

Report of the Independent Audit Panel

for

**Recommendations in the Interim Report of
the Commission of Inquiry into the Construction Works at
and near the Hung Hom Station Extension
under the Shatin to Central Link Project**

Mr WONG Kwai Huen BBS, JP

Ir Prof LO Hong Kam JP

Ph.D., FHKIE, FCILT, FHKSTS, FHKIHT, MASCE

Ir CHAN Chi Chiu SBS

BSc(Eng), FHKIE, CEng, MICE, HonFCIWEM, C.WEM

26 MAY 2020

Content

Introduction	1
Chapter 1	Promoting public safety	6
Chapter 2	Enhancement of leadership, competence and governance	8
Chapter 3	Promoting collaborative culture	22
Chapter 4	Revised arrangements for contractual and commercial issues	31
Chapter 5	Rationalisation and clarification of rules and requirements	36
Chapter 6	Review of monitoring and verification arrangements	60
Conclusion	66
Annex A	Extract of Paragraphs Relevant to the Recommendations	68
Annex B	Summary of Recommendations	80
List of Abbreviations		88

Introduction

1. A 17 kilometre long railway, the Shatin to Central Link (“SCL”) is an integral part of the Government’s railway development strategy. The entire SCL project is funded by the Government under the concession approach, under which the MTR Corporation Limited (“MTRCL”) is entrusted with the design, construction and commissioning of the SCL project by the Government, whereas the Highways Department (“HyD”), with the assistance of its Monitoring and Verification (“M&V”) consultant is responsible for verifying whether MTRCL has fulfilled its obligations as the project manager.
2. In May 2018, media reports revealed the substandard steel works found at a platform slab of Hung Hom Station Extension under MTRCL’s Contract no. 1112 of the SCL project. There were also concerns that the main contractor had adopted revised slab to diaphragm wall connection details which were different from the design drawings accepted by the Building Authority. This gave rise to public concerns on the structural integrity of the station box structure, as well as the insufficiency of existing oversight and inspection regimes.
3. In response, the Chief Executive in Council appointed 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 Commission”) under the Commission of Inquiry Ordinance (Cap. 86) on 10 July 2018 to look into the facts and circumstances surrounding the steel reinforcement fixing works and any other works which raised concerns about public safety in respect of the diaphragm wall and platform slab construction works at the Hung Hom Station Extension.
4. Due to discovery of further matters of public concern in respect of Contract no. 1112, the Chief Executive in Council approved on 19 February 2019 the expansion of the terms of reference of the Commission, which was retitled “Commission of Inquiry into the

Construction Works at and near the Hung Hom Station Extension under the Shatin to Central Link Project”.

5. The Commission submitted its Interim Report to the Chief Executive on 25 February 2019, which was then redacted, pursuant to legal advice, to avoid any prejudice (actual or perceived) to any ongoing criminal investigations and any potential prosecutions of any criminal offences in the future, and was made public. The Commission put forward in the Interim Report a series of recommendations to enhance MTRCL’s project management system and the Government’s monitoring mechanism. An extract of the paragraphs relevant to the recommendations is at **Annex A**.
6. In its Interim Report, the Commission also recommended that a follow-up audit independent from the Government be conducted 12 months after the issuance of the Interim Report (i.e. 25 February 2019), so as to provide assurance to the Chief Executive that the recommended measures have been properly implemented and/or satisfactory progress towards their implementation is being made (“the Audit”). With the agreement of the Chief Executive, this Independent Audit Panel for Recommendations in the Interim Report of the Commission of Inquiry into the Construction Works at and near the Hung Hom Station Extension under the Shatin to Central Link Project (“the Panel”) was appointed in October 2019.
7. Mr Wong Kwai Huen, BBS, JP was appointed Chairman of the Panel, with Professor Lo Hong Kam, JP and Ir Chan Chi Chiu, SBS appointed as members. The Panel was supported by the Secretariat to the Panel established by the Transport and Housing Bureau (“THB”). The terms of reference of the Panel are as follows –
 - i. To consider progress reports from the Government and the MTRCL on the implementation of the recommended measures;
 - ii. To review whether the recommended measures have been fully implemented and, if not, whether satisfactory progress towards full implementation is being made; and

- iii. To prepare a report to the Chief Executive on (i) and (ii) above, together with any relevant observations or recommendations.
8. This Audit Report of the Panel (“the Audit Report”) was prepared to set out the outcome of the Audit, with the Panel having considered progress reports, other written submissions and oral presentations from the Government and MTRCL. In the course of the Audit, the Panel convened inquiry sessions on 20 to 21 November 2019, 23 January 2020 and 11 February 2020 during which officials from THB, Development Bureau, HyD and Buildings Department (“BD”), as well as core members of MTRCL’s Projects and Legal Divisions were present to set out the follow-up actions taken by the Government and MTRCL respectively, and to respond to questions from the Panel. The Government and MTRCL submitted progress reports, and additional data and information as requested by the Panel, for its perusal prior to each inquiry session. The Panel also visited the Hung Hom Station Extension in November 2019 and the site office of Exhibition Centre Station in December 2019 during which Members were briefed on the current site conditions and new supervision and monitoring systems.
9. It must be noted that the mandate of the Panel is to conduct an Audit in the form of an administrative, rather than judicial or legalistic, inquiry into the follow-up actions taken by the Government and MTRCL. The Panel took submissions from the Government and MTRCL on face value given the nature of the inquiry being administrative. The purpose of the aforementioned site visits was not to verify on-site the manner and to what extent the follow-up measures as set out in the Government and MTRCL’s written submissions were implemented, rather, it was to allow the Panel to familiarise with MTRCL’s work flow first-hand. Representations of the follow-up measures taken by the Government and MTRCL in the main text of the Audit Report reflect this Panel’s understanding of those measures and the relevant information provided by the Government and MTRCL to the Panel. The primary duty of the Panel is to evaluate the adequacy of these

measures in the implementation of the recommendations. It is beyond the remit of this Panel to assess, critique or vary the recommendations as put forth by the Commission.

10. This Panel notes that the Commission submitted its Final Report to the Chief Executive on 27 March 2020, and the redacted version of the same was released to the public on 12 May 2020. The majority of the recommendations in the Final Report have been featured in the Interim Report, with a few recommendations being varied and a good number of further recommendations as well. For the avoidance of doubt, the audit work of this Panel has not touched upon the latest recommendations stated in the Final Report. The Panel notes that the Commission recommends that a further follow-up audit be conducted 12 months following the date of the Final Report. The progress of implementation of these additional or revised recommendations will need to be assessed in that audit.

Structure of the Audit Report

11. The Interim Report put forward 58 recommendations to promote public safety and promote assurance on quality of works, which are mainly contained in Chapters 9 – 11 and Annexure F of the Interim Report. The Panel has categorised the recommendations into six categories. A table setting out the summary of each recommendation, their respective category and relevant action party is at **Annex B**. This Audit Report will set out the follow-up work taken by the Government and MTRCL in respect of each of the recommendations, as well as the Panel's assessment, accordingly in the ensuing six chapters –

Chapter 1 Promoting public safety;

Chapter 2 Enhancement of leadership, competence and governance;

Chapter 3 Promoting collaborative culture;

Chapter 4 Revised arrangements for contractual and commercial issues;

Chapter 5 Rationalisation and clarification of rules and requirements; and

Chapter 6 Review of monitoring and verification arrangements.

12. This Audit Report was written in English with a Chinese translation subsequently prepared. In case of any discrepancies, the English version prevails.

Chapter 1 Promoting public safety

On-going monitoring of station structure

Recommendation 1.1

Instrumentation, by means of fibre optics or other approved measures, at the east and west diaphragm walls and the East West Line and North South Line platform slabs to detect movement during operational phase of the station, and movements should be monitored and reported to the Government.

13. The Commission recommended in the Interim Report ongoing monitoring of the Hung Hom Station Extension diaphragm walls and platform slabs during operation of the station so as to provide assurance to the public. The Commission however noted the advice it had received that any significant movement would be unlikely.
14. As mentioned in the Final Report of the Holistic Assessment Strategy for the Hung Hom Station Extension¹, MTRCL would devise a long-term structural monitoring scheme for the station structure. The long-term structural monitoring scheme would include measures to regularise a movement monitoring and inspection regime for the diaphragm walls and platform slabs in the operation phase of SCL (including monthly groundwater monitoring, annual visual structural inspections and detailed structural inspections every 5 years). Evidence concerning the monitoring and inspection regime has been placed before the

¹ Since MTRCL has failed to submit comprehensive as-constructed records, the Government requested MTRCL to formulate a holistic strategy to verify the condition of the platform slab structure of the Hung Hom Station Extension. Upon completion of the three-stage exercise, the Government scrutinised and accepted MTRCL's final report on the holistic assessment strategy on 18 July 2019. According to the final report, MTRCL proposed "suitable measures" to address poor workmanship issues and to attain the requirements of the Code of Practice for Structural Use of Concrete under the Buildings Ordinance as well as established good practice of engineering design. The "suitable measures" including drilled-in dowel bars, local thickening of slabs, reinstatement of shear links, addition of columns, grouting, etc., are proposed to address the workmanship issues of coupler connections, shear links, horizontal construction joints, seepage, etc. MTRCL completed the design in September 2019, and commenced the relevant works of the approved design progressively in November 2019. Long-term structural monitoring works will also be considered for implementation after the completion of the structural modifications.

Commission in the Stage 2 hearing of the Inquiry. MTRCL advised that they would finalise the monitoring and inspection regime and submit to the Government for agreement according to established procedures.

15. Nevertheless, this Panel notes that the East West Line platform slab has been monitored by the following means since October 2018, with no significant movement being detected –
 - (i) the M&V consultant appointed by HyD has since August 2018 conducted weekly site inspections to identify signs of distress;
 - (ii) between October 2018 and September 2019, any sign of movement was monitored by an automatic deformation monitoring system; and
 - (iii) since September 2019, MTRCL’s surveyors continued measurements for any excessive or abnormal movement or settlement on site manually at 22 survey stations located along the East West Line tracks to allow structural modifications (i.e. the “suitable measures” proposed in the Final Report of the Holistic Assessment Strategy for the Hung Hom Station Extension alluded in footnote 1) pursuant to the above-mentioned Holistic Assessment Strategy to be implemented on site.

16. The Panel notes that progress has been made towards the implementation of the Commission’s recommendation. In view of the revised recommendation stated in the Final Report, MTRCL will need to make further submissions in the further follow-up audit regarding the finalisation of the monitoring and inspection regime in the long term.

Chapter 2 Enhancement of leadership, competence and governance

Leadership

Recommendation 2.1.1

Closer involvement of senior leaders of all parties – Government, MTRCL and contractors – working collaboratively to achieve a quality outcome, involving senior leaders being more visible to the workforce and taking a lead role in communicating key messages throughout their respective organisations.

17. The Commission recommended strengthening the involvement of senior leaders in the promotion of collaborative working. As the first step, HyD and MTRCL established a high-level SCL Steering Group on Communications (“SGC”) in May 2019, aiming to provide directions on enhancing the communication between the Government and MTRCL, including promotion of collaborative working relationships and culture in project delivery to achieve a quality outcome². With a small membership size of senior management of both parties (led by the Director of Highways and MTRCL’s Projects Director), the SGC met on a monthly basis in 2019 and has been meeting bimonthly since January 2020.
18. This Panel notes that the SGC has already achieved, among others, the following –
- (i) A review of the 3-tier project supervision meetings of the SCL project, namely the top-tier Project Supervision Committee (“PSC”), middle-tier Project Coordination Meeting (“PCM”) and base-tier Project Progress Meeting

² The terms of reference of the SGC are as follows:

- (i) Review the scope of existing communication protocols between HyD and MTRCL (e.g. meetings, letters, reports, submissions, etc.) in delivering the SCL project with a view to optimising the protocols for effective communications;
- (ii) Formulate measures to ensure that the reporting of SCL project matters from MTRCL to the Government is timely, with appropriate context, and pitched at right level;
- (iii) Formulate initiatives that encourage open communication and constructive challenges between HyD and MTRCL, with a view to supporting collaborative working relationships and culture in delivering the SCL project; and
- (iv) Set up and steer working group(s) to implement improvement initiatives as required.

(“PPM”), was completed with enhancement measures implemented to rationalise the arrangement for escalating issues and to avoid overloading the PSC with non-urgent items which had not been deliberated at lower tier meetings (see Recommendation 2.4.1 below); and

(ii) HyD and MTRCL introduced a co-location working arrangement for the SCL project. Since July 2019, HyD’s in-house inspectorate team has been stationed at MTRCL’s site offices, facilitating direct and frequent communication with MTRCL’s construction team (see Recommendation 3.1.1 below).

19. Outside the SGC, HyD’s directorate officers have since June 2019 started meeting senior project staff of MTRCL, main contractors and sub-contractors during their regular visits to sites at key construction stages, i.e. the sites of Contracts 1123 and 1128 which are the two remaining major civil engineering contracts in full swing under the SCL project. These site visits and meetings took place on average once a month, making senior leaders more visible to the workforce and help direct communication of key messages.
20. This Panel has received assurance that, for future railway projects under concession approach, suitable forum(s) will be set up with reference to the SGC and the directorate officers of HyD will continue to meet the senior project staff of MTRCL, contractors, sub-contractors and/or suppliers of construction materials during their regular site visits.
21. The Panel considers that the Commission’s recommendation has been fully implemented.

<p><i>Recommendation 2.1.2</i> <i>Leadership roles should be developed in line with the principles set out in ISO 9001:2015.</i></p>

22. ISO 9001 specifies certain requirements for a quality management system. Its accreditation requirements were revised in 2015 to place a stronger focus, amongst other things, on the role of

leadership in promoting the correct culture and behaviours. For example, clause 5 stipulates that top management shall demonstrate leadership and commitment with respect to the quality management system. This can be achieved by ensuring establishing quality policies and quality objectives; integrating system requirements into the organisation's business processes; communicating the importance of effective quality management to system requirements; promoting improvement; and making available resources needed etc. Senior leaders should have greater involvement in the management system to ensure that the strategic directions are compatible with the organisational policy and objectives.

23. This Panel notes that HyD's Integrated Management System ("IMS") has been compliant to, among others, ISO 9001:2015 since February 2018. This Panel further notes that since 2018 both internal and external annual audits of IMS have found it to be fully ISO 9001:2015 compliant. In furtherance of the requirement on leadership roles, HyD reported that its directorate officers had been engaging in frequent, regular and direct communication with multiple levels of staff of government departments and MTRCL. This has enabled the senior leaders to obtain a better grasp of the department's strengths and weaknesses as well as key risks associated with the system; thus facilitating decision making and allocation of responsibilities and authorities.
24. For MTRCL, its Project Integrated Management System ("PIMS") has been ISO 9001 compliant. MTRCL advised this Panel that, as the overarching document of PIMS, the PIM Policy was updated in May 2019 to better define project management principles and articulate expected behaviours of staff involved in managing railway projects. The word "quality" has since been adopted and prominently used in the latest updated PIM Policy. This has in turn further reinforced MTRCL's focused attention to "quality"; in addition to "safety" and the "environment". Some other sections of PIMS were also revised in May 2019 to delineate responsibilities clearer having regard to ISO 9001:2015.

