

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

WITNESS STATEMENT OF MAK YU MAN

I, Mak Yu Man of 24/F and 25/F ADP Pentagon Centre, 98 Texaco Road, Tsuen Wan, Hong Kong, state as follows:

Introduction

1. I am duly authorised to make this witness statement on behalf of PYPUN-KD & Associates Limited ('**PYPUN-KD**'), in response to the requests set out in the letter from Lo & Lo (the Solicitors for the Commission of Inquiry ('**Commission**')) dated 2 October 2018 to PYPUN-KD.
2. I am a director of PYPUN Engineering Consultants Ltd (a sub-consultant of PYPUN-KD for the monitoring and verification consultancy, and which owns 50 percent of the shares in PYPUN-KD), and am involved in the Shatin to Central Link project ('**Project**') as the Project Manager of PYPUN-KD as the Monitoring & Verification Consultant ('**M&V Consultant**') to the Railway Development Office ('**RDO**') of the Highways Department ('**HyD**').
3. By way of background, PYPUN-KD was incorporated in March 2009, combining the expertise of PYPUN Engineering Consultants Ltd in civil and structural engineering, and Key Direction Limited in electrical and mechanical engineering, particularly in railway projects. Prior to the Project, PYPUN-KD has acted as consultant to the Government on railway projects, namely: provision of fire safety assessment services for the Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL), independent checking of funding arrangement for Kwun Tong Line extension, and independent checking of funding arrangement for South Island line.
4. I am a Fellow of the Hong Kong Institution of Engineers and a Fellow of the Institution of Engineers, Australia. I have been practising civil engineering and construction management with a focus on large scale infrastructure projects in Hong Kong, mainland China and overseas since 1975. Within my 15 years of experience in railway projects, I have been extensively involved with work on the MTR's Tsuen Wan Line, East Rail Line, Airport Express Line and West Rail Line in Hong Kong. I was appointed Deputy Project Director for the planning, design, construction, energization and operation of the first pilgrimage railway with the capacity to convey over 3 million

Muslim pilgrims in Makkah in Saudi Arabia during Hajj. The railway is 18km long with nine stations, and the first phase was completed and commissioned within 22 months. **Annex 1** hereto is a copy of my CV.

5. As Project Manager of the M&V Consultant, I am the leader of the Project Management Team, principal liaison with the RDO, and responsible for management of the team, co-ordination of findings and information into deliverables, ensuring deliverables and other inputs address the necessary issues, achieve project, financial and programme management and setting standards and ensuring quality of work of PYPUN-KD in the provision of its services under the M&V consultancy. I have been the Project Manager since January 2016. My predecessor was Mr Robert Lloyd.
6. Matters stated herein which are within my personal knowledge are true. Matters stated herein which are not within my personal knowledge are true to the best of my information, knowledge and belief.

Background

7. The background to the Project would be well known to the Commission, and I will therefore not recite information about that, except where I believe doing so would be helpful to draw the Commission's attention to particular matters.
8. Pursuant to Agreement No CE 7/2012 (HY) dated 20 August 2012 between the Government of the Hong Kong Special Administrative Region (as the 'Employer') and PYPUN-KD (as the 'Consultants'), PYPUN-KD was appointed the M&V Consultant ('**M&V Agreement**' [**Bundle G9/7638**]) to assist the HyD with monitoring and verification of certain aspects of the works of the Project.
9. Various background information about the Project, as well as the M&V Consultant's role in view of the circumstances of the Project, are set in the 'Brief' prepared by the RDO, which formed part of the M&V Agreement.

Use of MTR Corporation Limited's ('MTRCL') existing system to procure the Project

10. The mode for the implementation of the Project under the concession approach, under which the Government funds the Project and entrusts the design and construction of the Project to the MTRCL, the MTRCL being regarded as the Government's agent for the delivery of the Project, is as set out in paragraph 2.15 of the Brief.
11. Paragraph 2.18 of the Brief sets out information about the systems to be adopted for the procurement of the Project relevant to the role of the M&V Consultant:

*'One of the major considerations behind the entrustment of the design and construction of the Project to the MTRCL is to fully utilise the expertise and experience of the MTRCL in managing large-scale railway projects. Thus, in principle the SCL will be implemented by using MTRCL's internal systems for project management and control. That is to say, in general the MTRCL will carry out or procure to carry out the design and construction works using its own system. Under the provisions of the 3 EAs [Entrustment Agreements] for the design and site investigation, advance works and construction phases, the SCL shall be designed, constructed, procured and delivered to standards and/or specifications which are consistent with and not materially in excess of those applicable to relevant elements of comparable completed railway projects in Hong Kong. Main key features of the EAs for the SCL design and site investigation, advance works and construction phases in relation to this Assignment are shown in **Appendix C** for reference.'* (emphasis in original)

12. The project procurement system was therefore to fully utilise the expertise and experience of MTRCL to manage the Project, in particular, MTRC's internal systems for project management and control.
13. As stated on page 3 of the MTRCL's 'Report on SCL Contract 1112 – Review of the EWL Slab Construction' dated 15 June 2018 [**Bundle B1/1**], the MTRCL was obliged under the relevant Entrustment Agreement to follow its own Project Integrated Management System (**PIMS**), which is certified ISO9001 compliant and had been used to manage railway projects for many years.
14. As the Commission would be aware, a report by Lloyd's Register Rail (Asia) Limited in respect of the Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link (XRL) project [**Bundle G3/G1776**] stated at paragraph 1.1.5 that MTRCL's processes are known to be robust and in line with industry best practice, regularly reviewed and audited by outside bodies and have been proven and refined through the delivery of many high quality railway projects by MTRCL in Hong Kong and abroad.

