CS-000580 (pile cap)	H2601-ITP-LCA-CON-181-00	Item 11 (rebar fixing, formwork, cleanliness etc.)

Table 1 - Summary of Method Statements and ITPs

Item 1.1.1: Provide a general layout plan and sectional drawings of the HHS

17. The general layout plan of HHS is shown in **Appendix I** of this witness statement. I also attach in **Appendix II** a cross sectional drawing of the HHS structure cut at the line A-A in the general layout plan for illustration purposes of the various tracks and trough wall structures.

Item 1.2: Describe and explain, with reference to the terms of the relevant contract(s), approved plans, drawings, laws and regulations, practice notes, handbooks, guidelines, circulars, industry standards, approved site supervision plan(s) quality supervision plan(s) and quality assurance plan(s), practice, procedures and requirements (the "Requirements, Standards and Practice"):

Item 1.2.1: the steps and procedures involved in the rebar fixing works and concreting works in the construction of HHS

18. In general terms, the rebar fixing works and concreting works which formed part of the construction works in HHS (and similarly for NAT and SAT) involve the following steps:

(i) Sampling and testing of rebars and couplers by an approved material testing laboratory;

(ii) After the relevant blinding layer, waterproofing and associated formwork were completed, steel fixers would fix the rebars in accordance with the latest working drawings;

(iii) The Inspectorate teams from MTRCL would carry out daily surveillance to ensure the quantities, sizes, spacing of, and support to, the rebars were correct and adequate. Members of the Engineering team who were appointed as Technically Competent Persons (TCPs) under the Site Supervision Plan ("**SSP**") would also carry out inspections at relevant frequencies stipulated in the SSP;

(iv) Representatives from MTRCL and Leighton would carry out a joint final inspection upon completion of the whole steel reinforcement to ensure compliance with the specification and construction drawings;

(v) Before pouring concrete, representatives from MTRCL and Leighton would carry out a joint final inspection to confirm the condition of the construction joint, cast-in-items, starter bar connections and the general cleanliness of the reinforcement and formwork;

(vi) Representatives from MTRCL and Leighton would carry out a joint inspection of the fresh concrete delivered to site and ensure that the concrete sampling procedures were carried out in accordance with relevant standards and specifications;

(vii) Representatives from MTRCL and Leighton would inspect the concrete pouring process and ensure that the procedures and results were in accordance with the agreed methods.

19. The steps and procedures of the construction of various structures in HHS are set out in the Method Statements submitted by Leighton and identified in Table 1 in paragraph 16 above. For more details of the rebar fixing and concreting works in HHS, please refer to those Method Statements.

Item 1.2.2: the respective roles and responsibilities of MTRCL and each of the contractors and subcontractors involved in the rebar fixing and concreting works in HHS. Identify the contractors and subcontractors involved

20. As the project manager of the SCL Project, MTRCL was responsible for managing the construction works in HHS. Leighton was the main contractor under Contract 1112 and was directly involved in the construction works in HHS in its capacity as the main contractor under Contract 1112.

21. As to the list of sub-contractors engaged by Leighton for the rebar fixing and concreting works in HHS, I refer to the following list of sub-contractors who carried out these works within HHS:-

	Works area	Re-bar fixing	Concreting
1.	HHS Stabling sidings tracks Accommodation blocks 1-3 and 8 Underpasses	Wing and Kwong	Bik Hoi
2.	Accommodation blocks 4-7	Wing and Kwong	Richwell
3.	NFA track slab and trough wall	Wing and Kwong	Tung Yat

Table 2 – Rebar fixing and concreting sub-contractors in Contract 1112

Item 1.2.3: Please also confirm and explain whether testing and approval were required in respect of the use of such rebars and couplers and if so, describe and explain the testing and approval procedures. Please produce the relevant testing and approval records

22. In general, MTRCL required Leighton to submit a "Material Related Submission Form" in respect of the type of rebars and any couplers that Leighton proposed to use. The "Material Related Submission Form" should set out, among other things, the name and type of the proposed rebar/coupler, the name and address of the proposed supplier, and the proposed location and duration for its use. MTRCL would then approve, reject or comment on the proposed use of that type of rebar / coupler by reference to the requisite standard and requirements set out in, among other things, the acceptance letters issued by the Buildings Department ("**BD**") and the [C5/3545-3773] "*Materials and Workmanship Specification for Civil Engineering Works*" (D/MTRCL/NW/CIV/M&W/001/A3) ("**M&W Specification**"). Upon MTRCL's approval, Leighton would place orders with the approved supplier and arrange delivery of the approved rebars / couplers to the site.