25. This Panel takes note of the fact that an external consultant has been appointed by MTRCL to carry out a full review and an update of PIMS by Q4 2020 (see Recommendations 5.7.1 to 5.7.2). There will be an emphasis on clarifying the roles and responsibilities (including “leadership”) such that they are consistently and clearly defined and embedded across all documents by putting in place a standard Responsibility, Accountability, Consulted and Informed (“RACI”) model.
26. The Panel considers that the Commission’s recommendation has been fully implemented.

Recommendation 2.1.3

Establish a cross-party Senior Leadership Forum comprising the Government, MTRCL, contractors and major sub-contractors to monitor working relationships and cultural aspects of service delivery and to agree ways of developing collaborative working.

27. The project management expert of the Commission, Mr Steve Rowsell, advocated the establishment of a “senior leadership forum” to support collaborative working on projects. This has become one of the recommendations by the Commission.
28. In response to this recommendation, the Government and MTRCL jointly organised a Senior Leadership Round-Table on 10 January 2020 to –
- (i) foster a collaborative working relationship at all levels; and
 - (ii) build a working culture which supports constructive challenges.

This Panel was advised that the Round-table was attended by representatives from the Government (led by the Director of Highways), MTRCL (led by Projects Director), contractors and major subcontractors (led by their directors). With an external facilitator, senior leaders discussed the challenges in delivering the SCL project and exchanged views on incentivisation measures and measures to promote trust and cross-party collaboration. The

SGC (see Recommendation 2.1.1 above) would follow up on the matters discussed.

29. This Panel has received assurance that similar forums among senior leaders of various project parties to promote collaborative working will be considered in major railway projects in future.
30. The Panel considers that the Commission's recommendation has been fully implemented.

Competence

Recommendation 2.2.1

Review the "Competence" requirements for personnel engaged in project management/sponsorship roles and review checks and procedures to ensure ongoing competence of project-related staff.

31. When making Recommendations 2.2.1 and 2.2.2, the Commission remarked that "competence" could be defined as the combination of training, skills, experience and knowledge that a person has and the ability to apply them in performing a task effectively. Factors such as attitude and physical ability could also affect someone's competence.
32. In light of this recommendation, the Railway Development Office ("RDO") of HyD³ has reviewed the competence requirements of its professional staff. A framework of the required qualification, experience and training requirements of RDO professionals has been drawn up. At present, staff posted to RDO are qualified professional engineers. There are also junior staff holding relevant degrees who are close to obtaining professional qualifications. Training will be provided to new staff members (see details in paragraphs 33 to 34). RDO will seek to maintain a pool of engineers with a minimum average of three-year railway related experience. This will serve as a baseline in guiding future

³ RDO is one of the four divisions in HyD that is responsible for planning, development and implementation of new railway projects.

human resource management decisions with a view to striking a balance between maintaining a pool of expertise and widening staff exposure.

33. This Panel notes that RDO has, in parallel, consolidated its existing training regime and devised a railway development training scheme for its professional staff. A modular-based “Railway-related Training for Professionals of RDO” has been introduced since January 2020. There are six modules⁴ which will be reviewed and appropriately updated annually to best suit latest needs. Taking on board this Panel’s suggestion, HyD is extending the six-module training to staff set to be posted to RDO. In addition, RDO will continue to nominate suitable staff members to attend other railway-related training courses, conferences, duty visits and/or pursue master’s degree in railway engineering.
34. To entrench the above practices in its IMS, this Panel was advised that HyD promulgated in March 2020 new operational procedures and work instructions to regularise the staff competence review and training for RDO professionals as checks and procedures that ensure ongoing competence of staff. The programme on railway-related training for RDO staff will also be reviewed annually under the continual improvement plan of the IMS.
35. This Panel observes that MTRCL is also verifying and recording the competence of project-related staff for identifying skill shortage, hence training needs. It is currently developing a “Competency Management Procedure” so as to build within 2020 a framework of requirements for all key roles across supervisory staff for all disciplines. In the external recruitment or internal deployment process for the future railway projects, the competency of the applicants will be verified and checked against the framework of requirements.

⁴ The six training modules are -
(i) Railway planning and development in Hong Kong;
(ii) Introduction of railway systems;
(iii) Railway project management;
(iv) Railway design;
(v) Finance consideration for railway projects; and
(vi) Railway operations and maintenance.

36. The Panel considers that the Commission's recommendation has been fully implemented by the Government, and that satisfactory progress towards the implementation of the recommendation is being made by MTRCL.

Recommendation 2.2.2

Put in place effective measures to reduce the risk of failure by mistake, incompetence or malicious act.

37. In the Interim Report, the Commission recognised that even when employing competent people, human nature meant that errors might still occur, hence this recommendation.
38. This Panel notes that HyD maintains procedural and record-keeping requirements throughout all stages of its work in planning and implementing railway systems under its IMS. As a general measure, annual internal and external audits are conducted to detect and prevent non-conformities to the established standards, and suitable corrective actions would be suggested. The first half-yearly reminder of IMS requirements was issued to all RDO staff in November 2019.
39. The Government also reported specific measures to minimise risk of failure by mistake, incompetence or malicious act respectively –
- (i) to avoid failure by mistake, RDO has established a new monitoring system since May 2019 to ensure timely follow-up of incoming correspondences from MTRCL. HyD has also reviewed and re-affirmed the existing guidelines on supervision and checking of correspondences, whereby external correspondences signed off by officers at the Engineer rank will be countersigned;
 - (ii) to avoid failure by incompetence, HyD has since 2011 held quarterly experience-sharing sessions to foster knowledge transfer. The experience in relation to the Hung Hom

Station Extension incident will be put on the watch list for future sharing; and

- (iii) to avoid failure by malicious act, HyD staff are required to attend integrity training workshops at regular intervals. In accordance with established guidelines, integrity training should be arranged at a frequency of 3-year and 5-year cycles as far as possible for government site and non-site supervisory staff respectively. Having also reviewed its operational procedures on security management of restricted and confidential documents⁵, RDO's officers will conduct regular security inspections and report findings every quarter from Q1 2020 onwards.

40. MTRCL reported new measures to reduce the risk of failure –

- (i) MTRCL introduced in 2019 a site quality alert arrangement to identify developing quality issues on site and to notify project teams across the SCL project so that they would be more vigilant in similar issues.
- (ii) A new second line of defence has also been introduced since 2019, whereby MTRCL's Assurance, Monitoring and Verification teams are now based on each site to carry out surveillance inspections, which may lead to issuance of non-conformance reports ("NCRs")⁶, observations and recommendations. Experience and information gathered are shared across all sites to minimise similar mistakes being made due to process or procedure failures. Potential for

⁵ To defend against malicious acts and divulgence of sensitive information, the Government has set very stringent rules to prevent any leakage of classified information. Under the Official Secrets Ordinance (Cap. 521), a public servant commits an offence if, without lawful authority, he makes a damaging disclosure of any information, document or other article relating to security or intelligence that is or has been in his possession by virtue of his position, and shall be liable to a fine of up to \$500,000 and imprisonment for two years. Civil servants may also be subject to the common law offence of Misconduct in Public Office if the act of unauthorised disclosure of government information constitutes a misconduct of their public office. Civil servants are also required to observe administrative regulations and instructions, binding them through their employment contracts, those who are found to have disclosed classified information will also be liable to disciplinary proceedings. To ensure compliance, offices will arrange random inspections weekly to ensure security requirements are strictly adhered to and to identify security risks. Established guidelines are also regularly circulated to staff.

⁶ Under the SCL project, there is a system in place for reporting substandard works that require the use of "non-conformance reports". Follow-up measures implemented to improve non-conformance reporting are discussed under Recommendations 5.5.1 – 5.5.4.

mistakes due to incompetence will be addressed by the new “Competency Management Procedure” to be introduced as discussed under Recommendation 2.2.1 above.

41. The Panel considers that the Commission’s recommendation has been fully implemented.

Governance

Recommendation 2.3.1

Critically address the way in which the Government executes its multiple roles in relation to railway enhancement projects and actively consider creating an overall Government “sponsor” role for all individual projects to provide both authority and responsibility for the project.

Recommendation 2.3.2

For future railway enhancement projects a Project Board should be established to provide strategic direction. The Project Board might comprise appropriate Government officials as board members, supported by external non-executive members from specialist backgrounds who could bring experience of best practice from the wider industry so as to provide strategic advice.

Recommendation 2.3.3

Review how the Government organises itself for the management of its interests in the railway project. Establish a single point of responsibility within the Government for administering its agreement with MTRCL, especially in overseeing and managing internal consultations. Consider whether rail projects should remain within the portfolio of Director of Highways or a new distinct Director of Rail Development should be established.

Recommendation 2.3.4

Consider whether the Government should continue to adopt the “concession” model or revert to “ownership” model, or the “Special Purpose Vehicle” approach with a dedicated Board and delivery

organisation with reference to the experience of major rail infrastructure projects in the United Kingdom.

42. The Commission made a number of recommendations in relation to restructuring the Government's project sponsorship arrangements to provide both authority and responsibility for the railway projects: thus enhancing project governance and high-level supervision. The Government itself also sees the need to reinforce its ability to monitor and control the delivery of railway projects.
43. At present, RDO provides support to THB in the planning and delivery of new railway projects, with the involvement of a number of other departments at different stages. In this regard, this Panel observes that the Government is examining the feasibility of establishing a new department specifically tasked to supervise and monitor the planning and delivery of new railway projects. The roles, responsibilities and structure of the new department will be studied in depth.
44. In addition to the aforesaid study carried out by the Government in-house, this Panel has learnt that HyD commissioned a consultancy in January 2020 to examine enhancements to the Government's monitoring and control strategies for new railway projects. The consultancy will study different delivery approaches and practices adopted in major rail infrastructure projects overseas for the Government to consider how the ownership and concession approaches can be fine-tuned. The Government will further consider the composition and staffing strength of the new department with reference to the consultancy's recommendations.
45. As regards the establishment of a "project board" to provide strategic direction having regard to industry best practices, the Government advised that the aforesaid consultancy would also explore the merits of establishing an "independent railway expert advisory committee" that would be responsible for providing strategic advice to the Government in respect of railway projects, and for sharing industry best practices and knowledge. The Panel

notes that the Government has embarked upon the study of the setting up of a body that performs similar functions. In addition, since September 2019, PSC meetings for the SCL project have been divided into two segments with the attendance in the second segment being restricted to a smaller number of senior members to enable more focused discussion on the strategic directions and sensitive issues concerning the project (see Recommendation 2.4.1 below). These arrangements mean to streamline the communication and decision-making process, serving a function similar to that of a project board.

46. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendations is being made, noting that the Government's consultancy is currently underway.

Facilitating the work of the Project Supervision Committee

Recommendation 2.4.1

Review the attendance at the Project Supervision Committee to ensure that it is operating as a high-level committee focusing on strategic and performance issues as intended.

47. Co-chaired by the Director of Highways and MTRCL's Projects Director, the PSC is at the top tier of the project supervision meetings of the SCL project (i.e. PSC, PCM and PPM). As set out in clause 16.1 of the Entrustment Agreement for Construction and Commissioning of the SCL signed between the Government and MTRCL on 29 May 2012 ("the Entrustment Agreement"), the PSC will hold monthly meetings to review the project progress, entrustment activities and programme, and any issues arising as a result of site inspections as well as to monitor procurement activities, post-tender award cost control and resolution of contractual claims. Nevertheless, having read the past records of PSC meetings of the SCL project, Mr. Rowsell expressed concern that the large number of attendees might mean that the focus was

on less strategic issues which could / should be addressed at the other meetings.

48. In response to the recommendation, the Government and MTRCL jointly reviewed the membership of the PSC and streamlined the 3-tiered project supervision meetings of the SCL project to enhance their effectiveness. Among others –
- (i) PSC meetings was divided into two segments, with the attendance in the second segment being restricted to a smaller number of senior members from both the Government and MTRCL (see also Recommendation 2.3.2 above); and
 - (ii) the escalation of issues from PPM to PCM and from PCM to PSC would be rationalised to avoid overloading the PSC (see also Recommendation 2.1.1 above).

The streamlined arrangement has taken effect since September 2019, and has helped bring sensitive and strategic issues into the focus of the PSC for effective deliberation.

49. This Panel has been advised that similar arrangements will also be adopted in future railway projects under the concession approach.
50. The Panel considers that the Commission's recommendation has been fully implemented.

Recommendation 2.4.2

Ensure that the PSC is provided with reliable performance data which will allow substantive issues relating to time, cost and quality to be identified and acted upon.

51. The Government advised this Panel that since the commencement of the Entrustment Agreement, regular updates on issues such as safety performance, progress at critical contracts and statutory inspections, stakeholder engagement, project financial situation and status of contractual claims, etc. had been reported at the monthly PSC meetings. This would enable close monitoring of

the progress of works, cost control and resolution of contractual claims.

52. Further, since August 2018, statistics of NCRs have been submitted to the PSC, while details of specific NCRs are deliberated at the PCM. For example, the fulfilment of Request for Inspection and Survey Checks (“RISC”) forms for each station of the Tai Wai to Hung Hom Section of the SCL project has been reported in the PSC meeting since July 2019. Similar arrangements will also be adopted in future railway projects under the concession approach.
53. The Panel considers that the Commission’s recommendation has been fully implemented.

Recommendation 2.4.3

Report progress of as-built drawing production as part of the monthly progress to PSC⁷.

54. During the inquiry, two changes to the top of the east diaphragm wall without proper and timely record were revealed. This brought about concerns on the timely production and monitoring of as-built drawings.
55. This Panel takes note that in order to address these concerns, since October 2018, the PSC has been provided with regular reports on matters relating to MTRCL’s compliance with the building safety standard under the Buildings Ordinance (Cap.123) (“BO”) and progress of as-built drawings production, status of material compliance documents and plan submissions for working out appropriate follow-up actions.
56. As further reported by the Government, HyD reminded MTRCL in December 2019 its obligation under the Entrustment Agreement to maintain a register of all design changes and associated submissions. This would allow closer tracking of the progress of preparation of as-built drawings.

⁷ Please refer to Recommendation 5.8.3 on measures implemented to introduce rigorous monitoring of as-built drawing production.