Role of RDO and M&V Consultant

15. In view of the circumstances of the Project and the MTRCL systems to be implemented, the RDO's role was as stated in paragraph 2.25 of the Brief:

*'Railway Development Office (RDO) of the Highways Department is tasked with the overall administration of the SCL. There is a need to monitor and verify the MTRCL's work (including submissions by its consultants, agents, contractors and suppliers to MTRCL) in the SCL to ensure that the MTRCL's work is in compliance with the provisions of the 3 EAs for the SCL design and site investigation, advance works and construction phases and has achieved value for money so as to meet the public aspiration. **In particular, the RDO has a duty to the public to closely monitor the project cost and expenditure to ensure that public funds are justifiably used.***' (emphasis added)

16. The particular focus on cost as well as programme and public safety as to the scope of the M&V Consultant's work is stressed repeatedly in the Brief, including at paragraph 3.1, which sets out the objectives of the M&V Consultant:

'3. Objectives of the Assignment

- 3.1 *The overall objective of the Assignment is to provide monitoring and verification services in relation to the work undertaken by the MTRCL (including submissions by its consultants, contractors or agent to MTRCL) during the construction, testing and commissioning phase of the Project so as to provide assurance that the MTRCL's obligations stated in the EAs for the SCL advance works and construction phases have been properly fulfilled. **The monitoring and verification shall focus on cost, programme and public safety of the Project.***
- 3.2 *Provision of professional services in respect of the assessment of building submissions for compliance with the BO and other relevant ordinances, regulations and standards.'*

(emphasis added)

17. The 'Assignment' was defined in the Memorandum of Agreement of the M&V Agreement to mean the professional services to be provided by the M&V Consultant in respect of the 'Shatin to Central Link (SCL) Monitoring and Verification for Construction, Testing and Commissioning Phase – Investigation', namely, the subject matter of the M&V Agreement.
18. Paragraphs 4.1, 6.2.2, 6.3.4, 6.4.1, 6.4.5, 6.5.3 and 6.7.5 of the Brief reiterated the focus on cost, programme and public safety.
19. As to 'public safety', the 'Inception Report' dated 22 March 2013 (version 0) (**Annex 2** hereto) prepared by PYPUN-KD explains that public safety in the context of the Project concerns the risk of accidents involving neighbouring residents (see page 4). Public safety therefore means safety to the public when the construction works for the Project are being carried out and during testing and commissioning phase, and not quality or integrity of the permanent works constructed. A draft of the Inception Report was provided to the Director's Representative, and the Director's Representative had '*no further comment*' on such document (**Annex 3** hereto).
20. Paragraphs 4.1, 4.2 and 4.5 of the Brief set out in detail the scope of the M&V Consultant's work:

'4. *Description of the Assignment*

4.1 *The Assignment shall include but not be limited to the following:*

- (a) *a review of the documents relating to the following -*
- (i) *construction programmes;*
 - (ii) *contractors' method statements and proposals bearing major implications and significance to the Project in terms of cost, programme and public safety;*
 - (iii) *project finance including reports/information on contract expenditure/forecast, contract commercial issues;*
 - (iv) *submissions to the Project Control Group (PCG)¹ meetings, which bear significant implications to the Project in respect of cost, programme and public safety;*
 - (v) *public safety plans; and*
 - (vi) *other key documents relating to the SCL works.*

- (b) *carrying out monitoring on MTRCL's works through a review of the concerned project documents and necessary site inspection and identification of and providing advice on key issues, **which bear significant implications in respect of cost, programme and public safety to the Project;***
- (c) *carrying out verification by conducting audits (including process and/or technical audits) to the activities/processes undertaken by the MTRCL, reporting and the necessary follow-up work;*
- (d) *provision of professional services in respect of the assessment of building submissions for compliance with the BO and other relevant ordinances, regulations and standards;*

[Footnote 1: 'PCG is an internal committee of MTRCL of which approval for any significant changes to the Project including programme, cost variation, etc is required.']

- 4.2 *Notwithstanding Clause 4.1 above, the **Consultants shall not be required to carry out site supervision or any checking of detailed design of the works.***

- 4.5 *The Consultants shall carry out the monitoring and verification activities **with due regard to minimising disruption to the construction, testing and commissioning activities of the Project.***

(emphasis added)

21. I would like to draw attention to particular matters relating to the above quoted passages:

Focus on cost, programme and public safety

- 21.1 As stated in paragraph 3 of the Brief to be the overall objective of the Assignment, the focus of the M&V Consultant's work is key issues which bear significant implications in respect of cost, programme and public safety. This is consistent with the fact that the M&V Consultant is employed by the HyD as the HyD's consultant, taking a role which does not concern the actual construction of the work of the Project, but on cost, programme and safety to the general public (whilst minimising disruption to the actual works).
- 21.2 Such scope of work and role of the M&V Consultant is also consistent with the fact that the M&V Consultant assists the BO Team (defined in paragraph 27 below) in its regulatory role to see that the Project complies with the requirements of the Entrustment Agreements as to cost, programme and public safety.

Site inspection as distinct from site supervision

- 21.3 The construction industry draws a distinction between site inspection and site supervision. The former relates to viewing (and obviously not the carrying out) of works, and generally denotes tasks concerning the viewing of the status (a snapshot) of the work progress.
- 21.4 Site supervision, on the other hand, involves the supervising of the work as it is being carried out.
- 21.5 The Brief specifically draws a distinction between inspection and supervision. The work of the M&V Consultant relates (and is limited) to site inspection. The nature of the site inspection to be carried out by the M&V Consultant concerned:
- (a) site inspections '*which bear significant implications in respect of cost, programme and public safety to the Project*' (paragraph 4.1(b) of the Brief), and
 - (b) inspection of the site in relation to the work of the Building Submission Review & Compliance Team ('**BSRC**') Team
- 21.6 As regards site supervision, paragraph 2.24 of the Brief states:
- 'The MTRCL has employed consultancies or utilised in-house design resources for the detailed design of the Project including tender preparation and assessment. **Construction project administration and site supervision will generally be carried out by MTRCL's inhouse resources.**'* (emphasis added)
- 21.7 The MTRCL systems and the division of site inspection / supervision under the M&V Agreement therefore was such that the M&V Consultant was responsible for certain site inspections, and the MTRCL (and its consultants/agents) was responsible for site inspection and site supervision.
- 21.8 This is in line with the fact that the M&V Consultant assisted the BO Team with the work that would have been carried out by the Buildings Department ('**BD**') in respect of its vetting and approval work for a private sector project (whilst minimising disruption to the actual works). The BD's role is not to supervise the carrying out of construction work, for which the employer/developer, contractor (and their consultants/agents) are responsible.
22. The M&V Consultant's role is supportive in nature and the mode of provision of its services was further explained by paragraph 6.1.3 of the Brief, which states that the M&V Consultant would consult, liaise and correspond direct with project stakeholders (including the MTRCL, other Government departments and authorities, other organisations and their agencies/consultants) on