23. Upon delivery of the rebars and couplers to site, the rebars and couplers should be sampled and tested in accordance with the requirements set out in [C5/3749-3773] Section 10 of the M&W Specification and the [BB2/1178-1213] "*Construction Standard on carbon steel bars for reinforcement of concrete*" ("**CS2**"). Each batch of rebars and couplers delivered to the site should be sampled in accordance with [C5/3754-3755] paragraph 10.14 and [C5/3769-3773] Appendix 10.1 of the M&W Specification. The sample details should be recorded in a Steel Test Request Form ("**STR Form**"). The specimen of rebars should be tested to determine their yield stress, elongation, tensile strength, bending and re-bending properties and unit mass. On the other hand, each specimen of coupler should be tested as a connected assembly (1 coupler joined to 2 lengths of rebar each 500mm long, which should be of the same type,

size and grade as the rebars to which the coupler would be fixed in the construction works) to determine the tensile strength and the slip between the coupler and the bars.

24. In addition to the foregoing, MTRCL should comply with BD's specific sampling and testing requirements set out on its acceptance letters.

[BB2/543-1059]

25. A summary of the relevant testing results for HHS have been disclosed by MTRCL to the Commission of Inquiry on 3 May 2019 in response to item [BB1/4] 1.7.4 of the NAT Letter.

Supervision, Inspection and Records

Item 1.3: Describe and explain, with reference to the relevant Requirements, Standards and Practice, the supervision, monitoring, quality control and inspection system in place in respect of the rebar fixing works and concreting works for HHS. Explain and confirm at which stages supervision and inspection was required to be carried out by MTRCL in respect of the rebar fixing works and concreting works in HHS

26. The stages which required site surveillance and inspection by MTRCL in respect of the rebar fixing works and concreting works in the construction of HHS have been set out in paragraph 18 above.

Item 1.3.2: describe and explain the frequency of the supervision and inspection by the inspectors of MTRCL

27. Day-to-day routine site surveillance was carried out by members of the Inspectorate team during the construction period to inspect the works on site, and to ensure that the progress of works, site arrangement and site safety were satisfactory. The precise timing and frequency of such daily routine site surveillance depended on each Inspectorate team member's practice, but in general inspectors would return to the site office before and after the lunch period, and before the end of each day, to handle paperwork and other administrative works (i.e. daily record / photo record). Other than such periods, the inspectors would generally be on site.

28. Formal inspection of works required at hold points as defined in the approved Method Statements and ITPs (including rebar fixing and pre-pour checks) would be carried out by representatives from the Inspectorate and Engineering teams of MTRCL upon being notified by Leighton that such works were ready for inspection. I shall leave it to other

members of MTRCL's Construction Management team ("**CM Team**") to address this issue in their witness statements in greater detail.

Item 1.3.3: describe and explain how supervision and inspection were actually carried out in respect of such works

29. As to the carrying out of the daily routine site surveillance and the formal hold point inspections, I shall leave it to other members of MTRCL's CM Team to address this issue in their witness statements in greater detail.

RISC Forms

Item 2.7: With reference to the timeline in the construction and completion of HHS, describe and explain the various stages and checkpoints at which RISC form inspections would have to be conducted and RISC forms would have to be generated by Leighton and provided to MTRCL to counter-sign

30. In general, RISC form inspections (or in other words, formal hold point inspections) would be conducted jointly by representatives from MTRCL and Leighton for some critical works which were defined as "HOLD POINTS" in the ITPs of the relevant approved Method Statements. In this regard, with respect to the reinforced concrete structures in HHS, two RISC form inspections – one for rebar fixing and the other for the pre-pour inspection, were required prior to the commencement of the relevant concreting works as defined in the ITPs listed in Table 1.