57. The Panel considers that the Commission's recommendation has been fully implemented.

Chapter 3 Promoting collaborative culture

Fostering integrated working arrangement

Recommendation 3.1.1

Consider options for working arrangement in which Government staff could be integrated within MTRCL teams on a regular basis to help ensure a common understanding of requirements, improve communications, undertake joint forward planning and to resolve issues more efficiently. Review options for more integrated and co-located working between the parties to achieve greater transparency of issues, better forward planning and joint risk management.

58. The Commission was of the view that there was considerable scope for creating a more collaborative culture between the Government, MTRCL and contractors with the objective to achieving more successful project outcomes. It took note of the progress being made across the world in changing the internal culture of the construction industry. It also recognised that the change was progressively resulting in the reduction of project delay and budget overruns.
59. For the SCL project, in-house inspectorate staff of HyD have been stationed at MTRCL's site offices since July 2019 (see Recommendations 2.1.1 above and 6.1 below). Since December 2019, the arrangement has also been extended to HyD's engineers for initially half a day at monthly interval. Subject to review of its effectiveness, similar arrangements where site offices are designated for co-locating staff of HyD and/or M&V Consultant(s), MTRCL and its contractors or sub-contractors will also be adopted in future railway projects under concession approach.
60. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made.

Recommendation 3.1.2

Create more collaborative culture between the Government, MTRCL and contractors with the objective of achieving more successful project outcomes, e.g. closer working relationship between the Buildings Department and MTRCL and its designers and contractors to facilitate dialogue in all engineering matters.

61. This Panel was advised, by way of background, that there had been ample communication at a frequent interval between the Government and MTRCL to discuss engineering matters (e.g. through weekly working level meetings, regular management meetings and senior management meetings). In addition, a prescribed consultation mechanism⁸ had been established where high priority consultation submissions from MTRCL to the Government would be processed in not more than 14 days. Notwithstanding the above, the inquiry still revealed disagreement among parties as to whether prior consultation with the Government should be made on some minor changes of design and construction details.
62. In this connection, the format of the SCL monthly coordination meeting between MTRCL and the BO team of the Government has been amended since August 2018 in order to promote more collaborative working with respect to consultation submissions. The Panel notes that currently priority submissions and long outstanding replies to particular submissions either from the Government or MTRCL are highlighted for discussion in the meetings.
63. The Panel also notes that the Government and MTRCL have also collaborated to introduce a set of fast track consultation procedures for processing minor changes of design and construction details within 7 days through an enhanced communication system and working arrangement with MTRCL and its design

⁸ Insofar as the construction of the station box structure of the Hung Hom Station Extension is concerned, MTRCL has been exempted from several requirements under the BO, e.g. approval of plans. Nevertheless, MTRCL has been required to, among others, submit such drawings, plans and calculations and other details as may be necessary under a prescribed consultation process.

consultants/contractors. The new fast track consultation procedures have been implemented since March 2020.

64. The Panel considers that the Commission's recommendation has been fully implemented.

Introducing New Engineering Contract ("NEC")

Recommendation 3.2

Introduce standard use of an industry standard collaborative form of contract such as NEC4.

65. The Commission recognised the introduction of new contract forms such as NEC3 and NEC4 and the introduction of collaborative initiatives such as partnering and alliancing as key enablers of changing the internal culture of the construction industry across the world.
66. It was the Commission's view that the Government should take a leading role if a culture change was to take place. The Panel takes note that the adoption of collaborative approach (by NEC form) in the procurement and management of public works projects has become an established Government policy. The first pilot trial of NEC form was implemented in 2009. With Government policy on promotion of wider use of NEC form starting from 2015, the number of contracts adopting NEC form has continued to increase. Up to 2019, the Government has awarded more than 190 NEC works contracts.
67. The aforementioned policy was promulgated after the Entrustment Agreement being signed in 2012. As the project manager, MTRCL might determine the most appropriate contract form and contract package for the SCL project. This Panel notes that MTRCL will adopt NEC4 in the detailed design of the Ma Chai Hang Recreation Ground reprovisioning works under the SCL project and the preliminary design of the Tung Chung Line Extension project. Both contracts will be awarded in 2020.

MTRCL is also actively considering further use of NEC contract forms.

68. This Panel recognises the importance of providing training to allow staff involved to be acquainted with the collaborative spirit inherent to NECs, and has been advised that –
- (i) Apart from organising occasional in-house NEC knowledge sharing sessions, HyD has been supporting officers to attend a variety of external NEC courses and conferences;
 - (ii) MTRCL has also commenced relevant training, with a detailed plan for training of all staff who will use NEC4 by external NEC Consultants currently being prepared; and
 - (iii) HyD organised an experience-sharing session with MTRCL on the implementation of NEC contracts in public works projects under HyD’s management in December 2019, with about 50 participants from both the HyD and MTRCL. HyD may organise similar events in the future where opportunity arises.
69. The Panel considers that the Commission’s recommendation has been fully implemented.

Adopting Building Information Modelling (“BIM”) as a collaboration tool

Recommendation 3.3

Develop, implement and promote the use of BIM as a collaboration tool.

70. Apart from the introduction of NEC form of contract, the Commission noted that the introduction of BIM had made a significant contribution to improving trust and performance on project delivery. The Commission also noted that with effect from 1 January 2018, BIM technology is required to be used in all Government capital works projects with estimated costs greater than \$30 million.

71. Insofar as public works projects are concerned, as at end 2019, 224 consultancy agreements / works tenders with BIM adoption have been invited and 162 consultancy agreements /works tenders have been awarded. The Government further advised that it is exploring wider use of BIM through trial projects to facilitate off-site prefabrication, site supervision, asset management and integration with geospatial data for smart city planning.
72. The above-mentioned requirement of using BIM was promulgated after the Entrustment Agreement was signed in 2012. For future railway projects, HyD will impose the use of BIM as a standard requirement, and MTRCL has also decided that all future projects will be fully designed and managed using BIM. As a start, the design consultancies of the detailed design of the Ma Chai Hang Recreation Ground reprovisioning works under the SCL project and the preliminary design of the Tung Chung Line Extension project to be awarded by MTRCL in Q2 2020 are being tendered with contract documents which mandate the use of BIM.
73. This Panel observes that HyD has organised an experience sharing session with MTRCL on the implementation of BIM in projects under HyD's management in December 2019. There have been about 40 participants from both HyD and MTRCL attending the session. MTRCL has also set up a common data environment ("CDE") to facilitate the future design and data management on site using BIM. Training on how to use this CDE has commenced with a programme being put in place to train all staff who will be involved in future projects. The CDE will be used in the two projects as mentioned in paragraph 72.
74. The Panel considers that the Commission's recommendation has been fully implemented. It should be noted that in the Final Report the Commission will have made further recommendations beyond a basic level of use of BIM. In view of this, the Government / MTRCL will need to make further submissions in the further follow-up audit.

MTRCL's internal organisation

Recommendation 3.4.1

Consider ways of inducing closer working between different groups within the project organisation to avoid the risk of silo-working in which information and knowledge is not shared. Consider the effectiveness of existing communication arrangements between the teams and throughout the organisation. Review information databases and systems to ensure a single accessible source of true position accessible as appropriate to all people.

75. The inquiry revealed that there was a lack of liaison and communication between the MTRCL construction management and design management teams. Certain essential information was not fed through as a matter of routine.
76. This Panel attended MTRCL's demonstration on-site in December 2019, and noted that MTRCL introduced a series of changes to its procedures with a view to improving communication arrangements –
- (i) iShare was introduced in 2019 to all major SCL contracts; iShare is a web-based knowledge and information management portal for managing documents, information and other functions for internal knowledge sharing and collaboration purposes. It is accessible to all MTRCL project staff across contracts and to contractors. RISC forms, site diaries and quality observations are now digitalised for ease of access to relevant parties;
 - (ii) dashboard reporting is being introduced to keep the relevant parties better informed on developing issues; and
 - (iii) RISC form has been revamped to be inclusive of all relevant parties for review and sign off digitally; design management team can now verify the status of data and drawings to ensure the latest design details are being adopted on site.
77. In addition, this Panel understands that MTRCL has introduced new digital platforms to provide a common, transparent platform

for information sharing (see Recommendation 5.3.6 below), and will make further updates to PIMS by Q4 2020 (see Recommendations 5.7.1 to 5.7.2 below) to implement integrated process maps for each project stage to promote collaborative project delivery and improve project record keeping. Pending the outcome of the PIMS review, PIMS on site supervision and inspection process has been revised and implemented in August 2019.

78. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made, noting that the PIMS review is currently underway.

Recommendation 3.4.2

Review and clarify MTRCL roles and responsibilities in relation to the provisions and requirements of the Conditions of Contract. In particular, ensure that the position of Engineer to the Contract is understood and that roles and responsibilities respect the need for the Engineer to act impartially in the administration of the contract. The role of the Engineer needs to be integrated and compatible with the roles of others in MTRCL who have responsibilities for delivering obligations under the Entrustment Agreements.

79. Mr. Rowsell considered MTRCL’s obligations as Employer and Engineer under the terms of the contract with Leighton Contractors Asia Limited (“Leighton”) who was the contractor of the construction works in the Hung Hom Station Extension. He noted that given MTRCL’s dual role, there would appear to be a risk of instructions or directions being given by parties other than the Engineer. He also pointed out, with the Engineer being part of the Employer’s organisation, the risk that decisions might not be perceived to be fully impartial.
80. This Panel notes that MTRCL is reviewing its roles and responsibilities in relation to the Conditions of Contract. The review is targeted to be completed in Q4 2020.

81. To provide a greater degree of independence and impartiality, the role of the Engineer in future railway projects will be transferred from MTRCL's projects division to the engineering division, which does not participate in the management or supervision of railway projects. The Engineer will carry out defence checks on the quality of project delivery, and will report directly to the Engineering Director rather than the Projects Director.
82. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that MTRCL's review is currently underway. It should be noted that in the Final Report the Commission will have made further recommendations on the role of the Engineer. In view of this, MTRCL will need to make further submissions in the further follow-up audit.

Recommendation 3.4.3

Review arrangements for managing relationships with stakeholders to ensure that there is clarity on responsibilities and clear lines of communications particularly with Government Departments, and set out such arrangement in a Stakeholder Management Plan which is accessible by all involved in the project delivery.

83. The Commission noted the very large number of Government bureaux, departments, offices, committees and other sundry bodies involved in rail enhancement projects. On the one hand, the Government was recommended to critically address the way in which it executes its multiple roles (see Recommendation 2.3.1 above). On the other hand, MTRCL was recommended to review and set out its arrangements for stakeholder management.
84. This Panel notes that MTRCL is reviewing and updating its stakeholder management plan as well as its project management documentation to enhance accessibility and usability for implementation in future railway projects. These reviews are being conducted as part of MTRCL's PIMS review (see Recommendations 5.7.1 to 5.7.2 below).

85. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that the PIMS review is currently underway.

Chapter 4 Revised arrangements for contractual and commercial issues

Devising and developing a conflict of interest policy

Recommendation 4.1

Developing a conflict of interest policy appropriate and applicable to projects of this nature, the administration of which may be assigned to the Project Coordination Meeting or other committees as appropriate.

86. The Commission noted that the same design firm was engaged by MTRCL as the detailed design consultant while at the same time also engaged by Leighton as a technical advisor. While the firm had set up two teams to work for MTRCL and Leighton separately, both the project director and design team leader were the same persons for both teams. The Commission remarked that while no actual conflict of interest was identified, the potential for such conflict was real, hence this recommendation.
87. On the part of the Government, there has been an established policy on conflict of interest for civil servants. In addition, this Panel notes that the handbook on Selection, Appointment and Administration of Engineering and Associated Consultants has set out requirements and procedures in respect of avoidance of conflict of interest in the procurement and management of the related consultancy services for public works projects. There are standard requirements on “Special Conditions of Employment: Conflict of Interest and Debarring” for incorporation in consultancy agreements.
88. MTRCL reported that it had corporate-level documentation in place to guard against conflict of interest. In general, the same design consultant would not be employed by MTRCL and its contractor to work on the same contract. In exceptional circumstances where there is an advantage to the safe and efficient production of designs (as in Contract 1123 where the same consultant has, since January 2015, been designing both permanent and temporary works for

MTRCL and its contractor respectively), MTRCL has introduced a procedure which clearly defines and separates the workflows of the respective consultant teams. By so doing, all communications must route through the teams of MTRCL and the contractor on site to provide a meaningful and effective firewall. Team membership must be subject to approval to ensure that the same staff are not working for both teams. These measures were taken in response to the Commission's recommendation. So far, no breach of protocol has been found in the internal audits conducted in August 2019.

89. This Panel notes that MTRCL is considering how best the above-mentioned procedures can be incorporated into contract documentation for future projects. At the same time, HyD has shared the Government's policy on conflict of interest for civil servants and consultants directly employed by the Government and debarring (as mentioned in paragraph 87) for MTRCL's review and development of its internal conflict of interest policy. HyD has also asked MTRCL to ensure that future consultancy agreements entered into under the SCL project and future railway projects of similar nature should follow similar conflict of interest policy in general. This Panel has expressed concern over how the conflict of interest policy will be ensured to be continuously overseen and administered. In response, MTRCL advised that it had established a separate and dedicated team for dealing with matters concerning potential conflict of interest.
90. Apart from engagement of the same consultant by both the client and the contractor, other undesirable scenarios may include MTRCL's employment of staff from the contractor to work on the same contract/project or vice versa, personal relationship with working counterparts, etc. There are already requirements for contractors of Government's contracts to complete a declaration form on compliance with ethical requirements including conflict of interest. Failure to do so will entitle withholding of payment. This Panel notes that HyD has reminded MTRCL to make reference to these Government requirements in future contracts, and follow up on all potential scenarios.

91. The Panel considers that progress has been made towards the implementation of the recommendation. In any event, in the Final Report, the Commission has again highlighted the issue of potential conflict of interest, which may require more consideration in the further follow-up audit.

Commercial settlements

Recommendation 4.2

Including subcontracts within the provisions for commercial settlements set out in the Entrustment Agreement to provide the Government with greater transparency of commercial settlements which have a significant impact on the settlement of the final contract value and greater control on the settlement of the contract final account.

92. It was revealed during the inquiry that there had been commercial disputes between Leighton and one of its sub-contractors since late 2016, alongside assertions from the sub-contractor about systematic and extensive cutting of the thread end of rebars on site. Eventually, Leighton and the sub-contractor reached a commercial settlement in September 2017.
93. Under the SCL project, commercial settlements with main contractors would require consultation with the PSC as set out in clause 4.6(B) of the Entrustment Agreement, while settlements with sub-contractors were not included in this obligation. Nevertheless, Mr. Rowsell pointed out that sub-contracts represented typically around 70% of the value of the main contract, and it was therefore important to have transparency and effective accounting and governance procedures to ensure that sub-contract settlements are in accordance with the approved terms and conditions.
94. This Panel understands that there is a limited scope for implementation of this recommendation under the SCL project as it would involve the amendment of the Entrustment Agreement.