matters relating to the Project with the prior consent of the Director's Representative (the Principal Government Engineer/Railway Development (PGE/RD) of the HyD).

23. In line with the M&V Consultant's 'behind the scene' role to the RDO/BO Team:

- 23.1 PYPUN-KD was 'not expected to consult, liaise and correspond with MTRCL's consultants, contractors or agents without the consent of the Director's Representative and the MTRCL. The Consultants shall copy relevant correspondence relating to these consultation, liaison and co-ordination to the Director's Representative' (paragraph 6.1.3 of the Brief).
- 23.2 PYPUN-KD was to discuss all preliminary findings with, and present all draft reports to, the Director's Representative before finalising reports or issuing such reports to parties other than the Director's Representative (paragraph 6.1.6 of the Brief).
- 23.3 The monitoring and verification should be undertaken in parallel with the MTRCL's construction, testing and commissioning programme and in a manner which will minimise any delay or interruption to the project activities (paragraph 6.1.9 of the Brief).

24. The M&V Team reported to Director's Representative (of the RDO), whereas the BSRC Team reported to Senior Structural Engineer and Senior Building Surveyor of the BO Team.

Oversight of MTRCL's system and role of the BD and responsibilities of the Competent Person

25. The BD's role in the approval of designs and supervision plans for the Project was different to common private sector building projects. As stated in paragraph 2.19 of the Brief:

'Being a public works project, the SCL is exempted from the Buildings Ordinance (BO). This is similar to the Express Rail Link which is under construction, but different from most previous railway projects funded by the railway corporations. For the SCL, the Highways Department will resemble the roles of the Building Authority under the BO (except the statutory powers given to the Building Authority) and the building submissions in respect of the SCL would be submitted by the MTRCL or its consultants/agents to the Highways Department for vetting and approval to the requirements and standards stipulated under the BO.'

26. In place of an Authorised Person and a Registered Structural Engineer appointed for a private sector building project, the MTRCL appointed a 'Competent Person', having primary responsibility under the Buildings Ordinance ('BO') to coordinate and supervise the works.

27. The system designed by the BD / HyD and implemented was that the HyD would vet and approve building submissions from the MTRCL (and its consultants and agents) submitted to the HyD, and this vetting and approval team comprised four personnel (a Senior Structural Engineer, a Structural Engineer, a Senior Building Surveyor and a Building Surveyor) who were seconded from the BD to the RDO on a full-time basis ('BO Team'). The M&V Consultant supported and

assisted the BO Team with such vetting and approval, and also carried out other tasks as provided for under the M&V Agreement, as explained below.

Monitoring and verification

28. The scope of duties of the M&V Consultant can be divided into three aspects: monitoring, verification and BSRC. As stated in paragraph 6.1.9 of the Brief, the M&V Consultant's monitoring and verification covers all work carried out by the MTRCL during the construction, testing and commissioning phase, including the electrical and mechanical (E&M) systems (such as signalling and rolling stock systems), unless otherwise stipulated in the Brief.
29. I refer below to specific provisions of the M&V Agreement on monitoring and verification which are potentially relevant to the diaphragm wall and platform slab construction works. I have read the Witness Statement of Yueng Wai Hung on behalf of PYPUN-KD in final draft form, and agree with the matters regarding BSRC set out in paragraphs 8 to 31 of such statement.

M&V Consultant's deliverables

30. The documents to be submitted by the M&V Consultant recording its work are set out in the table at paragraph 5.1 of the Brief, as follows:

| Item No. | Deliverables | Reference Clause | Max. no. of hard copies | Submission Schedule (Due Dates) |
|-----------------|--------------------------------|-------------------------|--------------------------------|--|
| 1 | <i>Draft Inception Report</i> | 6.7.1 | 4 | <i>Within 3 weeks from commencement of Assignment</i> |
| 2 | <i>Inception Report</i> | 6.7.1 | 4 | <i>Within 2 weeks from issuance of comments on the Draft Inception Report</i> |
| 3 | <i>Programme</i> | 8 | 4 | <i>Refer to Clause 8</i> |
| 4 | <i>Draft Monitoring Plan</i> | 6.7.2 | 4 | <i>Within 4 weeks from commencement of Assignment</i> |
| 5 | <i>Monitoring Plan</i> | 6.7.2 | 4 | <i>Within 2 weeks from issuance of comments on the Draft Monitoring Plan</i> |
| 6 | <i>Draft Verification Plan</i> | 6.7.3 | 4 | <i>Within 4 weeks from commencement of Assignment</i> |
| 7 | <i>Verification Plan</i> | 6.7.3 | 4 | <i>Within 2 weeks from issuance of comments on the Draft Verification Plan</i> |