31. The carrying out of the RISC form inspections generally involved the following steps:-

    (i) Leighton should first initiate the RISC form inspection process by issuing a RISC form to MTRCL prior to the date and time when the inspection of a particular piece of work was required to be carried out;

    (ii) Upon receipt of the RISC form from Leighton and depending on the nature of the works to be inspected, the SIOW would assign a member of the CM Team to carry out the inspection of that particular piece of work;

(iii) After the completion of the RISC form inspection, the SIOW would return the RISC form completed with the inspection results to Leighton with all the relevant signatures. However, before the SIOW returned the signed RISC forms to Leighton, the member of the construction team who inspected the works would verbally advise his counterpart in Leighton about the result of the inspection right after the inspection, so that the next stage of the works could be progressed with before Leighton received the counter-signed copy of the RISC form.

32. I understand that other members of the CM Team who were involved in some of these RISC form inspections will provide a more detailed account of how the RISC form inspection process was actually carried out in their witness statements.

Item 2.9: In the event that a contractor has missed a particular RISC form inspection at any stage of the construction and no RISC form has been tendered to MTRCL to alert its inspectors to carry out a RISC form inspection, please explain whether it is possible that the construction could have proceeded to the next stage without the knowledge and/or inspection of MTRCL, particularly when the relevant RISC form properly endorsed by the parties was subsequently found missing. Describe the procedures and safeguards in place on the part of MTRCL to ensure that RISC form inspections could not be missed by the contractor

33. Insofar as works in HHS are concerned and as mentioned in paragraph 27 above, MTRCL's Inspectorate team carried out daily site surveillance in respect of the construction works on site, and the Engineering team also conducted regular site visits. Therefore, the CM Team would have a general idea of the progress of the works (including the status of any essential works relating to hold points) being carried out on site at different stages.

34. As the subsequent works following the rebar fixing and pre-pour checking hold points were likely to involve a different gang of workers and/or mobilising other equipment (such as concreting trucks), I believe it would be difficult for works to have proceeded beyond the rebar fixing and pre-pour checking hold points entirely unnoticed. I also believe that if Leighton proceeded to pour concrete without first having obtained the relevant permission to proceed from MTRCL's CM Team, members of MTRCL's CM

Team would report such fact to me, and I would follow up with Leighton's project director (i.e. Mr. Malcolm Plummer at that time).

35. As to the inspection of the rebar fixing and pre-pour checking on site and having revisited this issue recently, occasionally the CM Team did not strictly enforce the procedures relating to the submission of RISC forms prior to inspection of those works and the CM Team tolerated the late submission of RISC forms by their counterparts. I will defer to other members of the CM Team to describe the carrying out of the RISC form inspections in their witness statements, but I should emphasise that the toleration by MTRCL's CM Team was aimed at facilitating the progress of Leighton's works and avoiding delays and was based on the spirit of co-operation and trust that Leighton would complete the requisite paperwork shortly after such inspection.

Item 2.12: Explain why such a vast amount of RISC forms are missing in relation to HHS. Identify and provide a summary of all the check points relating to the missing RISC forms for HHS

Item 2.13: While RISC forms are not now available in relation to those identified checkpoints:

Item 2.13.1: confirm and explain whether RISC form inspections have actually taken place at the relevant checkpoints;

36. Leighton's performance in RISC form submissions was persistently poor, as its RISC form submissions were either late or not being made at all. Indeed, I have refreshed my memory with the aid of various documents (as set out below) and I recall that this aspect of Leighton's poor performance was a subject matter of constant reminders to Leighton and I had specifically raised the issue to Leighton's Kevin Harman.

37. Leighton was aware of MTRCL's dissatisfaction with its RISC form submissions and assigned a group led by Kevin Harman to look into the matter. The foregoing is documented in a series of documents prepared by Leighton titled "MTR Outstanding Submission Responses 5-Week Rolling View" and in particular the section titled "Kit Chan Special Request Process Control Register" ("**Special Request Register**").

[Item 13-15 of 3rd List]

38. I confirm that the items in the Special Request Register were raised by me for Leighton to deal with and the issue of Leighton's poor performance in terms of RISC form submissions was first raised in or about May 2015. Two general problems were identified, namely: (1) Leighton was making "*late RISC submissions*" (Item 36A in the Special Request Register); and, (2) Leighton was "*not submitting RISC records inspection requests*" (Item 36B in the Special Request Register).