Nevertheless, HyD is liaising with MTRCL with a view to devising a mechanism under which MTRCL would report major commercial settlements with sub-contractors at an appropriate forum so as to provide the Government with greater transparency of those settlements. HyD is also exploring with MTRCL if consultation requirements could be extended to sub-contractors' level with relevant provisions being incorporated into future works contracts. This would provide the Government with more information regarding closer monitoring of the contract final account. For future works contracts for Ma Chai Hang Recreation Ground Reprovisioning Works under the SCL project, MTRCL has agreed to explore the introduction of the requirement for consulting the Government for any commercial settlement between contractor and subcontractors.

95. This Panel notes MTRCL's view that this recommendation is directed towards "target cost contracts" where payments under the contract are based on the costs incurred by the contractor, including the costs of sub-contracts (as distinct to the majority of contracts which are "lump sum" where contract price is a function of valuation provisions stipulated in the contract). MTRCL's "target cost contracts" already included strengthened provisions in relation to the verification and settlement of sub-contracts. MTRCL would explore further revisions to future works contracts.
96. For future works contracts, the consultancy as mentioned under Recommendation 2.3.1 to 2.3.4 above will review the monitoring and checking of MTRCL's assessment and verification of commercial settlements and variations/compensation events of main contracts and tier 1 subcontracts. MTRCL is also reviewing its existing contract forms by Q3 2020 as mentioned, and will explore further revisions to its standard "target cost contracts".
97. The Panel considers that satisfactory progress towards the implementation of the recommendation is being made, noting that MTRCL's review is currently underway.

Subcontracting arrangements and commercial settlements

Recommendation 4.3.1

Review the procedures for the approval of sub-contracts and any subsequent revisions which change the conditions and / or prices.

Recommendation 4.3.2

Review the arrangements for the commercial settlements of sub-contracts to include a stage for MTRCL to verify and accept that proposed settlements are in line with the approved sub-contract terms and conditions.

Recommendation 4.3.3

Review and rationalise the provisions for disallowable costs and consider incorporating works not undertaken in accordance with approved plans and procedures as a disallowable costs.

98. This Panel notes that MTRCL is reviewing its procedures for approval of sub-contracts, the definition of disallowable costs and commercial management procedures as part of its review on contracts targeted to be completed by Q3 2020 as mentioned under Recommendation 4.2 above. The Panel understands that it will not be possible to implement changes to live contracts under the SCL projects due to limitations to amending their terms and conditions. Pending final outcome of the review, consideration will be given to implementing the recommendations from the review in the contracts to be tendered. The issue of commercial settlements of sub-contracts and MTRCL's view are also discussed under Recommendation 4.2 above.
99. The Panel considers that satisfactory progress towards the implementation of the recommendations is being made, noting that MTRCL's review is currently underway.

Chapter 5 Rationalisation and clarification of rules and requirements

Rationalising and clarifying rules and requirements

Recommendation 5.1.1

In relation to the Buildings Ordinance and consultation, pull together the provisions into a clearer and more precise description of the requirements and responsibilities.

100. In his expert report, Mr. Rowsell expressed his opinion that the provisions for the applicability of the BO and the associated requirements for consultation appeared to be quite complex. It was not straightforward to follow how the documents (e.g. the BO, the Entrustment Agreement, the Instrument of Exemption, etc.) had worked together. He added that some imprecise wordings were used in the requirements.
101. On the one hand, the Government is of the view that the relevant professionals appointed by MTRCL⁹ should have the pre-requisite knowledge and competence in understanding and handling the requirements under the BO and the Instrument of Exemption. It is because these professionals are persons registered under the BO while the Competent Person's qualifications and experience have to be vetted by the Government.
102. On the other hand, with a view to providing a concise document on the requirements and responsibilities under the BO to the relevant professionals as well as their respective site supervisory personnel engaged in private development projects, BD is preparing a new practice note which consolidates the various requirements relating to specific tasks and testing of materials (e.g. quality supervision

⁹ Under the Instrument of Exemption for the SCL project, MTRCL is required to appoint a competent person to take up the responsibilities and duties of both authorized person and registered structural engineer. The competent person is required to co-ordinate and supervise the works in accordance with the agreed proposals. In addition, a registered geotechnical engineer is required to be appointed for building works with significant geotechnical content. MTRCL is also required to appoint registered contractors to supervise and carry out the works in accordance with the agreed proposals.

plan for installation of ductility coupler splicing assemblies, on-site sampling for testing, etc.) imposed under the BO when approving plan submissions so as to providing clearer and more precise description of the requirements and responsibilities. BD is currently consulting the building industry on the draft new practice note via the Building Sub-Committee of the Land and Development Advisory Committee (“BSC”) and the Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers Committee (“APSEC”).

103. Regarding the consultation process, as reported under Recommendation 3.1.2 above, a set of fast track consultation procedures for processing minor changes within 7 days have been implemented since March 2020. There are clear guidelines on which types of changes of design or construction details can be regarded as minor changes.

104. The Panel considers that satisfactory progress towards the implementation of the recommendation is being made.

Recommendation 5.1.2

Review the 2009 Code of Practice for Site Supervision (“CoP”) to give clarity on the definition of supervision, record keeping requirements and non-conformance reporting. Set out in CoP requirements of the communication of the supervision plan and associated obligations, which should provide an adequate role for the designer to ensure delivery of design intent in the construction.

105. Throughout the inquiry, involved parties alleged to have different interpretations of the requirements in relation to supervision, record keeping and non-conformance reporting. The inquiry also revealed construction team’s misunderstanding of certain design intent.

106. In response to this recommendation, BD has reviewed the CoP and proposed amendments with a view to further enhancing its clarity on the definition of supervision, record keeping requirements and non-conformance reporting, strengthening the requirements on

obligations of the site supervisory personnel and the communication among the site supervisory personnel in order to ensure delivery of design intent in the construction. The proposed amendments include highlighting the manner of continuous supervision by full time Technically Competent Persons (“TCPs”), completing and keeping inspection records and site supervision reports contemporaneously, keeping these records and reports by responsible functional streams, enhancing non-conformities reporting procedures, maintaining communication among TCPs of different function streams, clarifying the responsibility of the head of each functional stream in ensuring their representatives and TCPs are fully aware of supervision requirements. BD is consulting the building industry on the draft amendments to the CoP via the BSC and APSEC.

107. The Panel considers that satisfactory progress towards the implementation of the recommendation is being made.

Clarifying design submission and consultation procedures

Recommendation 5.2.1

Review the wording of the Particular Specification in relation to alternative works design proposals to ensure that the process and terminology is aligned with the contract conditions.

108. As set out in the contract between MTRCL and Leighton, the Contractor might propose alternative works design by submitting to the Engineer full particulars and details of adjustments in cost and programme. If the Engineer considered it desirable, he would issue an order recording the change. Nevertheless, Mr. Rowsell expressed concern that the terminology and procedures in the contract and its Particular Specification did not appear to be fully aligned. In addition, in relation to the change associated with the modification to the top of the diaphragm wall, he had not seen an order from the MTRCL Engineer implementing the change.

109. This Panel notes that MTRCL's Particular Specification Documentation is being reviewed as part of the review on contracts targeted to be completed by Q3 2020 as mentioned under Recommendation 4.2 above. Pending the final outcome of the review, MTRCL will consider implementing the recommendations from the review in the contracts to be tendered. MTRCL further reported that each Particular Specification issued by MTRCL is specific to the contract to which it relates. Treatment of alternative works design proposals processes will vary depending on the nature of the contract and will be cross checked against all contract documents for consistency.
110. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that MTRCL's review is currently underway.

Recommendation 5.2.2

Ensure that the construction method statements are in place based on the latest approved designs before construction commences.

Recommendation 5.2.3

Review the liaison arrangements between the Contractor's design team, the Building Authority and MTRCL's design and construction management teams to ensure common understanding of submission requirements and awareness of design issues and the forward programme of potential submissions.

111. It was found during the inquiry that the drawings that were used for inspection purposes did not illustrate the modification to the top of the diaphragm wall. In his expert report, Mr. Rowsell remarked that it would have meant that there was no approved method statement in place and that the design change had not been ordered by the Engineer. Without those two requirements, the construction work should not have taken place.
112. Furthermore, proposals for permanent modifications to the top of the diaphragm wall were included in a submission which focused mainly on temporary works issues. The proposal was submitted

by Leighton to MTRCL for review, and subsequently sent by MTRCL to BD. Nevertheless, the parties did not appear to be agreed on whether the permanent modifications were properly submitted in accordance with the consultation procedures. It also did not appear that the different teams within MTRCL were agreed on the application of the appropriate procedures.

113. This Panel notes that new PIMS requirements are being reviewed for future projects, which will capture enhanced measures for stakeholder engagement and statutory submission processes. Pending finalisation of MTRCL's PIMS review (see Recommendations 5.7.1 to 5.7.2 below), this Panel notes that MTRCL implemented the following measures –
- (i) fourteen PIM Practice Notes have been amended since May 2019 while three more are currently under review. In particular, the PIM Practice Note on “Monitoring of Site Works”, which covers the use and review of methods of construction, was updated in September 2019 to reflect the RACI model of MTRCL in areas including review and monitoring of method statement implementation;
 - (ii) all inspection and test plans within current contracts have been reviewed since the SCL issues came to light to verify their correctness and adequacy; and
 - (iii) at site level, regular meetings are now being held with BD to identify submission requirements and the status of submissions made, together with the prioritisation of submissions against the programmed works on site.
114. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendations is being made, noting that the PIMS review is currently underway.

Rationalising and clarifying supervision requirements

Recommendation 5.3.1

For future rail infrastructure projects, require site presence of the designer to assist in ensuring implementation of design intent in the works.

115. The Commission noted that one of the risks associated with the absence of the designer on site was that the designer was given little opportunity to ensure that its design intent was properly implemented in the works. The Commission suggested that presence of designer should be considered for all future rail infrastructure projects.
116. This Panel notes that MTRCL has enforced the role of design liaison representative more strictly on site in all existing contracts to ensure that design related issues are dealt with more efficiently. MTRCL will also explore arranging designer teams with clearly defined roles and responsibilities on site in future projects.
117. The Panel considers that the Commission's recommendation has been fully implemented.

Recommendation 5.3.2

Review documents which set out supervision requirements and guidance to rationalise the documents to a more manageable and readable number, ideally with a view to producing an all-inclusive and bilingual "Supervision Manual" accessible to all involved in supervision and inspection procedures.

118. One of the matters that caused the Commission's concern was that the obligations of the various parties operating on site appeared to be contained in a variety of disparate documents. In the result, engineers and others working on site were not always fully aware of the obligations which they must meet.
119. This Panel notes that an external consultant has been appointed by MTRCL to carry out a full review and update of PIMS by Q4 2020 (see Recommendations 5.7.1 to 5.7.2 below). The update will

include the adoption of clearer definitions (which state clearly mandatory instructions and good practice guidelines) and use of flowcharts.

120. Further, MTRCL has issued a new quality management plan since May 2019 to all project staff to provide a quick reference guide on PIMS documentation. The quality management plan is readily accessible on the iShare platform discussed under Recommendation 3.4.1 above. A Chinese version of the relevant sections of PIM procedures / practice notes related to communication and site supervision have also been developed and included in training materials for project staff.
121. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that the PIMS review is currently underway.

Recommendation 5.3.3

Develop a clear definition of supervision for the purpose of contractual obligations and adopt a consistent approach to terminology throughout the documentation, with requirements being specific about the information that needs to be recorded and certified.

122. In his expert report, Mr. Rowsell noted that while most people involved in the construction industry had a reasonable understanding of what was meant by supervision, formal obligations were not imposed by a precise and agreed definition explaining the role and the duties. The terms used to describe supervision related activities also varied from document to document. Mr. Rowsell was also of the opinion that the specific requirements for the information that needed to be recorded and retained by the MTRCL's and Leighton's site supervision and inspection teams were not clearly set out.
123. MTRCL's follow-up actions in this regard have been set out under Recommendations 4.2, 4.3.1, 4.3.2 and 4.3.3 above. In addition, the review and update of PIMS (see Recommendations 5.7.1 to

5.7.2 below) will also capture the details of the roles and responsibilities of staff involved in a contract.

124. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that MTRCL's review on contracts and PIMS review are currently underway.

Recommendation 5.3.4

Make the frequency of supervision and inspections flexible and reactive to the compliance and performance of work with requirements, with less frequent supervision supported by self-certification and audits upon demonstration of consistently high-quality work.

125. Mr. Rowsell noted that high levels of supervision might not produce good value for money when the contractor had a skilled workforce working to robust procedures and was producing good quality with little input from supervisors. Instead, he suggested commencing a project with a high level of supervision but with a phased reduction when the contractor had demonstrated good performance and created a good level of confidence. Ongoing performance could be monitored by a combination of more limited supervision supported by audit, with the cost of additional audit arising from poor performance being borne by the contractor.
126. This Panel notes that MTRCL has set up a new quality assurance team to monitor performance of project teams on site as a second line of defence. To bolster reliability of self-certification and audits, a new, enhanced training programme has been introduced for site supervision teams including those who have statutory responsibilities. A register is now in place to record training attended and to match training programmes with actual duties performed on site, and retraining programmes are also offered.
127. For future projects, MTRCL aims to complete by Q3 2020 its review of mechanisms for monitoring contractor's compliance with works requirements, expected level of supervision and encouragement of earlier notification of defects of works.

Suitable initiatives will be implemented in contracts tendered before completion of the review.

128. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made, noting that MTRCL’s review is currently underway.

Recommendation 5.3.5

Review the requirements for formally defined hold-points in relation to the contract provisions for not covering-up work without inspection and clarify whether inspection certificates apply to both hold-points and pre-covering up inspections.

129. As pointed out by Mr. Rowsell, PIMS and the Project Management Plan (“PMP”) set out the need for hold points in relation to higher risk activities where the contractor might not proceed. However, the contract set out a wider requirement that no work might be covered up or made unavailable for testing or examining without the consent of the Engineer. The lack of integration between the different documents carried risks that the latter duty might be overlooked or procedures might not be applied consistently.
130. Submission of inspection and test plans and carrying out works according to these plans are contract requirements that help prevent works being covered up prior to inspection and certification. MTRCL has reviewed its inspection and test plans to ensure that critical hold points are covered. This Panel attended MTRCL’s demonstration on-site in December 2019, and was advised that MTRCL had introduced a new digital platform known as iSuper (see also Recommendation 5.3.6 below), which was reportedly more efficient in managing hold points as it allowed for easier detection of irregularities, and, because it was fully archivable and allows tracking of certification documents, enhances accountability. RISC forms recorded in iSuper will highlight the delegation of respective inspectors and record those parties that sign off the inspection and certify the works can proceed to the next stage. Through iSuper, MTRCL can identify if inspection and test plans have been breached, and if so, defect correction can be instigated.