| | | | | |
|----|--|-------|---|---|
| 8 | <i>Audit Plans [note 1]</i> | 6.7.4 | 4 | <i>Within 1 month before conducting of each audit session</i> |
| 9 | <i>Audit Reports [note 1]</i> | 6.7.5 | 4 | <i>Within 2 weeks after completion of each audit session</i> |
| 10 | <i>Review Reports [note 2]</i> | 6.2.2 | 4 | <i>Within 3 weeks upon availability of relevant document/information</i> |
| 11 | <i>Monthly Progress Reports [note 3]</i> | 9.2 | 6 | <i>Within 1 week from start of each reporting month</i> |
| 12 | <i>Draft Six-monthly Interim Reports and Draft Executive Summary of Six-monthly Interim Reports on Monitoring and Verification</i> | 6.5 | 4 | <i>Within 2 weeks after completion of the reporting period</i> |
| 13 | <i>Six-monthly Interim Reports and Executive Summary of Six-monthly Interim Reports on Monitoring and Verification [note 4]</i> | 6.5 | 4 | <i>Within 2 weeks from the comments given to the draft report in item 14</i> |
| 14 | <i>Draft Final Report and Draft Executive Summary of Final Report on Monitoring and Verification</i> | 6.5 | 4 | <i>Within 12 weeks after a date to be agreed with the Director's Representative which shall not be later than the completion date of the last construction contract for the project</i> |
| 15 | <i>Final Report and Executive Summary of Final Report on Monitoring and Verification [note 5]</i> | 6.5 | 4 | <i>Within 2 weeks from issuance of comments on the draft report in item 16</i> |

Note 1: such documents concern audits by the M&V Consultant on the aspects of cost, programme and public safety (paragraphs 6.7.4 and 6.7.5 (in particular paragraph 6.7.5(c)) of the Brief).

Note 2: such reports 'include any major observation or comments on these documents with particular regard to major risks to cost, programme and public safety and will include recommendations to mitigate the risks' (page 9 of Inception Report).

Note 3: such reports 'will include a summary of the monitoring and verification activities and the Building Submission & Review Compliance (BSRC) Team's progress of the reporting month. The monitoring activities section will highlight the key risks to cost and programme and public safety and suggest mitigation measures that RDO may wish to implement. The verification section will summarize the reviews and audits that have taken place during the month and report on follow up actions and nonconformities to ensure they are properly tracked for close-out. The BSRC Team's activities will be reported with an indication of the status of the current BSRC reviews and progress of remaining planned reviews' (page 9 of Inception Report). As noted in paragraph 52 below, any instances of non-conformities in the verification section relate to programming implications, and not quality or integrity of the works of the Project.

Note 4: such reports will in particular 'include an overview of the Project during the reporting period focusing on cost, programme and public safety and also an overview and evaluation of our work in respect of achieving the project objectives' (page 9 of Inception Report).

Note 5: such report will in particular 'provide a final overview on total contract cost, programme and public safety performance, and summarise our work with respect to the achievement of objectives' (page 10 of Inception Report).

31. The M&V Consultant is to seek the Director Representative's prior agreement on the format of all deliverables, and also to obtain the Director Representative's comments on its draft submissions (paragraph 5.2 of the Brief).
32. Annexed hereto are a copy set of the following deliverables:

| Item no | Deliverable | Annex |
|---------|---|---------------------------------------|
| 2 | Inception Report | 2 |
| 5 | Monitoring Report (Plan) | 4 |
| 7 | Verification Plan | 5 |
| 8 | Typical Audit Plan (for all three aspects of Financial (Cost) Audit, Programme Audit, and Public Safety Audit) | (within item no 9 Audit Report below) |
| 9 | Typical Audit Report (for all three aspects of Financial (Cost) Audit, Programme Audit, and Public Safety Audit) | 6 |
| 10 | Typical Review Report (to date there has only been one such report (dated 20 June 2013), relating to use of reduced quantity of explosives and cost consequences) | 7 |
| 11 | Typical Monthly Progress Report | 8 |

| | | |
|----|---|-------------------|
| 13 | Typical Six-monthly Interim Report and Executive Summary of Six-monthly Interim Report on Monitoring and Verification | 9 |
| 15 | Final Report and Executive Summary of Final Report on Monitoring and Verification | Not yet available |

33. Prior to the issue of a certificate of completion by MTRCL, HyD will conduct a joint pre-completion site inspection with MTRCL. Such inspections are not within the original scope of the M&V Agreement which PYPUN-KD did not attend. In September 2018, HyD assigned to PYPUN-KD an additional service (with additional payment to PYPUN-KD) to perform quality checking for pre-completion inspections and a technical review of key critical tests for the system wide electrical and mechanical (E&M) works to facilitate the handover of the Project.

Inception Report

34. The Inception Report (Annex 2 hereto) describes the activities to be undertaken by the M&V Consultant.
35. The technical approach is set out in Section 5.2, namely:

'5.2 Technical Approach

5.2.1 General

Our main role will be to appraise, monitor and audit the activities / processes of MTRCL, and verify that these activities / processes are carried out in accordance with MTRCL's management and control procedures and in compliance with the EAs for the SCL design and site investigation, advance works or construction phases, and that value for money is achieved through procedures that are complied with and to recommend improvement measures whenever appropriate.

We propose to use a structured process to underpin our work at a high level with the primary focus on the significant areas of risks. The Project risks of concern to RDO will be those that may impact on 'cost', 'programme' and 'public safety'.

5.2.2 Risk Based Approach

Due to the fast-track manner that the Project is to be implemented, the number of contracts and scope of the Project, the monitoring and verification activities will be carried out most effectively by utilizing a risk-based approach.

The approach to be adopted (as shown below) for this assignment comprises a risk planning, identification, (qualitative) analysis, evaluation (using a Risk Matrix) and treatment process that is conducted using appropriate recording, monitoring and reviewing of the risks and uncertainties.

...

The management of the project risks will be undertaken by MTRCL and we will review their project risk register and audit the process that they adopt to create and update it.

The project risk register should have already been prepared and include risks ascertained by MTRCL, its design consultants and by some of the contractors. This will have identified risks

associated with each works contract as well as those associated with the interfaces between the contracts.

It is understood that the project risk register will be regularly reviewed by MTRCL taking into consideration new information as the SCL designs reach a more advanced stage, and include new risks that may arise from contractors designs as the design and build contracts are awarded.