39. Initially, Leighton had envisaged that the problem would be resolved soon. Although Leighton had purportedly resolved Item 36A on or about 19 August 2015, the problem of late submissions was in fact not resolved and I understand that MTRCL's other witnesses will give further evidence in relation thereto.

40. In any event, Item 36B (*i.e.* Leighton was "*not submitting RISC records inspection requests*") persisted.

41. As shown in the Special Request for the cut-off date of 19 May 2016 (at around the time when I left Contract 1112), the original planned date of resolving Item 36B was continuously deferred from 18 May 2015 to 30 April 2017, indicating that Leighton did not have any immediate solution to resolve the problem. I understand that MTRCL's witnesses will give further evidence as to the complaints made to Leighton in respect of its poor RISC form submissions.

42. Despite Leighton's poor RISC form submissions, due to the tight construction programme MTRCL did not insist on a strict adherence to the RISC form inspection procedure as, if it were otherwise, substantial delay to the works would have been caused.

43. Having said the foregoing, I should emphasise that RISC forms are an administrative procedure and not a statutory requirement and any lack of a RISC form certainly cannot be equated with lack of an actual inspection.

44. I should point out that I have been tasked to lead colleagues in the CM Team to carry out an internal investigation to ascertain whether there is evidence to show that hold point inspections were carried out notwithstanding the absence of some RISC forms. In this regard, we have collated the following information (to the extent that such information is available) as evidence to show that hold point inspections were carried out:

[Item 44 & 66 of 3rd List]

(i) RISC forms;

(ii) WhatsApp messages;

(iii) site photographs retrieved in MTRCL's server;

(iv) Leighton's pre-pour checklists;

(v) site diaries;

(vi) concrete cube/grout submission request summaries;

(vii) non-conformance reports.

45. After collating the information referred to above, we would put the information into [Item 44 & 66 of 3rd List] relevant "boxes" (which match with the "Box No." in the pour summaries). As regards the information for HHS, my colleagues are still collating and sorting such information into different "boxes" and we shall provide such information to the COI as soon as practicable.

Deviation

Item 3.14 of the NAT Letter and Item 2.14 of the HHS Letter: Describe and explain, with reference to diagrams and drawings, the deviation "change on use of Type 1 coupler instead of lapped bar at some of the construction joints at walls" discovered at HHS (and NAT) (the "deviations"). Identify the locations of the deviations in the layout plan of HHS and NAT

Item 2.14 of the SAT Letter: Describe and explain, with reference to diagrams and drawings, the deviation "change on use of Type 1 coupler instead of lapped bar at some of the construction joints at walls" and the deviation "no coupler was used for the standalone SER, TER & CER rooms and associated E&M rooms" discovered at SAT (the "deviations"). Identify the locations of the deviations in the layout plan of SAT

Item 3.16 of the NAT Letter and Item 2.16 of the SAT Letter and HHS Letter: Explain when and how such deviations came about and describe MTRCL's role and

participation in such deviations. Confirm whether MTRCL was aware of these deviations and approved of them at the time of the construction of NAT, SAT and HHS

Item 3.17 of the NAT Letter and Item 2.17 of the SAT Letter and HHS Letter: Explain whether BD's consultation and approval was necessary to effect such deviations and if so, whether such consultation and approval had been sought and if not, explain why it was not necessary

Item 3.18.1 of the NAT Letter and Item 2.18.1 of the SAT Letter and HHS Letter: Explain and confirm whether such deviations concern checkpoints in the construction of NAT, SAT and HHS where RISC form inspections were required

Item 3.18.1 of the NAT Letter and Item 2.18.2 of the SAT Letter and HHS Letter: Explain and confirm whether a full set of RISC forms covering such deviations is available and if so, please produce them and if they are missing, please explain the reason for them to be missing