131. This Panel further notes that an external consultant has been appointed by MTRCL to carry out a full review and update of PIMS by Q4 2020 (see Recommendations 5.7.1 to 5.7.2 below). As part of the review, guidance on key hold points for key construction activities will be established.
132. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that the PIMS review is currently underway.

Recommendation 5.3.6

Review options for the use of the latest technological applications and tools to support the efficient effective recording of site records.

133. The inquiry revealed that while digital, hand-held devices were used extensively on construction sites around the world to capture the results of quality inspections and for tracking defects, this was not happening under Contract no. 1112.
134. This Panel notes that MTRCL, in response to the Commission's remarks, introduced the following new digital tools for site records and communications as a short term response to the recommendation –
- (i) iSuper is a digital tool for managing the key activities concerning RISC Forms and NCRs that can be used on mobile and PC devices. Frontline teams will undertake all inspections using the iSuper system. Records on this system cannot be overwritten, and can be archived for future reference and audits if required to verify who carried out inspections and when. A module for digitalising the site diaries is also being progressively introduced on live North South Line contracts. The tool has enabled better monitoring of hold points (see also Recommendation 5.3.5 above);
 - (ii) iComm is a secured site communication application that allows archiving of communication records including those

related to discussions, requests and actions between MTRCL and contractors; and

- (iii) iShare is a web-based knowledge and information management portal for managing documents, information and other functions for internal knowledge sharing and collaboration purposes (see also Recommendation 3.4.1 above).

135. MTRCL is also looking to develop a more robust long term digital system for future project management. This Panel has been advised that future projects undertaken by MTRCL will be delivered using BIM technology from preliminary design through handover stage. To gear up for this, MTRCL has developed a CDE (see Recommendation 3.3 above); enhanced site project management systems will also be developed to be compatible with BIM and rolled out in future contracts.

136. The Panel considers that the Commission's recommendation has been fully implemented.

Recommendation 5.3.7

Ensure there are procedures in place to record who are undertaking supervision duties on a daily basis and that supervisors have the required level of competence.

137. In relation to the requirements for approved resources for site supervision and their technical competence as set out in the Site Supervision Plan, Mr. Rowsell doubted if the requirements were being delivered.

138. This Panel notes that MTRCL's review and update of PIMS (see Recommendations 5.7.1 to 5.7.2 below) will capture the details of the roles and responsibilities of staff involved in a contract. This will support identification of particular procedures relating to particular roles.

139. As regards competency, as mentioned under Recommendation 2.2.1 above, MTRCL is developing a "Competency Management

Procedure” so as to build within 2020 a framework of requirements for all key roles across supervisory staff for all disciplines. MTRCL has also delivered retraining courses on its code of practice on site supervision for relevant staff in appropriate contracts. This training course now forms part of the training requirements for new staff joining future railway projects.

140. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made.

Recommendation 5.3.8

Ensure that records are kept to support the possible application of the contractual disallowable cost provisions.

141. The administration of the provisions for disallowable costs relies on robust and reliable record keeping. While the contractor shall keep accounts and records which allow payment to be justified, the Engineer also needs to have reliable records in order to verify work and to certify payment.
142. This Panel has been advised that the iSuper system discussed in Recommendations 5.3.5 and 5.3.6 provides archived records of approvals for work to proceed, which can subsequently be used to evaluate potential disallowed cost activities. In the long term, MTRCL is reviewing the definition of disallowable costs as part of its review on contracts (see Recommendations 4.3.1 to 4.3.3 above).
143. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made.

Reviewing site entry/exit systems and records

Recommendation 5.4

Review the existing entry/ exit site staff recording system in relation to:

- *knowing who is on site;*
- *supporting the payment of people under the commercial model;*
- *knowing who undertook work inspections and who certified work; and*
- *helping to confirm that the required level of supervision and the ratio of supervisors to workers.*

144. The reliability of entry / exit records was called into question during the inquiry. People, including casual visitors, came and went without the system making any record.
145. For the remainder of the SCL project, MTRCL has pointed out that while digital hand key systems continue to be used at all site entry points to record who is present on site, a new digital site diary system, which records where on site workers are deployed and what their trades are, will be deployed under iSuper (see also Recommendation 5.3.6 above).
146. This Panel notes that MTRCL is reviewing options for recording and monitoring of works on site, and will consider whether there are alternative systems that improve the monitoring of entry/exit to sites for implementation in future railway projects.
147. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made.

Reviewing non-conformance reporting

Recommendation 5.5.1

Review current guidance on non-conformance reports (“NCRs”) to ensure clarity and consistency on when NCRs should be issued.

Recommendation 5.5.2

Encourage “near-miss” non-conformance reporting to drive continuous improvement.

Recommendation 5.5.3

Maintain a single NCR database across all parties which is accessible to all supervisors and inspectors to allow recurrent issues to be readily identified.

Recommendation 5.5.4

Review and enhance the NCR close-out procedures including effective monitoring arrangements.

148. The Commission found that NCRs provide valuable learning points and facilitate continuous improvement through proper investigation and implementation of corrective measures, and suggested that MTRCL’s system of non-conformance reporting require a full review. Specifically, Mr. Rowsell gave the following opinions:

- (i) The process for dealing with non-conformities was not fully robust as it did not clearly describe the types of non-conformance that should have been recorded and reported. BD’s CoP indicated that any non-conformance should get reported but this was not clarified in the project plans and it did not occur in practice;
- (ii) While it would seem reasonable and pragmatic to apply a degree of significance to the non-conformance reporting requirements, the definition of significance would need to be set quite low as it was important to learn from non-conformances to support continuous improvement; and
- (iii) It was important for non-conformances to be shared across the team so that different inspectors were aware of any emerging problems.

149. In the view of the Commission, the review of MTRCL’s system of non-conformance reporting would not be full without reviewing the process of “closing out”.

150. This Panel notes that MTRCL's non-conformance reporting process has been substantially revised in July 2018 –
- (i) to capture quality issues found prior to hold point inspections, MTRCL has introduced a new reporting system known as “quality observation” under iSuper since September 2019 under two live SCL contracts. Under the system, quality issues and “near miss” cases are logged and communicated to relevant contractors for actions and due closure of these issues are closely monitored by MTRCL. Issues identified thereunder are communicated to relevant teams to alert them of potential non-conformance and allows early follow-up actions. The system will be introduced to all SCL contracts, and upon review of its effectiveness, will also be introduced to future railway projects;
 - (ii) to improve tracking of follow-up on NCRs, MTRCL digitised NCR and introduced dashboard reporting. These allow easier identification and follow-up of issues on site by MTRCL's site teams. The status of NCRs is updated weekly under a consolidated register for better monitoring of remedial actions. This register is circulated to HyD for discussion;
 - (iii) to enhance communication on issues with stakeholders, a database on iShare capturing NCRs issued by MTRCL is now being maintained. NCR registers provided by contractors are also being maintained and can be accessed by MTRCL project teams. MTRCL will move towards one digital system in future railway projects; and
 - (iv) to increase visibility of close out status, NCRs are graded by severity, and a procedure, based on the grading of the NCR, for the phased escalation to MTRCL's senior management of NCRs which are slow to be closed out was put in place in late 2018 to effectively monitor and manage the closure of NCRs. There are also regular meetings where NCRs to be closed out are reported to both the Government and MTRCL's senior management. The duration required to

close out any specific NCR is dependent on its nature and scope of remedial action required. Figures provided by MTRCL indicate that the average number of open NCR per week reduced from above 70 in Q3 to Q4 2018, to around 40 in Q1 2020.

151. The current PIMS have been updated in August 2019 to reflect the new procedures and staff have been trained accordingly. The review and update of PIMS (see Recommendations 5.7.1 to 5.7.2 below) will make further refinements to these processes as appropriate.
152. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendations is being made, noting that the PIMS review is currently underway.

Reviewing PMPs

Recommendation 5.6.1

Make PMPs more comprehensive and relevant to the project by translating generic guidance into project specific requirements while minimising cross-reference to other documents.

Recommendation 5.6.2

Consider including an introductory section in PMPs setting out MTRCL's corporate policies and the project strategic objectives to help steer the development of the project.

Recommendation 5.6.4

Consider including in the PMP (i) proposals for partnering arrangements and initiatives; (ii) checklists for sub-contract approval procedures; and (iii) commercial management procedures.

153. Under the Instrument of Exemption for the SCL project, MTRCL is required to prepare a PMP for the Building Authority's agreement. It sets out how MTRCL's proposed management process will meet the exemption requirements.

154. In his expert report, Mr. Rowsell pointed out that for many procedures, the PMP cross-referred to other procedural documents which were largely generic type documents. He suggested that the PMP should contain more specific detail on how the generic procedures would be applied to individual contracts.
155. He also opined that the PMP could have contained the following –
- (i) An introductory section to set out MTRCL corporate policies or objectives which should be applied to the delivery of the project, e.g. corporate priorities in relation to such aspects as safety, welfare, quality, sustainability and efficiency together with the culture and behaviour expected of people working on the project;
 - (ii) Information on how high-level partnering principles to be applied in practice on the project;
 - (iii) Procedures or methods associated with the approval of sub-contract arrangements; and
 - (iv) Information about commercial management arrangements and procedures.
156. This Panel has noticed that MTRCL has amended the current PMP for the SCL project to update information therein which has been superseded. Given the SCL project being in its final stages of construction, this Panel accepts MTRCL's submission that it is not an opportune moment to overhaul the PMP.
157. As a long term objective, MTRCL will be revisiting the format and contents of the PMP in future railway projects in consultation with the Government so as to address the Commission's recommendations for implementation. The new PMP is expected to include sections on liaison between the Government and MTRCL, quality assurance on design and construction management, with a focus on communication, adherence to processes and maintaining project records. These enhancements

will follow the guidelines set out in PIMS, which is currently under review (see Recommendations 5.7.1 to 5.7.2 below).

158. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendations is being made.

Recommendation 5.6.3

Include specific details about which PIMS manuals are applicable to a project and job roles.

159. On making the PMPs more contract specific, Mr. Rowsell remarked that the PMP, which stated that a list of 153 PIMS documents would be applied to the SCL project “where appropriate”, did not identify who would make the call of appropriateness. He considered that the applicability of documents and requirements should be made clearer to ensure a consistent and comprehensive approach to the application of the PIMS manuals and procedures on the contract.
160. This Panel notes that MTRCL has been offering training on specific PIMS relevant to the work of existing project staff. Relevant training on PIMS will also be provided to staff involved in future railway projects. As noted under Recommendation 5.3.2 above, MTRCL issued a new, readily available quality management plan in May 2019 to all project staff to provide a quick reference guide on PIMS documentation. In the long term, the review and update of PIMS (see Recommendations 5.7.1 to 5.7.2 below) will address this recommendation, and will also suggest relevant training requirements for project staff.
161. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made, noting that the PIMS review is currently underway.

Reviewing PIMS

Recommendation 5.7.1

Review and update PIMS procedures and manuals, to ensure alignment of project management guidance and procedures with contractual procedures.

Recommendation 5.7.2

Highlight in the manuals the aspects of the guidance which need to be assessed for the specific circumstances of a project and translated into project-specific guidance in the PMP, and the aspects of PIMS manuals which need to be converted from generic advice into project specific proposals.

162. The SCL project was entrusted to MTRCL on, among others, the condition that MTRCL would follow its own project management system, i.e. PIMS. PIMS includes a number of manuals, procedures and practice notes. The Commission suggested that substantial changes to PIMS is warranted.
163. In particular, Mr. Rowsell pointed out that it would be desirable to review and refresh the older PIMS documents, and align PIMS procedures with the Conditions of Contract (e.g. rationalising hold points under PIMS and pre-covering up inspections under the contract, as mentioned under Recommendation 5.3.5 above). There might also be opportunities to rationalise or combine some PIMS documents to reduce the overall numbers to which practitioners have to refer.
164. In relation to Recommendations 5.6.1 and 5.6.3 above on translation of the generic requirements in PIMS into project specific plans, Mr. Rowsell considered it helpful if PIMS manuals could more easily identify aspects which need to be developed into project specific requirements for inclusion in PMPs.
165. This Panel notes that an internationally renowned external consultant has been appointed to carry out a full review and update of PIMS by Q4 2020. The PIMS review is being carried out as

part of the MTRCL business transformation process to proactively advance the project delivery capability of MTRCL in going forward.

166. MTRCL has suggested that quality culture will be cultivated through the updated PIMS by incorporating a RACI model, competence management and capture of quality measurements and performance levels. The updated PIMS will include the definition and implementation of cross disciplines and integrated process maps for each project stage to support a holistic view of how disciplines and function groups will work collaboratively for project delivery. It will also include processes that ensure all information will be captured, generated and maintained as project record, as well as revamped stakeholder management plans.
167. The updated PIMS will be digitised to facilitate the dissemination of updated practices and requirements. This will mean a simplified route for readers to comprehend the processes and requirements. The documents will be digitised and grouped together online into relevant disciplines, and will also be searchable by job title. MTRCL will also consider introduction of a supervision manual once the updated PIMS is fully developed.
168. As an interim measure pending the launch of the updated PIMS, MTRCL is progressively updating the existing PIMS in their current format. Since May 2019, fourteen PIMS Practice Notes have been reviewed and amended to enhance project management of the works, with another three current under review.
169. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendations is being made, noting that the PIMS review is currently underway.

Recommendation 5.7.3

Review training (with the contractor where appropriate) on PIMS and contract procedures, including ongoing refresher training and the coverage of any updates to the procedures.

170. In his expert report, Mr. Rowsell advised that initial induction training needed to be supported by ongoing and focused training on key aspects of PIMS and contract procedures and associated roles. Where possible, this should be joint training between the Engineer's and Contractor's teams so there is a common understanding of roles and how contract procedures will work.
171. This Panel notes that MTRCL has provided more structured training on PIMS and contract procedures for its frontline project staff and contractor's staff since Q3 2018 to improve the site team's understanding of their supervision role. Classroom-based PIMS training has also been introduced, and an online training module to be completed by all project staff on a compulsory basis is being developed. These will be supplemented by discipline specific training. An annual training plan is in place, which will be subject to review and updating. As part of the PIMS review, MTRCL will also develop training in PIMS specific to the roles of different staff in the future.
172. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that the PIMS review is currently underway.

As-built drawings requirements and production

Recommendation 5.8.1

Review the current documents setting out requirements for as-built drawings to ensure consistency and clarity on roles, responsibilities and procedures, and pull them together in the PMP.

Recommendation 5.8.2

Clarify and maintain site records to support the delivery of the contractual requirements for the prompt recording of as-built dimensions and details.