Our audit process will validate that the review of risks by MTRCL is being undertaken in line with their risk management plan and we will comment on information submitted by MTRCL to RDO. We will review the supporting data provided by them, particularly focusing on risks that may impact on cost, programme and public safety to ensure that RDO have a reliable, up-to-date understanding of the on-going project risks, potential consequence, and proposed mitigation.'

36. The project risk register mentioned in Section 5.2.2 is the MTRCL's risk register referred to in paragraph 46 below. During the design stage, MTRCL prepared, reviewed and updated its risk register. However, during the construction stage, MTRCL's main contractor, Leighton Contractors (Asia) Limited's ('Leighton') and MTRCL jointly reviewed and updated the risk register.
37. Section 5.3 sets out the approach as to review of documents as required under Clause 4.1(a) of the Brief in relation to monitoring and verification, and Sections 5.4 and 5.5 contain additional information relating specifically to monitoring and verification activities respectively.

Monitoring

38. Pursuant to paragraph 6.3.1 of the Brief, a Monitoring Plan was developed by the M&V Consultant (version 2a dated 21 January 2016 is at Annex 4 hereto), and pursuant to paragraph 6.3.2 of the Brief, a Monitoring Team was set up and maintained during the Project.
39. The composition of the Monitoring Team could be seen at the bottom of the 'Core Team Organisation Chart' at Chart 2 of the Inception Report (Annex 2 hereto). This chart also shows that above the Monitoring Team are three separate teams: 'Cost M&V Team', 'Programming M&V Team' and 'Public Safety M&V Team', to monitor and verify matters relating to the three areas.
40. In carrying out the tasks identified in paragraph 6.3.4 of the Brief, the M&V Consultant '*shall, on risk basis... focus on cost, programme and public safety aspects*'. Similar to paragraph 6.1 of the Brief (as noted in paragraph 23 above), under paragraph 6.3.5 of the Brief, the M&V Consultant would attend meetings upon the reasonable request of the Director's Representative.
41. The M&V Consultant's supportive role during the construction stage is extended to the system integration test and trial operation stage – paragraph 6.3.7 of the Brief states that the M&V Consultant would be required to witness site testing and commissioning activities undertaken by the MTRCL, its contractors, suppliers or agents upon the directions of the Director's Representative.

Monitoring Plan

42. A draft of the Monitoring Plan was provided to the Director's Representative, and the Director's Representative had '*no further comment*' on such document (**Annex 10** hereto).
43. Section 2.1 of the Monitoring Plan repeats that the monitoring process is on a risk basis with focus on the aspects of cost, programme and public safety. Section 2 sets out the matters to be taken into account for such risk based approach. Section 3 expands on the key issues of cost, programme and public safety during the construction phase of the Project which are the subject of the monitoring.
44. Section 4 explains that the monitoring will be on a high level basis, monitoring by review of documents (Section 4.1) focusing on cost, programme and public safety. Section 4.4 sets out the extent of site visits which are consistent with the focus on the three areas: an initial site visit to the sites of the major civil construction contracts (which total 25), visit to each site on a regular basis thereafter to observe and record observations related to cost, programme and public safety.
45. The scale of the Project of 25 civil contracts and sites as set out under paragraph 4.4.2 of the Monitoring Plan. As stated in such paragraph, during the course of the Project the M&V Consultant visited each site about once each quarter. The duration of each visit was approximately three hours.
46. As to the risk based approach, Figure 1 (Risk Assessment Flowchart) of Appendix A to the Monitoring Plan refers to the 'MTRCL's / Contractor's Risk Register'. I note several entries in such risk registers relating to diaphragm walls and couplers:
- 46.1 MTRCL's register: 'Risk ID' 43775 [**Bundle G10/7895**] with 'Risk Description' (third column) of '*Uncontrolled ground movement due to removal of existing bore pile clashing with the D-wall alignment at grid 42 & 44 at HHS*' and 'Main Cause(s)' (fourth column) of '*Spatial constraint, proximity of Dwall alignment with underpinning pile cap*'. The 'Impacts' (fifth column) were stated to be cost, programme and railway operations.
- 46.2 MTRCL's register: 'Risk ID' 50415 [**Bundle G10/7900**] with 'Risk Description' (third column) of '*Difficulty/safety in installing three layers of couplers at Dwall*' and 'Main Cause(s)' (fourth column) of '*Low headroom means couplers need to be used to connect small cages together*'. The 'Impacts' (fifth column) were stated to be programme and safety.
- 46.3 MTRCL's register (as commented on and revised by Leighton): 'Risk ID' 65802 [**Bundle G10/8098**] with 'Title' (second column) of '*Delay to diaphragm wall contractor due to coupler supply constraints*' and 'Cause' (ninth column) of '*[c]oupler supply problems from*

Bosa'. The 'Effect' (tenth column) was stated to be '*[d]elayed production rates resulting in Intrafor claims'*'.

- 46.4 It could be seen that such entries do not concern steel reinforcement fixing works. There are other entries in the risk registers relating to diaphragm walls and couplers, but they do not appear relevant to the issue of alleged cutting of threaded steel bars or existence of a gap at threaded steel bar/coupler connections.
- 46.5 In fact, in the MTRCL's risk register, the 'Impacts' of the risks (fifth column of risk register table) are classified to be cost, programme, safety, environmental impact and railway operations, but not such matters as quality or integrity of the works.

Excerpts from the MTRCL's risk register were appended to reports prepared by PYPUN-KD.

Verification

47. As stated in paragraph 6.4.1 of the Brief, verification shall comprise financial process and programme compliance, and public safety audits to be carried out by the M&V Consultant. Again, a risk based approach is to be taken to identify high risk areas for forward planning of audits. The ambit of verification being the three matters of cost, programme and public safety are emphasised in paragraphs 6.4.5 and 6.4.6 of the Brief.
48. Pursuant to paragraph 6.4.2 of the Brief, a Verification Plan was developed by the M&V Consultant (version 1 dated 11 June 2013 is at Annex 5 hereto).