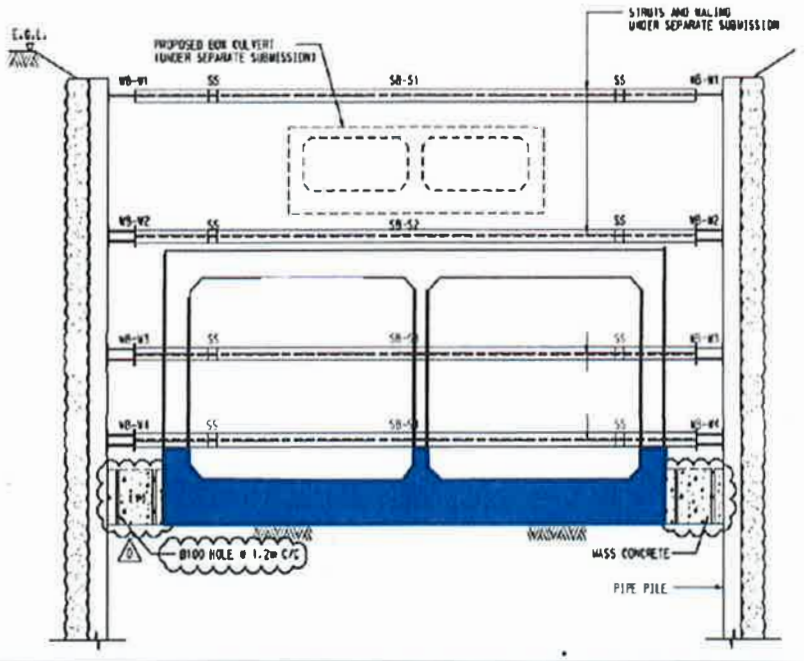
46. One main reason behind the change to the use of coupler instead of lapped bar at some of the construction joints at the slab and the wall at the NAT, the SAT and the HHS was to form an opening at a permanent structure for the provision of a temporary site access for a short period of time (e.g. a few months). This is a very common practice in the construction and engineering industry involving a large civil project like the SCL project. For example, on 15 December 2015, Leighton submitted a CSF [Item 28 of 3rd List] (1112-CSF-LCA-CS-000618) to MTRCL regarding HHS West EVA Road Diversion and Couplers Layout. On 22 December 2015, MTRCL replied by noting that the said submission was for information only.

47. Apart from this reason, at the NSL level of the NAT:

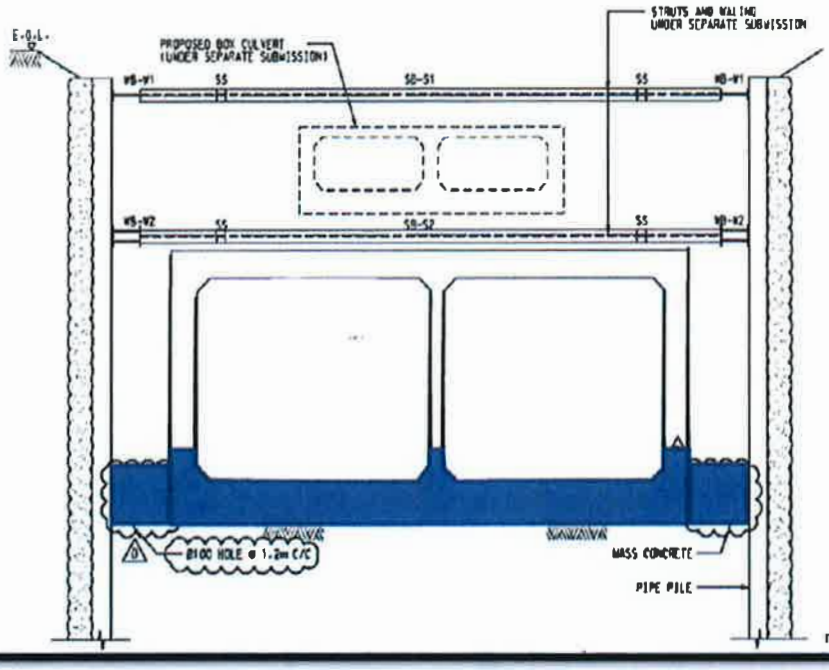
    (i) During the excavation process, layers of horizontal steel struts were installed to provide lateral support to the excavation trench. The steel struts would only be removed after the construction of the base slab and after the gap between the base slab and the pipe pile wall was backfilled with mass concrete. In this respect I refer to the following diagrams extracted from paragraph 6.2 of the 1112 NAT Method Statement titled "*NAT-Method Statement of Permanent Structure Construction of*