173. While requirements for as-built drawings were contained in a number of documents, the management of the production of as-built drawings did not appear to be specifically covered in the PMP. Mr. Rowsell also flagged up a discrepancy in the main contract and its general specifications regarding the extent of as-built drawings the contractor was required to produce.
174. Production of as-built drawings required the contemporaneous recording of what had been built. While there was some contention during the inquiry that site photographs could serve this purpose, Mr. Rowsell stated that they alone could not deliver the contractual requirements of keeping dimensions during the course of the execution of the works and the provision of as-built surveys and records.
175. This Panel notes that MTRCL is reviewing and updating all aspect of as-built documentation in PIMS as part of the PIMS review (see Recommendations 5.7.1 to 5.7.2 above). The updated PIMS will enhance the procedures for producing, managing, tracking and submitting of drawings, and put measures in place to ensure that all stakeholders have access to the same drawings. The adoption of BIM by MTRCL (see Recommendation 3.3 above) in future railway projects will improve the accuracy of as-built data by developing it in ‘real time’ as the works progress on site.

176. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendations is being made, noting that the PIMS review is currently underway.

Recommendation 5.8.3

Introduce rigorous monitoring of as-built drawing production.

177. Some MTRCL witnesses testified at the inquiry that as-built drawings were still not prepared for the EWL slab. However, the contractor was actually required by the contract to produce and submit to MTRCL updated as-built records and drawings during the course of the work, and MTRCL's procedures should have ensured that this was happening.

178. This Panel notes that the status of submissions including as-built records has been reported to PSC since Q4 2018 (see Recommendation 2.4.3 above). Monthly coordination meetings between the Government and MTRCL have been enhanced to deal with submission matters, including as-built records.

179. While the current contract requires as-built drawings to be submitted after completion of the works, MTRCL will consider the introduction of specific clauses to future contracts for the phased submission of as-built drawings based on the phased completion of works packages. In addition, MTRCL will discuss with BD on submission requirements prior to implementation of future railway projects, including whether multiple phased as-built drawing submissions, are preferable. The use of BIM and NEC in future projects will also greatly assist in ensuring that design data is consistent with as-built data and in managing design data.

180. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made.

Clarifying method statement procedures

Recommendation 5.9

Review and clarify the procedures for the submission and acceptance of working method statements.

181. In relation to submission, review and acceptance of working method statements, in his expert report Mr. Rowsell listed out a few differences in the procedures set out in the PMP and the contract.
182. This Panel notes the PIM Practice Note on “Monitoring of Site Works”, which covers the use and review of methods of construction, was updated in September 2019 to reflect the RACI model of MTRCL in areas including review and monitoring of method statement implementation. Further, MTRCL has also reviewed the inspection and test plans within current contracts to ensure their continuing applicability to the works to be inspected (see Recommendation 5.2.2 above).
183. The Panel considers that the Commission’s recommendation has been fully implemented.

Chapter 6 Review of monitoring and verification arrangements

Extending the role of the M&V Consultant

Recommendation 6.1

Consider extending the role of the M&V Consultant to provide a wider “eyes and ears” role to help protect the Government’s interests in the delivery of the project and to provide high-level monitoring of the project quality assurance systems. Develop the M&V Consultant into the Government’s Project Representative that works more closely within the MTRCL organisation to monitor performance and to identify emerging issues.

184. In his expert report, Mr. Rowsell pointed out the potential to expand the M&V Consultant’s role to help ensure that Government had access to more reliable project performance data which would put it in a stronger position to plan its involvement at key stages and to respond to any issues that emerge during the delivery of the project. He also considered that the M&V Consultant’s role could be extended to a Project Representative role which would include high-level monitoring and auditing of quality assurance procedures.
185. For the SCL project, the current “check the checker” approach was heavily reliant on MTRCL’s compliance with its internal project management procedures and/or contractual requirements under the Entrustment Agreement.
186. That said, this Panel notes that HyD has provided in-house inspectorate staff stationing full-time on site to serve as Government’s “eyes and ears” since July 2019. A total of 9 inspection officers at different ranks and 4 works supervisors, all with experience in site supervision of infrastructure projects, have been progressively deployed on various MTRCL site offices of the SCL project. They would conduct surprise checks at works fronts critical to structural quality and safety or to the overall progress of the project, spot-check the compliance of works against the working drawings and review whether MTRCL fulfils its

supervision requirements. They also check associated site records such as RISC forms and test records.

187. With in-house inspectorate staff on site, HyD could monitor the site works more closely and independently, and could assess the effectiveness of MTRCL's supervision regime. For example, HyD's inspectorate staff have identified missing and irregular RISC forms during their inspections and flagged these incidents up for MTRCL's immediate follow-up.
188. Owing to existing contractual arrangements, there will be limitations to extend the role of the M&V Consultant. This notwithstanding, HyD has requested the M&V Consultant to be more proactively involved in its existing role under the SCL project. Since mid-2018, the M&V Consultant has joined all of the three-tier project supervision meetings to enable its prompt follow-up of and instant feedback to issues raised by MTRCL thereat. Since August 2018, the M&V Consultant has been conducting site walks and audits more frequently. The frequency of site walks has been increased from quarterly to monthly for civil engineering contracts, and from half-yearly to quarterly for electrical and mechanical contracts. From August 2018 to April 2020, a total of 191 site walks have been conducted. As for audits, the average number of audits per year for active civil engineering contracts has been increased from 4-5 audits before the enhancement in August 2018 to 7-8 audits at present. These enhancements have enabled the M&V Consultant to monitor the works more closely.
189. For future railway projects, the consultancy as mentioned under Recommendation 2.3.1 to 2.3.4 above will review the duties of the M&V Consultant and the current monitoring and supervision mechanism for railway projects generally. The Government will consider, having regard to the recommendations of the consultant, how the existing duties of the M&V Consultant can be extended, for instance in conducting in-depth monitoring and checking of the project delivery performance of the railway project manager, in future railway projects.

190. The Panel considers that satisfactory progress towards the implementation of the Commission’s recommendation is being made, noting that the Government’s consultancy is currently underway.

Reviewing the engagement arrangements of the M&V Consultant

Recommendation 6.2.1

Review the lump sum contractual arrangement used to employ the M&V Consultant and consider options which may provide a more effective incentive to be proactive in the execution of its duties and consider options of recovering M&V Consultant’s costs from the defaulting party for additional audits as a result of poor performance by the contracting parties.

191. Mr. Rowsell was of the view that the form of contract involving payment to the M&V Consultant on a lump sum basis did not support the proactive approach that the Government was seeking. Alternative contractual arrangements should be considered.
192. For the SCL project, upon HyD’s invitation for new initiatives, the M&V Consultant has made some preliminary proposals to uplift the M&V services. HyD has agreed to the proposed increase in the frequency of site walk (see Recommendation 6.1 above) and arrangement of “surprise audit” after regular site walk, and would issue additional services for about 107 audits and 154 site walks shortly. So far, 18 additional services have been ordered from the M&V Consultant with a total cost more than \$31 million. These include provision of additional manpower and additional quality checking and verification duties.
193. For future railway projects, taking into account the findings in relation to the role of the M&V Consultant under the consultancy as mentioned under Recommendation 2.3.1 to 2.3.4 above, the procurement approach and remuneration arrangement of M&V Consultants will be reviewed.

194. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that the Government's consultancy is currently underway.

Recommendation 6.2.2

Ensure that the M&V Consultant is given access to the necessary level of resources if the level of monitoring has to be increased due to concerns about poor performance.

195. The level of resources reasonably expected and required from the M&V Consultant was a topic of investigation.
196. HyD would continue to monitor the level of resources of the M&V Consultant to ensure that it has sufficient resources to deliver its tasks. In fact, a standing item for reviewing the level of resources of M&V Consultant has been included in the monthly progress meeting since October 2019. Further, this Panel notes that additional services will be ordered from the M&V Consultant if such services are necessary and justified under the M&V agreement (see Recommendation 6.2.1 above). According to HyD, thus far manpower resources deployed by the M&V Consultant are considered sufficient to meet service requirements.
197. The Panel considers that the Commission's recommendation has been fully implemented. It should be noted that in the Final Report the Commission will have made further recommendations on the appointment of M&V consultants. In view of this, the Government will need to make further submissions in the further follow-up audit.

Clarifying requirements for the M&V Consultant

Recommendation 6.3

Clarify in M&V Consultants' briefs requirements in relation to site audits and surprise checks.

198. The nature of surprise checks and audits by the M&V Consultant and how it could be implemented under the terms of the Entrustment Agreement were looked into during the inquiry. In particular, the Commission was not entirely convinced that the “surprise check” needed to be scheduled in advance with MTRCL and Leighton, despite site security and access constraints.
199. Under the Entrustment Agreement, MTRCL shall be informed of the date and site of the M&V Consultant’s inspections and audits. Nevertheless, to maintain an element of surprise, specific site locations and scope of the inspections and audits will not be disclosed in advance. In addition, HyD will regularly review with the M&V Consultant on the requirements and details of site inspections and audits, including their frequency, location and scope.
200. On the other hand, as mentioned under Recommendation 6.1, HyD’s in-house inspectorate staff are stationed full-time on site to carry out ad-hoc and unscheduled site inspections and audits. Upon HyD’s request, MTRCL has started providing a 3-week rolling programme of site activities for advance information, facilitating checks by HyD’s inspectorate staff on site and the M&V Consultant.
201. As mentioned under Recommendation 2.3.1 to 2.3.4 above for future railway projects, taking into account the findings in relation to the role of the M&V Consultant under the consultancy, HyD will ensure that the requirements related to site inspections, audits and/or surprise checks are clearly set out in the M&V Consultants’ briefs.

202. The Panel considers that satisfactory progress towards the implementation of the Commission's recommendation is being made, noting that the Government's consultancy is currently underway.

Conclusion

203. Mega infrastructure projects are by nature of an immense scale and complexity. They will often require close-knit coordination between multiple stakeholders, and involve a myriad of regulatory and supervisory requirements and voluminous documents, guidelines and specifications. Operational challenges are almost an inevitability. Handling these challenges well helps prevent cost overruns and delays. The Commission has put forward recommendations in the Interim Report regarding aspects of construction and management of infrastructure projects. These are the valuable outcomes of lessons learnt, and if followed through will bring about positive change to the construction industry as a whole.
204. This Panel has conducted the Audit to review whether the 58 recommendations put forward in the Interim Report have been fully implemented and, if not, whether satisfactory progress towards full implementation is being made. Having reviewed in detail verbal and written submissions from the Government and MTRCL, this Panel is of the view that, of the 58 recommendations, 14 have been fully implemented and satisfactory progress towards full implementation of 42 recommendations is being made, whereas progress has been made towards the implementation of the remaining two recommendations. As set out in this Audit Report, both the Government and MTRCL have embarked on consultancies and reviews to address the Commission's recommendations. This Panel is of the view that the Government and MTRCL have taken satisfactory steps towards implementation of the recommendations currently under review, and that the Government and MTRCL should take active steps to implement these recommendations fully subject to the outcomes of the consultancies and reviews.
205. This Panel finds that the Government and MTRCL have demonstrated that they are taking the Interim Report seriously with full commitment to put in undiluted effort to tackle those long standing issues as identified by the Commission by implementing the recommendations. Such effort was reflected in the detailed

progress reports submitted to the Panel during the Audit exercise. Where the Panel found information submitted insufficient, the Government and MTRCL were effective and responsive in providing supplemental information to aid the Panel's deliberation. Representatives of the Government and MTRCL attending the inquiry sessions and site visits showed their understanding of the necessity and gravity of taking on board all the recommendations of the Commission. In the Panel's view, maintaining such a commitment, as well as nurturing a culture that emphasises quality and collaboration, will be crucial to sustaining and following through all the measures implemented or to be fully implemented in the SCL project as well as all future railway projects.

206. This Panel notes that in the Final Report, the Commission has recommended a further independent follow-up audit be conducted 12 months following the date of the Final Report. The updated implementation progress of the above-mentioned 44 recommendations that have not been fully implemented may be assessed in that audit.

Extract of Paragraphs Relevant to the Recommendations

Paragraph Number¹⁰	Extract	Recommendation Number
Chapter 9 Is the structure safe?		
(391)	<p>Pursuant to section (c) of its original Terms of Reference, the Commission is required to make recommendations on suitable measures with a view, firstly to promoting public safety, and secondly to promoting assurance on quality of works. With regard to the first part, namely promoting public safety, the Commission recommends as follows:</p> <p style="padding-left: 40px;">The Commission recommends ongoing monitoring of the station structure during operation of the station, so as to provide reassurance to the public. However, the Commission notes the advice it has received that it is unlikely that any significant movement will occur.</p>	1.1
Chapter 10 Reviewing adequacy of MTRCL's & Government's management systems		
(408)	<p>The project management systems of both MTRCL and Leighton prescribe a system for reporting substandard works requiring the use of 'Nonconformance' reports ('NCR's). The accepted practice is that it is unnecessary to issue an NCR if the defective work that has been identified is able to be corrected and signed off on the same day. Both project management experts agreed with this practice. However, they recommended that all site supervision and construction engineering teams should be made aware of the defective work so that they are put on notice to be watchful for repeat occurrences. In the event that similar defective work occurs again, an NCR should then be issued.</p>	5.5.1 5.5.3
(410)	<p>In the view of the Commission, MTRCL's system of non-conformance reporting requires a full review which should include a review of the process of 'closing out' (in respect of which evidence was put before the Commission of unacceptable delay).</p>	5.5.4

¹⁰ Paragraph reference in the redacted Interim Report; F-X denotes paragraph reference in Annexure F. Paragraphs with their numbers in brackets do not carry recommendations per se, but suggestions from the Commission or its experts which supplement the recommendations.