Verification Plan

49. A draft of the Verification Plan was provided to the Director's Representative, and the Director's Representative had '*no further comment*' on such document (**Annex 11** hereto).
50. Section 1.2.2 of the Verification Plan repeats that the verification approach is designed to advise the Government that the MTRCL will be delivering the Project in line with established cost allocation and programme arrangements. Sections 2 and 3 reiterates that the scope of verification relates to cost, programme and public safety, including by citing various provisions of the Brief, and then set out the matters to be taken into account for the risk based approach.
51. Attached to the Verification Plan are templates for the following: Audit Notes, Audit Reports, Non-conformance Report (NCR), Observation Report and Audit Questionnaire.
52. As could be seen from such templates, the notes / reports / questionnaire relate to programming implications, and not quality or integrity of the works of the Project. The Non-conformance Report (NCR) reports on reported non-conforming work which has programming implication.

Project meetings

53. Project meetings are held for different purposes, including the following:
- 53.1 Project Control Group meetings: I understand that the main purpose of these meetings is cost control. PYPUN-KD does not attend these meetings, but is invited to provide comments prior to meetings on proposals to be raised during meetings.
 - 53.2 Project Co-ordination Meetings: the main purpose of these meetings is progress of the Project. Prior to August 2018, PYPUN-KD was not invited to these meetings.
 - 53.3 Project Progress Meetings: the main purpose of these meetings is also progress of the Project. PYPUN-KD is invited to attend these meetings as an 'observer'.
 - 53.4 Project Steering Committee meetings: the main purpose of these meetings is to discuss main strategic issues, and is attended by senior management of MTRCL. PYPUN-KD has been invited to attend these meetings since August 2015.

PYPUN-KD's performance of the M&V Agreement

54. Pursuant to Government's appraisal system applicable for consultancies like that under the M&V Agreement, the consultant's performance is appraised on a quarterly basis, and a 'Consultant's Performance Report' is issued by the Government on that basis. From the entering into of the M&V Agreement in August 2012 to date, PYPUN-KD has received a rating of 'acceptable' as the overall assessment for each performance assessment period, and a rating at 'good' or 'satisfactory' for individual aspects of performance assessed. PYPUN-KD has not received any 'adverse' overall assessment / report of its performance, or a rating below 'satisfactory' (ie, 'poor' or 'very poor') for any of the aspects of performance assessed.
55. I set out below my response to Requests 1 and 4 of Lo & Lo's letter dated 2 October 2018. Mr Yueng, Leader – BSRC Team of PYPUN-KD is responding to Requests 2 and 3.

Request 1 – Role and Responsibilities of PYPUN-KD & Associates Limited

(a) Describe and explain, in general terms, the role played by Your Company in performing monitoring and verification work under the "check the checker" approach in Contract 1112.

56. The role of PYPUN-KD as the M&V Consultant is noted in paragraphs 15 to 53 above in relation to monitoring and verification (which focuses on cost, programme and public safety), and paragraphs 8 to 31 of Mr Yueng's witness statement in relation to BSRC.
57. Pursuant to paragraph 6.1.7 of the Brief, *'[t]he main roles of [PYPUN-KD] is to appraise, monitor and audit the activities/processes of the MTRCL, and verify that these activities/processes are*

carried out in accordance with the MTRCL's management and control procedures and in compliance with the 3 EAs for the SCL design and site investigation, advance works or construction phases, and that value for money is achieved through procedures that are complied with and to recommend improvement measures whenever appropriate.'

58. The checker was the MTRCL using its internal systems for project management and control, and PYPUN-KD checked the checker (MTRCL) on the basis of the risk-based approach and matters set out in the M&V Agreement, and in the background of *'the expertise and experience of the MTRCL in managing large-scale railway projects'* (paragraph 2.18 of the Brief).
59. The 'check the checker' approach was recommended by Lloyd's Register for the Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link Project, and is a risk-based sampling approach to verify delivery of the requirements of the project scope and authorised expenditure, bearing in mind that the Government's resources should be utilised effectively to avoid repetition and micro management of the Project.

(b) Describe and explain, with reference to relevant provisions in the M&V Agreement, the respective roles, powers, duties and responsibilities of Your Company in the construction of the diaphragm walls and EWL/NSL Slabs under Contract 1112, including the respective quality control, supervisory, monitoring, inspection and reporting roles in ensuring the quality, safety and integrity of the design and construction works.

60. The roles, powers, duties and responsibilities of PYPUN-KD as the M&V Consultant are as noted in paragraphs 15 to 53 above in relation to monitoring and verification, and in paragraphs 8 to 31 of Mr Yueng's witness statement in relation to BSRC.
61. As stated in paragraph 4.1(b) of the Brief, PYPUN-KD was to carry out monitoring of MTRCL's works through a review of the concerned project documents and necessary site inspection and identification of and providing advice on key issues, which bear significant implications in respect of cost, programme and public safety to the Project.
62. In relation to the construction of the diaphragm walls and EWL/NSL Slabs under Contract 1112, the BSRC Team carried out the following in accordance with the BO Team's instructions:
- 62.1 site inspection of trial excavation for diaphragm walls on 21 January 2014,
- 62.2 site witnessing of core-drilling as proof test on the completed diaphragm walls on 5, 16 June, 12, 18, 26 August, 9, 15 October, 3 November 2015, and 3 February, 3, 9, 31 March, 25 April, and 3, 6, 11 May 2016,
- 62.3 site auditing of MTRCL's and Leighton's compliance with site supervision requirements as stipulated in their Site Supervision Plans (SSP) for proof test stage of diaphragm walls on

5, 16 June, 12, 18, 26 August, 9, 15 October, 3 November 2015, and 3 February, 3, 9, 31 March, 25 April, and 3, 6, 11 May 2016,

- 62.4 site auditing of the threading process, sampling, assembling and testing of couplers on 22 and 24 January 2014 (see paragraph 29.3 of Mr Yueng's witness statement),
- 62.5 site inspections of MTRCL and Leighton's inspection and supervision records regarding construction of EWL slab since June 2018 as part of the Supplementary Engagement (as to which please see paragraph 43 of Mr Yueng's witness statement), and
- 62.6 site inspections on a weekly basis since August 2018 of the completed EWL slab as part of the work to address public concerns on the safety of the slab as part of the Supplementary Engagement.