East West Line (EWL) and North South Line (NSL) at North Approach Tunnel (NAT)" (1112-CSF-LCA-CS-000673A) [BB1/202-305]:

12. Backfill between base slab and pipe pile with mas concrete in minimum strength 25N/mm2 require before removal of 4th and 3rd layer of struts and lay 100mm diameter pvc pipes at 1.2m c/c within mass concrete



13. When mass concrete has achieved strength pf 25N/mm2, remove strut SB-S5 and SB-S3



ment rev. 8, 12 Dec 2013

BB5201

(ii) As the horizontal steel struts obstructed the fixing of the vertical rebars at the external walls of the tunnel structure, the workers installed vertical couplers at the end of such vertical rebars for connection with the corresponding vertical rebars (for the purpose of constructing the external tunnel walls) after the steel struts were removed.

48. It needs to be borne in mind that when the design of HHS, SAT, NAT was drawn up and in accordance with common practice, no consideration was given at the design stage to coordination, programming and sequencing issues. However, when the design was completed, consideration was then given to coordination and construction sequencing at a high level. If there arose any sequencing or coordination issues then these are resolved at site level. When the works were first commenced, work was expected to be commenced at the same time in different parts of the site. Initially, there are unlikely to be any material coordination or construction sequencing issues as the contractor has "a clean sheet of paper" to build on, but as the works took shape and were progressively constructed, the site space would become more congested such that there would be less 'room' to manoeuvre or to position different components of the structure. This is where 'bottleneck' would occur and eventually clashes would take place. In Contract 1112, for example, the track slab rebar needed to be installed at a time when and at a location where temporary vehicular access continued to be needed and used to access other parts of the site to enable construction work to progress. As I understand it, the foregoing represents the type of site conditions referred to in [Item 49 of 3rd List] Appendix 7 of the Project Management Plan.

49. MTRCL has requested Leighton to provide the details and locations of the deviations for several months. However, Leighton has yet to formally submit the required information to MTRCL for approval.

50. In relation to the NAT:

(i) [Item 50 of 3rd List] By a letter dated 13 December 2018, Leighton submitted draft design proposal drawings for NAT to MTRCL. The CM Team and I reviewed the as-constructed drawings submitted by Leighton at that time.

(ii) Upon review of Leighton's draft design proposal drawings for NAT, the CM Team and I made some marked-up comments on those drawings – in particular, MTRCL

BB5202

pointed out that while the site photographs showed that couplers were used in various locations in NAT (including the locations where the fixing of rebars was obstructed by the steel struts and where couplers were used to form an opening at the external wall for necessary vehicular access), such use of couplers was not reflected in the drawings submitted by Leighton. As Construction Manager, Michael Fu on behalf of MTRCL issued a [Item 51 of 3rd List] letter attaching the drawings with such mark-up comments to Leighton on 11 January 2019.

(iii) By a [Item 52 of 3rd List] letter dated 13 February 2019, Leighton submitted amended drawings in relation to NAT. The CM Team and I commented on those amended drawings, and they were issued to Leighton by a [Item 53 of 3rd List] letter dated 20 March 2019. I understand that Leighton will submit the updated as-constructed drawings shortly.

51. In relation to the SAT:

(i) By a [Item 67 of 3rd List] letter dated 20 September 2018, Leighton submitted a set of design proposal drawings purportedly incorporating the as-built details for the EWL and NSL slabs for Areas A and HKC, as well as the NSL section of the SAT. Upon review of those drawings, the CM Team and I made some comments on the drawings submitted by Leighton, and Michael Fu issued the comments to Leighton on behalf of MTRCL by a [Item 68 of 3rd List] letter dated 23 October 2018. In response, Leighton submitted a set of the updated drawings to MTRCL by a [Item 69 of 3rd List] letter dated 16 November 2018. Given that there were many minor amendments that had to be made to the as-constructed drawings for Area A, Area HKC and the NSL section of the SAT, I recall that Mr. Jon Kitching and I had a discussion and we agreed that Leighton would submit one set of formal as-constructed drawings in respect of all these areas. On 5 December 2018, [Item 70 of 3rd List] Leighton issued a letter to Michael Fu (who passed a copy of the same to me) to reflect the above discussion. Leighton has not yet submitted such as-constructed drawings to MTRCL.