(416)	<p>The Commission further notes that Atkins was not required to have a presence on site under either of its arrangements. One of the risks associated with this absence from site is that the designer is given little opportunity to ensure that its design intent is properly implemented in the works. The Commission agrees with the project management experts that it is desirable, if not essential, for a designer to have a presence on site. The Commission believes that this should be considered for all future rail infrastructure projects.</p>	5.3.1
(426)	<p>The Commission is aware of the fact that digital, hand-held devices are used extensively on construction sites around the world to capture the results of quality inspections and for tracking defects. It was surprising therefore to discover during the course of the hearings that MTRCL, together with its contractors and subcontractors, did not appear to make use of technology for systematic data capture on site, especially for producing contemporaneous records of quality inspections. The Commission heard from a number of witnesses that records of inspection were not immediately recorded on site but were recorded later on paper in the site office: on occasions, only being recorded much later, if at all. In respect of the use of technology on site, MTRCL appears to have ‘fallen behind the curve’.</p>	5.3.6
(428 – 434)	<p>Building Information Modelling (‘BIM’) has not been used on the SCL project. Indeed, it appears that BIM has hardly been used on any MTRCL projects. However, Steve Rowsell, the Commission’s independent expert, recommended that MTRCL should develop and implement the use of BIM as a collaboration tool. In addition, MTRCL’s management consultant, Turner & Townsend, make reference to BIM in their review and the Commission has been informed that MTRCL is progressing the development of BIM for future projects.</p> <p>What therefore is BIM and, in the view of the Commission, what benefits will it provide in future Hong Kong infrastructure projects?</p> <p>BIM is a process. A software model of the asset is developed and shared within a common data environment thereby increasing transparency between the parties. BIM provides clarity regarding the asset requirements at each phase of the project life cycle. Data from all parties is linked. The project is thereby kept on schedule and on budget. It may even be said that BIM is becoming part of the DNA of future construction.⁴⁹ Experience in the use of BIM demonstrates that significant savings of time and cost can be achieved, predominantly by reducing wasted or duplicated effort.</p> <p>BIM has been widely adopted in the United Kingdom, Europe and North America. In 2012, the Government of the United Kingdom mandated</p>	3.3

	<p>that BIM be used on all publicly procured projects from April 2016. Many private sector clients in the United Kingdom have followed suit and BIM is progressively becoming the norm for designing, implementing and maintaining building and infrastructure assets across the United Kingdom and parts of Europe. The Commission notes that similar government mandates have been introduced in Finland (2007), Norway (2008), USA (2008), Singapore (2014) and France (2017). Germany will follow in 2020.</p> <p>The Hong Kong construction community is already aware of the benefits of BIM. In the Chief Executive’s 2018 Policy Address it was stated that the Government has established a “HK\$1 billion Construction Innovation and Technology Fund to encourage wider adoption of innovative technologies and stimulate the provision of cutting-edge solutions”.⁵⁰ Further, the Government’s Budget Measures for 2018-2019 states that starting this year, the Government will adopt BIM technology in the design and construction of major government capital works projects.⁵¹</p> <p>The Commission also notes that the Secretary for Development issued Technical Circular (Works) number 7/2017 in December 2017 setting out the requirement to use BIM technology in all capital works projects with estimated costs greater than HK\$30 million, this to take effect from 1 January 2018.</p> <p>The Commission is not therefore recommending a technological process that is unknown in Hong Kong or of no interest to the construction industry here. In the context of this report, however, and looking forward, it is a development to be encouraged.</p> <p>_____</p> <p>⁴⁹ AIM Group, Hong Kong ⁵⁰ See paragraph 145 of that address ⁵¹ See paragraph 113 of the Budget Measures statement</p>	
(437)	<p>The Commission recognises that there can be breakdowns in communication in the best managed organisations. The independent expert witnesses have, however, suggested that one way of materially improving communications, including communications within a single organisation, is by the adoption and use of BIM.</p>	3.3
442	<p>Steve Rowsell suggested that, in respect of a project which the Government is funding, it could ensure greater efficiency, greater cost effectiveness and savings in time if there was a single point of responsibility within the Government for administering the</p>	2.3.3

	Government's agreement with MTRCL, more especially to oversee and manage internal Government consultations. The Commission believes there is much strength in Steve Rowsell's recommendation.	
(443)	In the course of closing submissions, counsel for the Government said that it was the Railway Development Office ('RDO') within the Highways Department which served as the single point of contact for overall administrative coordination. However, counsel went on to say that, if considered necessary, the Government was prepared to instil further clarity into its lines of communication and reporting. The Commission believes this should be done.	2.3.3
(444)	<p>Indeed, the Commission goes further. It believes that the Government should critically address the way in which it executes its multiple roles in relation to railway enhancement projects and that active consideration should be given to creating an overall Government 'sponsor' role⁵² for all individual projects. The sponsor must command authority and take responsibility for the project on behalf of the Government. Steve Rowsell, the project management expert appointed by the Commission, also recommended that the Government should address its project sponsorship arrangements.⁵³</p> <hr/> <p>⁵² Sponsorship of a project, programme or portfolio is an important senior management role. The project sponsor is the individual (often a manager, executive or senior officer) with overall accountability for the project. The sponsor is accountable for ensuring that the work is governed effectively and delivers the objectives that meet the identified needs. The project sponsor is primarily concerned with ensuring that the project delivers the agreed benefits. It is normal on a large, complex project for the project sponsor to be supported by a sponsorship team. [From: The Association for Project Management (APM), Body of Knowledge]</p> <p>⁵³ Also included in paragraph 6 of Annexure F</p>	2.3.1
(445)	In this regard, the Commission respectfully suggests that the Government might wish to look to the experience of its counterparts elsewhere in the world, for example, in the United Kingdom where a number of major rail infrastructure projects have been funded (wholly or partly) and sponsored by the central Government.	2.3.4
(446)	Finally, it is to be emphasised that, in the view of the Commission, the skill sets required for effective sponsorship of projects are not the same as that required for effective project management.	2.3.1
451 – 452	Finally, and more fundamentally, the Commission is of the view that there is in Hong Kong considerable scope for creating a more collaborative culture between the Government, MTRCL and contractors	3.1.2

	<p>with the object of achieving more successful project outcomes. The Government should take a leading role if such a change is to take place.</p> <p>By way of example, the Commission believes that there would be great value in the Buildings Department working much more closely with MTRCL and its designers and contractors in order to facilitate dialogue on all engineering matters.</p>	
(454)	<p>Key enablers of this change have been the introduction of new contract forms such as NEC3 and NEC4⁵⁴ and the introduction also of collaborative initiatives such as partnering and alliancing. The introduction of BIM has also made a significant contribution to improving trust and performance on project delivery.</p> <p>⁵⁴ The New Engineering Contract (NEC) is a suite of contracts created by the Institution of Civil Engineers. NEC3 is a family of contracts unique in offering a complete end-to-end project management solution for the entire project life-cycle; from planning, defining legal relationships and procuring of works, all the way through to project completion, management and beyond. NEC4 builds on NEC3, providing improved flexibility, clarity and ease of use, thereby enabling the delivery of projects on time, on budget and to the highest standards.</p>	3.2 3.3
(455)	<p>Steve Rowsell, the Commission’s expert, advocated the establishment of a Senior Leadership Forum, comprising the Government, MTRCL and its contractors in order to “monitor working relationships and cultural aspects of service delivery and to agree ways of developing collaborative working”. He went on to suggest that it should include leaders of the major sub-contractors. The Commission supports this suggestion.</p>	2.1.3
Chapter 11 Recommendations in respect of promoting public safety and promoting assurance on quality of works		
460	<p>The Commission accepts the advice provided to it by independent structural engineering experts that the east and west diaphragm walls and EWL and NSL platform slabs should be instrumented to detect movement during the operational phase of the station. Instrumentation should be by means of fibre optics or other approved measures. Movements should be monitored and reported to the Government.</p>	1.1
(467)	<p>The Commission observes that MTRCL places a high reliance on its PIMS, which MTRCL notes has served it well over more than two decades. However, a record of past success cannot be a guarantee of future performance. The Commission is of the opinion that substantial change to PIMS is warranted.</p>	5.7.1

469	The Commission recommends that MTRCL expedites its adoption of BIM technology for new capital projects within its portfolio.	3.3
470	The Commission recommends that for future rail infrastructure projects the designer should have a site presence so as to assist in ensuring that the design intent is implemented in the works.	5.3.1
471	The Commission recommends the closer involvement of senior leaders of all parties – Government, MTRCL and contractors – working collaboratively to achieve a quality outcome. This would involve senior leaders being more visible to the workforce and taking a lead role in communicating key messages throughout their respective organisations.	2.1.1
473	<p>The Commission recommends that both MTRCL and the Government should review the ‘Competence’⁵⁵ requirements for personnel engaged in project management and project sponsorship roles in their respective organisations.</p> <hr/> <p>⁵⁵ ‘Competence’ can be defined as the combination of training, skills, experience and knowledge that a person has and their ability to apply them in performing a task effectively. Factors such as attitude and physical ability can also affect someone’s competence. [In plain sight: assuring the whole-life safety of infrastructure, The Institution of Civil Engineers, 2018]</p>	2.2.1
474	The Commission recognises, that even when employing competent people, human nature means that errors may still occur. Effective measures must therefore be in place to reduce the risk of failure, be it by mistake, incompetence or malicious act. The Commission recommends that MTRCL and the Government respectively should review their checks and procedures to ensure the ongoing competence of their project-related staff.	2.2.1 2.2.2
475	The Commission recommends that the Government should critically address the way in which it executes its multiple roles in relation to railway enhancement projects. Of particular concern is Government’s role as ‘client’ or ‘sponsor’ of railway projects. The sponsor organisation must provide both authority and responsibility for the project.	2.3.1
476	The Commission recommends that for future railway enhancement projects a Project Board should be established to provide strategic direction. The Project Board might comprise appropriate Government officials as board members, supported by external non-executive members from specialist backgrounds who could bring experience of best practice from the wider industry so as to provide strategic advice.	2.3.2
477	The Commission recommends that consideration be given as to whether it is appropriate for rail projects to remain within the portfolio of	2.3.3

	Director of Highways, or whether a new distinct Director of Rail Development role should be established.	
478	<p>The Commission further recommends that consideration should be given as to the appropriateness of the ‘Concession’ model for future projects entrusted by the Government to be project managed by MTRCL, or whether the Government should revert to the previously used ‘Ownership’ model. Alternatively, consideration might be given to the creation of a Special Purpose Vehicle (‘SPV’) approach, with a dedicated Board and delivery organisation, as has been employed on major rail infrastructure projects in the United Kingdom⁵⁶.</p> <p>_____</p> <p>⁵⁶ Crossrail Limited and HS2 Limited</p>	2.3.4
479 – 480	<p>Finally, the Commission recommends that a follow-up audit be conducted, 12 months following the date of this interim report, to provide assurance to the Chief Executive that the recommended measures herein have been properly implemented and/or satisfactory progress towards their implementation is being made.</p> <p>Given that the recommendations in this report are for action by both MTRCL and the Government, this audit should be carried out independently of the Government.</p>	7.1
Annexure F Recommendations of Mr Steve Rowsell on strengthening systems for supervision, monitoring, control and management		
F-1	Strengthen the involvement of senior leaders in all parties in establishing appropriate behaviours across the organisations to support a collaborative approach in the delivery of the project. Leadership roles should be developed in line with the principles set out in ISO9001:2015 and would involve senior leaders being more visible to the workforce and in them taking a lead role in communicating key messages throughout the organisations.	2.1.1 2.1.2
F-2	To support collaborative working on projects, establish a cross-party Senior Leadership Forum to monitor working relationships and cultural aspects of service delivery and to agree ways of developing collaborative working.	2.1.3
F-3	Consider ways of improving closer working between different groups within the project organisation to avoid the risk of silo-working in which information and knowledge is not shared. Consider the effectiveness of existing communication arrangements between the teams and throughout the organisation. Review information databases and systems	3.4.1

	to ensure that there is a single source of the true position which is accessible as appropriate to all people.	
F-4	Review and clarify MTRCL roles and responsibilities in relation to the provisions and requirements of the Conditions of Contract. In particular ensure that the position of Engineer to the Contract is understood and that roles and responsibilities respect the need for the Engineer to act impartially in the administration of the contract. The role of the Engineer needs to be integrated and compatible with the roles of others in MTRCL who have responsibilities for delivering obligations under the Entrustment Agreements.	3.4.2
F-5	Review arrangements for managing relationships with stakeholders to ensure that there is clarity on responsibilities and clear lines of communications particularly with Government Departments. Arrangements should be set out in a Stakeholder Management Plan which is accessible by all involved in the project delivery.	3.4.3
F-6	Review how Government organises itself for the management of its interests in the railway project. The structure needs to take account of the requirement for MTRCL to consult ten or more different Government Departments as part of its responsibilities for delivering the project. Whilst the Agreement with MTRCL is signed by the Secretary for Transport and Housing on behalf of the Hong Kong SAR Government, there would appear to be scope for improving the Government's project sponsorship arrangements to provide greater clarity in communication and reporting lines and more efficient project controls.	2.3.1 2.3.3
F-7	In relation to the Buildings Ordinance and consultation, the current structure of documents setting out requirements is quite complex and not easy to follow. It would be helpful for Government to pull together the provisions into a clearer and more precise description of the requirements and responsibilities.	5.1.1
F-8	Consider extending the role of the M&V Consultant ('M&V') to provide a wider "eyes and ears" role to help protect Government's interests in the delivery of the project. The role should also provide high level monitoring of the operation of the project quality assurance systems as well as the current role in monitoring cost and programme issues. The M&V role could be developed into a Government's Project Representative role that works more closely within the MTRCL organisation to monitor performance and to identify emerging issues.	6.1
F-9	Consider options for working arrangement in which Government staff would be integrated within MTRCL teams on a regular basis, say one day a fortnight, to help ensure a common understanding of requirements,	3.1.1

	improve communications, undertake joint forward planning and to resolve issues more efficiently.	
F-10	Review the attendance at the Project Supervision Committee ('PSC') to ensure that it is operating as intended, as a high-level committee focusing on strategic issues and performance. Ensure that the reporting arrangements to PSC are providing the Committee with reliable performance data which will allow substantive issues relating to time, cost and quality to be identified and acted upon.	2.4.1 2.4.2
F-11	Review the Buildings Department's Code of Practice ('CoP') to give clarity on the definition of supervision, record keeping requirements and non-conformance reporting. Terminology such as "continuous and full time supervision" requires further explanation. It would also be desirable for the Buildings Department's CoP to set out requirements of the communication of the supervision plan and associated obligations. The overall supervisory arrangements should provide an adequate role for the designer to give assurance that the intent of the design is delivered in the construction of the Works.	5.1.2
F-12	Develop a conflicts of interest policy appropriate and applicable to projects of this nature. Allocate responsibility for administering the policy to the Project Coordination Meeting ('PCM') or other committee as appropriate.	4.1
F-13	Review the lump sum contractual arrangement used to employ the M&V consultant and consider options which may provide a more effective incentive to be proactive in the execution of its duties.	6.2.1
F-14	Clarify in M&V consultants' briefs clearer requirements in relations to site audits and surprise checks.	6.3
F-15	Ensure that companies appointed to M&V roles have access to the necessary levels of resource if the level of monitoring by the M&V consultant has to be increased due to concerns about poor performance.	6.2.2
F-16	Consider the option of recovering M&V audit costs [from the defaulting party] if poor performance by the contracting parties results in additional audits being required above that normally required.	6.2.1
F-17	Review the wording of the Particular Specification in relation alternative works design proposals to ensure that the process and terminology is aligned with the contract conditions.	5.2.1
F-18	Ensure that construction method statements are in place based on the latest approved designs before construction commences.	5.2.2
F-19	Review the liaison arrangements between the Contractor's design team, the Building Authority and MTRCL's design and construction	5.2.3

	management teams to ensure that there is common understanding of submission requirements and that all parties are aware of design issues and the forward programme of potential submissions.	
F-20	Review the significant number of various documents which set out supervision requirements and guidance with the aim of rationalising the documents to a more manageable and readable number. Ideally, it would be better to have all supervision requirements and responsibilities pulled together into a single Supervision Manual made accessible to all involved in the supervision and inspection procedures and such Supervision Manual should be translated into the Chinese language which workers are familiar with. There is evidence before the Commission that there might not be any Chinese version of the Site Supervision Plan ('SSP') and the provisions of the SSP were not explained to site supervisors.	5.3.2
F-21	Develop a clear definition of supervision for the purposes of contractual obligations and adopt a consistent approach to terminology throughout the documentation. The requirements need to be specific about the information that needs to be recorded and certified.	5.3.3
F-22	To deliver best value for money and to make best use of resources, the frequency of supervision and inspections should be flexible and reactive to the compliance and performance of work with requirements. Demonstration of consistently high-quality work should allow supervision requirements to be reduced with confidence being maintained by less frequent supervision supported by self-certification and audits.	5.3.4
F-23	Review the requirements for formally defined hold-points in relation to the contract provisions for not covering-up work without inspection. Clarify whether inspection certificates apply to both hold-points and pre-covering up inspections. In the evidence given before the Commission, there seems to be confusion and misunderstanding over the requirements to keep contemporaneous inspection records and RISC forms.	5.3.5
F-24	Review options for the use of the latest technological applications and tools, such as tablets or smartphones, to support the efficient effective recording of site records.	5.3.6
F-25	Ensure that there are procedures in place to record who are undertaking supervision duties on a daily basis and that supervisors have the required level of competence.	5.3.7
F-26	Ensure that records are kept to support the possible application of the contractual disallowable cost provisions.	5.3.8