As to the nature of site inspection, site auditing and site witnessing, please refer to Mr Yueng's witness statement. PYPUN-KD was not otherwise involved with quality control, supervision, monitoring, inspection or reporting of the construction of diaphragm walls and EWL/NSL Slabs.

- 63. Under the arrangement with the RDO, PYPUN-KD would not carry out site witnessing / inspection / auditing unless instructed to do so by the BO Team in respect of a particular site witnessing / inspection / auditing. PYPUN-KD had not been instructed to carry out site monitoring of the construction of the EWL/NSL Slabs under Contract 1112.
- 64. PYPUN-KD was invited to tender for the role of M&V Consultant to the Government for the XRL project, and it understands that the scope of works of the M&V Consultant under the XRL project included tasks which focused on the quality or integrity aspects of the constructed works, and focused more generally on 'safety' rather than 'public safety'.
- 65. As noted above, paragraph 4.2 of the Brief stated that PYPUN-KD *'shall not be required to carry out site supervision or any checking of detailed design of the works'* (emphasis added).
- 66. It was therefore not within PYPUN-KD's (or the RDO/BD's) scope of works to supervise works covered by the various approved documents, namely, Inspection & Testing Plan (ITP) (prepared by Leighton and approved by the MTRCL), Cast In-situ Concrete Quality Control Checklist – SCL (prepared by Leighton), Request for Inspection / Survey Check (RISC) forms (prepared by Leighton and approved by MTRCL's supervision team), Quality Supervision Plan (QSP) for Installation of Couplers (prepared by the Competent Person (person designated by the MTRCL) and vetted by PYPUN-KD), Site Supervision Plans (SSP) (prepared by Leighton and MTRCL and vetted by PYPUN-KD), and Checklist for onsite assembly of EWL Slab to D-wall / Slab Couplers (prepared by Leighton and MTRCL and approved by MTRCL's supervision team). Such supervision was provided by MTRCL and Leighton.

(c) With reference to the Organisation Chart of Your Company, describe and explain the roles and responsibilities of the respective officers and staff of Your Company involved in the quality control, supervision, monitoring and inspection of the diaphragm walls and EWL/NSL Slabs. Identify, with names and job description, the relevant officers and persons on the Organisation Chart and indicate whether such persons are still in the employment of Your Company. If such persons have left Your Company, please provide contact details if such information is available.

67. In addition to the 'Core Team Organisation Chart' at the last page of the Inception Report (Annex 2 hereto), an organisation chart of the BSRC Team and the Monitoring & Verification Team is at **Annex 12** hereto. The roles and responsibilities of PYPUN-KD's staff are as follows:

- 67.1 Project Director: Mr Peter PUN was responsible for overall control and involvement in resolving key issues, ensuring adequate resources were allocated to execute the M&V Agreement and that the consultancy objectives were met, attending key meetings and addressing progress and liaison with matters requiring senior input. Mr PUN passed away in September 2016. The same work was undertaken by Mr CHANG Che Son since 6 September 2016. Mr CHANG is still employed by PYPUN-KD.
- 67.2 Project Manager: Mr Robert Lloyd was responsible for management of the team, co-ordination of findings and information into deliverables, ensuring deliverables and other inputs address the necessary issues, achieve project, financial and programme management and setting standards and ensuring quality of work of PYPUN-KD in the provision of its services under the M&V consultancy. Mr Lloyd retired and left PYPUN-KD in December 2015. The same work was undertaken by me from 1 January 2016. I am still employed by PYPUN Engineering Consultant (a sub-consultant of PYPUN-KD for the monitoring and verification consultancy).
- 67.3 Building Submission Review & Compliance: Mr YUENG Wai Hung (Leader – BSRC Team) was and remain the overall team leader of the BSRC Team, and also the lead structural engineer of the structural engineering sub-team of the BSRC Team responsible for Contract 1112. He is still employed by PYPUN-KD.
- 67.4 Monitoring and verification of cost: Mr CHAN Po Wa (Cost M&V Team Leader) was responsible for monitoring cost related activities/process and leading the team for carrying out cost audits and report preparation. He is still employed by PYPUN-KD.
- 67.5 Monitoring and verification of programming (Civil): Mr LEE Shan Chun (Programme M&V Team Leader – Civil Works) was responsible for monitoring programme related activities/process and leading the team on carrying out programme audits and report preparation during construction period of the diaphragm walls and EWL/NSL Slabs. Mr Lee left PYPUN-KD on about 13 August 2016 (and his contact telephone number is 2183 2777). The same work was undertaken by Mr LAU Chi Ming (Programme M&V Team Leader – Civil Works) during the period from about 7 July 2016 to 23 June 2017.

Subsequent to Mr Lau, Mr CHIU Chung Lai has been responsible for monitoring programme-related activities/process and leading the team on carrying out programme audits and report preparation. He is still employed by PYPUN-KD.

67.6 Monitoring and verification of programming (E&M): Dr TUNG Yip Wai (Programme M&V Team Leader – E&M Works) was responsible for monitoring programme related activities/process and leading the team on carrying out programme audits and report preparation in respect of E&M works. He is still employed by PYPUN-KD.

67.7 Monitoring and verification of public safety: Mr Michael CHAU (Public Safety M&V Team Leader) was responsible for monitoring public safety-related activities/process and carrying out public safety audits and report preparation. Mr CHAU left PYPUN-KD in September 2015. The same work was undertaken by Mr WONG Hok Sik (Public Safety M&V Team Leader) from 20 September 2015. Mr Wong is still employed by PYPUN-KD.