(ii) In around late January 2019, I requested Mr. William Holden to submit to MTRCL the as-constructed drawings for the EWL section of the SAT. On 4 March 2019, I [Item 73 of 3rd List] received from Mr. William Holden an email attaching several amended drawings, which showed a change from lapped bars to couplers at certain locations at the EWL section of the SAT. I understand that Leighton will submit the updated

as-constructed drawings reflecting the changes at the EWL section of the SAT shortly.

52. In relation to the HHS:

[Item 29 of 3rd List]

(i) On 20 December 2018, Leighton, by an email together with a set of layout plan and section drawings, informed MTRCL that couplers were used in lieu of lapped bars at various locations in HHS.

[Item 30 of 3rd List]

(ii) By two emails dated 28 January 2019 and dated 13 February 2019, Mr. William Holden sent us further drawings regarding the use of couplers at the HHS. However, such information still does not identify accurately the extent and locations of the change.

(iii) I understand that Leighton is in the course of preparing a set of as-constructed drawings for HHS which will reflect the locations of the couplers used in HHS.

53. The investigation into the locations of the deviations is ongoing and pending, in particular, the provision of relevant information by Leighton.

54. I was aware of the introduction of couplers by Leighton when I conducted my routine site walks. However, as I explained in paragraphs 46 above, the use of couplers in lieu of lapped bars is very common in the construction and engineering industry involving a large civil project like the SCL project. I also considered this a minor change, as lapped bars and couplers serve the same purpose and the change in the present case would not affect the structural integrity of the structure. I have been shown a copy of the [Item 49 of 3rd List] Appendix 7 to the Project Management Plan, which includes a Flow Chart for Design Management and Assurance Process. This Flow Chart is consistent with my understanding that in respect of minor changes or amendments necessary to suit site condition (i.e. the deviations presently in issue), the only requirement was for the deviations to be reflected in the as-built records. Leighton was requested to incorporate the deviation in the final amendment and as-built information. As I understand it, MTRCL's other witnesses will give evidence on how the change was effected on site, which was predominantly orally.

Materials (Couplers and Rebars)

Item 2.19: Given the deviations identified above ("change on use of Type 1 coupler instead of lapped bar at some of the construction joints at walls" discovered at HHS), the number of rebars and couplers acquired and used would be substantially different from the requirement under the original approved design of HHS. Provide a summary showing (1) the number of rebars and couplers which would have been required in the original design and (2) the number of rebars and couplers actually acquired and used by adopting the deviated designs

Item 2.20: Identify the party which placed the order for couplers and rebars for HHS and explain the role of MTRCL in the ordering, checking and testing of couplers and rebars and in ensuring that only the correct materials were used. Given the summary provided under 2.19, explain why MTRCL could not have detected and discovered that the materials ordered were substantially different from the materials intended to be used under the original design

Item 2.21: Confirm whether MTRCL would inspect, check and test the materials (couplers and rebars) against Requirements, Standards and Practice after such materials were delivered to the site and before they were used for the construction of HHS. Produce evidence of inspection, checking and testing of materials

55. MTRCL has requested Leighton to provide the quantity of rebars and couplers used on site. However, Leighton has yet to provide the required information. Leighton was the party which placed the order for couplers and rebars for HHS and MTRCL was not responsible for ordering of couplers and rebars. I am not aware of any specific requirement for the inspectorate team to record the actual quantities of rebars and couplers used on site.

56. Finally, I would like to mention the following:

    (i) Some of the events in question and which form the subject matter of the Commission of Inquiry took place several years ago and my recollection of every detail is not therefore perfect.

(ii) Accordingly, in preparing this witness statement I have reminded myself of the events in question by reference to various hard copy and electronic documents and materials. I understand these materials were retrieved by MTRCL's Legal Department, with the assistance of the MTRCL's external lawyers, Mayer Brown.

Dated 16 May 2019

Chan Kit Lam

CHAN Kit Lam