Request 4 – Your recommendations as the M&V Consultant

In relation to paragraph (b) of the Terms of Reference, provide your comments as the M&V Consultant of the SCL Project, on sub-paragraphs (i) and (ii), in particular, identify any aspects of non-compliance, inadequacies and deficiencies in MTRCL's project management and supervision system and the other systems, processes and practices as identified in sub-paragraph (i) and in the monitoring and control mechanisms of the Government and the implementation thereof as stated in subparagraph (ii).

68. We would recommend adding an additional hold-point in the Inspection & Testing Plan (ITP) requesting a joint inspection by MTRCL and its contractor of the exposed couplers before connecting steel reinforcement bars to them. The inspection record should note any damaged, missing or misaligned couplers already installed. Proper record of the inspection should be prepared and kept on site for preparation of any remedial work proposal. Proper record should also be kept of the submission of such proposal to the entity approving remedial work.
69. In my view, the benefit of creating these records is that they would go towards ensuring that couplers have been properly installed (as they would record the number of couplers installed, that couplers were free from damage and free of foreign materials within the 'female' threads before threaded reinforcement bars were screwed into the couplers). These records would also make it easier to handle matters on compensation and proposals of remedial works (for damaged, missing or misaligned couplers) for approval. The records would serve as an 'as-built' record of the couplers.

In the light of your response to the foregoing paragraph, and in relation to paragraph (c) of the Terms of Reference, describe and explain, from the perspective of the M&V Consultant which assumes a monitoring role and tasked with identifying and providing advice on key issues of the SCL Project on cost, programme and public safety, the suitable measures which could be taken in the future to promote public safety and assurance on quality of works. Please provide relevant basis in support of your reply.

Public safety during construction phase

70. Intensive monitoring of surrounding ground and building movement (and adequate supervision of such monitoring) is essential, as it provides early warning of possible adverse impact to buildings and utilities adjacent to construction works, in particular for works involving deep excavation. Effective monitoring needs to be tied to a prompt notification system to alert the developer/employer, project management, contractor and the government authorities/departments to take any necessary action in a timely manner.
71. In the Project, real-time monitoring and notification systems have been adopted for certain sections of the tunnel boring machine tunnelling works passing through sensitive structures/facilities. To further promote public safety, the use of the real-time monitoring and notification systems can be extended to monitor ground and buildings that may be affected by deep excavation works.

Assurance on quality

72. Although PYPUN-KD's scope of work did not focus on quality, in my view the following measures should be considered.
73. First, appointment of quality assurance auditor in site supervision team – the role of the auditor would primarily be to:
- 73.1 communicate with all relevant persons including site supervisors as regards quality assurance/control, supervision and reporting procedures to site supervisors,
 - 73.2 monitor compliance by the contractor and supervision teams through use of established quality assurance/control systems for construction on project-specific and work-specific supervision requirements, and carry out audits on procedure compliance and completeness of supervision records as appropriate, and
 - 73.3 take corrective action if deviation from procedure is found, to make recommendations for improvements towards compliance, and to report to top level of construction management.
74. Second, implementation of electronic platform for site inspection/supervision records – for large-scale construction projects, the site offices are usually distant from work sites, and many work sites at different locations are very often concurrently under construction. An electronic request-for-inspection system, which is accessible by mobile devices (e.g. on-line mobile apps), can be established to provide a convenient, real-time and traceable (auditable) communication record platform (including with photo storage capability) between the site supervision team and main

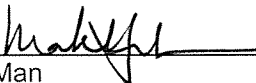
contractor. Such a system can also shorten field response time, allow control by other stakeholders, and provide instantaneous results and real-time project status visibility.

75. Third, engagement of an independent quality control advisor ('IQCA') – while an organisation might have its own quality assurance systems and procedures, established for general situations, to further promote assurance on quality, in addition to the project site supervision team, an IQCA could assist towards quality assurance. The IQCA can, amongst other things, independently review the organisation's existing quality assurance systems and procedures and its suitability for the specific project or even specific work task, recommend enhancement measures to improve the quality of the systems and procedures, and implement independent quality control tests.

Explain and confirm whether, if such "suitable measures" as identified above had been in place at the material times, the incidents of defective steel works and matters which gave rise to this Inquiry could have been avoided. Please provide relevant basis in support of your reply.

76. As the facts and circumstances surrounding the incidents are still being investigated, and whether the above measures are suitable or effective depends on the specific facts and circumstances, one cannot at present say whether implementation of the above measures could have avoided the incidents of defective steel works and matters which gave rise to this inquiry.
77. However, the above measures should under many situations be conducive to improving communication between construction workers and supervisors, identifying construction steps with high risk as to quality requiring more stringent supervision, and more complete and traceable inspection/supervision records.

Signed:


Mak Yu Man

Date:

13 November 2018

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

WITNESS STATEMENT OF MAK YU MAN

Dated the 13th day of November 2018

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AND PLATFORM SLAB CONSTRUCTION WORKS AT THE HUNG HOM STATION EXTENSION
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CORRIGENDUM
TO WITNESS STATEMENT OF MAK YU MAN DATED 13 NOVEMBER 2018

| <u>Page</u> | <u>Paragraph</u> | <u>Content</u> |
|-------------|------------------|--|
| K1/25 | 53.4 | <p>Replace</p> <p><i>'Project Steering Committee meetings: the main purpose of these meetings is to discuss main strategic issues, and is attended by senior management of MTRCL. PYPUN-KD has been invited to attend these meetings since August 2015.'</i></p> <p>with</p> <p><i>'Project Steering <u>Supervision</u> Committee meetings: the main purpose of these meetings is to discuss main strategic issues, and is attended by senior management of MTRCL. PYPUN-KD has been invited to attend these meetings since August 2015.'</i></p> |

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

**CORRIGENDUM
TO WITNESS STATEMENT OF MAK YU MAN
DATED 13 NOVEMBER 2018**

Dated the 11th day of December 2018

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