F-27	Review the adequacy of existing entry / exit site staff recording system in relation to: knowing who is on site; supporting the payment of people under the commercial model; knowing who undertook work inspections and who certified work; and helping to confirm that the required level of supervision and the numbers supervisors to workers is provided.	5.4
F-28	Review current guidance on non-conformance reports ('NCRs') to ensure that there is clarity and consistency on when NCRs should be issued.	5.5.1
F-29	Encourage a culture that treats non-conformance reporting in a similar way to "near-miss" reporting on health and safety so that lessons learnt drive continuous improvement.	5.5.2
F-30	Maintain a single NCR database across all parties, which is accessible to all supervisors and inspectors to allow recurrent issues to be readily identified.	5.5.3
F-31	Review and enhance the NCR close-out procedures including effective monitoring arrangements.	5.5.4
F-32	Review and improve the detailed content of Project Management Plans ('PMPs') to make them more comprehensive and relevant to the project by translating generic guidance into project specific requirements. The Plan should minimise the need to cross refer to other documents for details of project specific requirements.	5.6.1
F-33	Consider including an introductory section in PMPs setting out MTRCL's corporate policies and the project strategic objectives to help steer the development of the project.	5.6.2
F-34	It would be desirable to be more specific about which PIMS manuals are applicable to a project and job roles rather than just including a long list of all PIMS documents.	5.6.3
F-35	Consider including in the PMP: proposals for partnering arrangements and initiatives; checklists for sub-contract approval procedures, including revisions to subcontract terms and arrangements; and commercial management procedures, including the settlement of subcontract final accounts.	5.6.4
F-36	Review PIMS procedures, and update as necessary, to ensure alignment of project management guidance and procedures with contractual procedures. As part of this, highlight in the manuals the aspects of the guidance which need to be assessed for the specific circumstances of a project and translated into project-specific guidance in the PMP.	5.7.1 5.7.2

F-37	Review and refresh the older PIMS manuals which date back as far as 2008.	5.7.1
F-38	Review training on PIMS and contract procedures, including ongoing refresher training and the coverage of any updates to the procedures. Where appropriate, consider integrated training sessions with the Contractor to ensure a common understanding of requirements.	5.7.3
F-39	Highlight the aspects of PIMS manuals which need to be converted from generic advice into project specific proposals.	5.7.2
F-40	Review the current documents setting out requirements for as built drawings to ensure that there is consistency and clarity on roles, responsibilities and procedures. Pull together responsibilities and procedures associated with as built drawings in the PMP	5.8.1
F-41	Clarify and maintain site records to support the delivery of the contractual requirements for the prompt recording of as built dimensions and details.	5.8.2
F-42	Rigorous monitoring of as built drawing production to be introduced and progress reported as part of the monthly progress to PSC.	2.4.3 5.8.3
F-43	Review and clarify the procedures for the submission and acceptance of working method statements.	5.9
F-44	Introduce the standard use of an industry standard collaborative form of contract such as NEC4.	3.2
F-45	Review options for more integrated and co-located working between the parties to achieve greater transparency of issues, better forward planning and joint risk management.	3.1.1
F-46	Develop and implement the use of BIM as a collaboration tool.	3.3
F-47	Review the procedures for the approval of sub-contracts and any subsequent revisions that change the conditions and/or prices.	4.3.1
F-48	Review the arrangements for the commercial settlements of sub-contracts to include a stage for MTRCL to verify and accept that proposed settlements are in line with the approved sub-contract terms and conditions.	4.2 4.3.2
F-49	Review and rationalise the provisions for disallowable cost and consider incorporating works not undertaken in accordance with approved plans and procedures as a disallowable cost. This would be achieved by the use of the NEC contract.	4.3.3

Summary of Recommendations

	Recommendation	Action Party ¹¹		Ref ¹²
		Gov	MTR	
1. Promoting Public Safety				
1.1	<u>On-going monitoring of station structure</u> - Instrumentation, by means of fibre optics or other approved measures, at the east and west diaphragm walls and the East West Line and North South Line platform slabs to detect movement during operational phase of the station, and movements should be monitored and reported to the Government.	✓		460 (391)
2. Leadership, Competence and Governance				
2.1	<u>Leadership</u>			
2.1.1	- Closer involvement of senior leaders of all parties - Government, MTRCL and contractors - working collaboratively to achieve a quality outcome, involving senior leaders being more visible to the workforce and taking a lead role in communicating key messages throughout their respective organisations.	✓		471 F-1
2.1.2	- Leadership roles should be developed in line with the principles set out in ISO9001:2015.	✓	✓	F-1
2.1.3	- Establish a cross-party Senior Leadership Forum comprising the Government, MTRCL, contractors and major sub-contractors to monitor working relationships and cultural aspects of service delivery and to agree ways of developing collaborative working.	✓		F-2 (455)
2.2	<u>Competence</u>			
2.2.1	- Review the “Competence” requirements for personnel engaged in project management/sponsorship roles and review checks and procedures to ensure ongoing competence of project-related staff.	✓	✓	473 – 474
2.2.2	- Put in place effective measures to reduce the risk of failure by mistake, incompetence or malicious act.	✓	✓	474

¹¹ Recommendations 1.1, 2.1.1, 2.1.3, 3.1.1, 3.1.2, 4.1, 4.2 and 7.1 are to be implemented jointly by the Government and MTRCL.
Recommendations 2.1.2, 2.2.1, 2.2.2, 3.2 and 3.3 are to be implemented independently by the Government and MTRCL.

¹² Paragraph reference in the redacted Interim Report; F-X denotes paragraph reference in Annexure F.

2.3	<u>Governance</u>			
2.3.1	- Critically address the way in which the Government executes its multiple roles in relation to railway enhancement projects and actively consider creating an overall Government “sponsor” role for all individual projects to provide both authority and responsibility for the project.	✓		475 F-6 (444) (446)
2.3.2	- For future railway enhancement projects a Project Board should be established to provide strategic direction. The Project Board might comprise appropriate Government officials as board members, supported by external non-executive members from specialist backgrounds who could bring experience of best practice from the wider industry so as to provide strategic advice.	✓		476
2.3.3	- Review how the Government organises itself for the management of its interests in the railway project. Establish a single point of responsibility within the Government for administering its agreement with MTRCL, especially in overseeing and managing internal consultations. Consider whether rail projects should remain within the portfolio of Director of Highways or a new distinct Director of Rail Development should be established.	✓		477 F-6 442 (443)
2.3.4	- Consider whether the Government should continue to adopt the “concession” model or revert to “ownership” model, or the “Special Purpose Vehicle” approach with a dedicated Board and delivery organisation with reference to the experience of major rail infrastructure projects in the United Kingdom.	✓		478 (445)
2.4	<u>Facilitating the work of the Project Supervision Committee (“PSC”)</u>			
2.4.1	- Review the attendance at the PSC to ensure that it is operating as a high-level committee focusing on strategic and performance issues as intended.	✓		F-10
2.4.2	- Ensure that the PSC is provided with reliable performance data which will allow substantive issues relating to time, cost and quality to be identified and acted upon.	✓		F-10
2.4.3	- Report progress of as-built drawing production as part of the monthly progress to PSC.	✓		F-42
3. Looking to a More Collaborative Culture				
3.1	<u>Fostering integrated working arrangement</u>			
3.1.1	- Consider options for working arrangement in which Government staff could be integrated within MTRCL	✓		F-9 F-45

	<p>teams on a regular basis to help ensure a common understanding of requirements, improve communications, undertake joint forward planning and to resolve issues more efficiently.</p> <ul style="list-style-type: none"> - Review options for more integrated and co-located working between the parties to achieve greater transparency of issues, better forward planning and joint risk management. 			
3.1.2	<ul style="list-style-type: none"> - Create more collaborative culture between the Government, MTRCL and contractors with the objective of achieving more successful project outcomes, e.g. closer working relationship between the Buildings Department and MTRCL and its designers and contractors to facilitate dialogue in all engineering matters. 	✓		451 – 452
3.2.	<p><u>Introducing New Engineering Contract (“NEC”)</u></p> <ul style="list-style-type: none"> - Introduce standard use of an industry standard collaborative form of contract such as NEC4. 	✓	✓	F-44 (454)
3.3	<p><u>Adopting Building Information Modelling (“BIM”) as a collaboration tool</u></p> <ul style="list-style-type: none"> - Develop, implement and promote the use of BIM as a collaboration tool. 	✓	✓	469 F-46 (428 – 434) (437) (454)
3.4	<u>MTRCL’s internal organisation</u>			
3.4.1	<ul style="list-style-type: none"> - Consider ways of inducing closer working between different groups within the project organisation to avoid the risk of silo-working in which information and knowledge is not shared. Consider the effectiveness of existing communication arrangements between the teams and throughout the organisation. Review information databases and systems to ensure a single accessible source of true position accessible as appropriate to all people. 		✓	F-3
3.4.2	<ul style="list-style-type: none"> - Review and clarify MTRCL roles and responsibilities in relation to the provisions and requirements of the Conditions of Contract. In particular, ensure that the position of Engineer to the Contract is understood and that roles and responsibilities respect the need for the Engineer to act impartially in the administration of the contract. The role of the Engineer needs to be integrated and compatible with the roles of others in MTRCL who have responsibilities for delivering obligations under the Entrustment Agreements. 		✓	F-4
3.4.3	<ul style="list-style-type: none"> - Review arrangements for managing relationships with stakeholders to ensure that there is clarity on 		✓	F-5

	responsibilities and clear lines of communications particularly with Government Departments, and set out such arrangement in a Stakeholder Management Plan which is accessible by all involved in the project delivery.			
4. Commercial Issues				
4.1	<u>Devising and developing a conflict of interest policy</u> - Developing a conflict of interest policy appropriate and applicable to projects of this nature, the administration of which may be assigned to the Project Coordination Meeting or other committees as appropriate.		✓	F-12
4.2	<u>Commercial settlements</u> - Including subcontracts within the provisions for commercial settlements set out in the Entrustment Agreement to provide the Government with greater transparency of commercial settlements which have a significant impact on the settlement of the final contract value and greater control on the settlement of the contract final account.		✓	F-48 Para 143 of Rowsell Expert Report
4.3	<u>Subcontracting arrangements and commercial settlements</u>			
4.3.1	- Review the procedures for the approval of sub-contracts and any subsequent revisions which change the conditions and / or prices.		✓	F-47
4.3.2	- Review the arrangements for the commercial settlements of sub-contracts to include a stage for MTRCL to verify and accept that proposed settlements are in line with the approved sub-contract terms and conditions.		✓	F-48
4.3.3	- Review and rationalise the provisions for disallowable costs and consider incorporating works not undertaken in accordance with approved plans and procedures as a disallowable costs.		✓	F-49
5. Rules and Requirements				
5.1	<u>Rationalising and clarifying rules and requirements</u>			
5.1.1	- In relation to the Buildings Ordinance and consultation, pull together the provisions into a clearer and more precise description of the requirements and responsibilities.		✓	F-7
5.1.2	- Review the 2009 Code of Practice for Site Supervision (“CoP”) to give clarity on the definition of supervision, record keeping requirements and non-conformance reporting. Set out in CoP requirements of the communication of the supervision plan and associated obligations, which should provide an adequate role for the		✓	F-11

	designer to ensure delivery of design intent in the construction.			
5.2	<u>Clarifying design submission and consultation procedures</u>			
5.2.1	- Review the wording of the Particular Specification in relation to alternative works design proposals to ensure that the process and terminology is aligned with the contract conditions.		✓	F-17
5.2.2	- Ensure that the construction method statements are in place based on the latest approved designs before construction commences.		✓	F-18
5.2.3	- Review the liaison arrangements between the Contractor's design team, the Building Authority and MTRCL's design and construction management teams to ensure common understanding of submission requirements and awareness of design issues and the forward programme of potential submissions.		✓	F-19
5.3	<u>Rationalising and clarifying supervision requirements</u>			
5.3.1	- For future rail infrastructure projects, require site presence of the designer to assist in ensuring implementation of design intent in the works.		✓	470 (416)
5.3.2	- Review documents which set out supervision requirements and guidance to rationalise the documents to a more manageable and readable number, ideally with a view to producing an all-inclusive and bilingual "Supervision Manual" accessible to all involved in supervision and inspection procedures.		✓	F-20
5.3.3	- Develop a clear definition of supervision for the purpose of contractual obligations and adopt a consistent approach to terminology throughout the documentation, with requirements being specific about the information that needs to be recorded and certified.		✓	F-21
5.3.4	- Make the frequency of supervision and inspections flexible and reactive to the compliance and performance of work with requirements, with less frequent supervision supported by self-certification and audits upon demonstration of consistently high-quality work.		✓	F-22
5.3.5	- Review the requirements for formally defined hold-points in relation to the contract provisions for not covering-up work without inspection and clarify whether inspection certificates apply to both hold-points and pre-covering up inspections.		✓	F-23

5.3.6	- Review options for the use of the latest technological applications and tools to support the efficient effective recording of site records.		✓	F-24 (426)
5.3.7	- Ensure there are procedures in place to record who are undertaking supervision duties on a daily basis and that supervisors have the required level of competence.		✓	F-25
5.3.8	- Ensure that records are kept to support the possible application of the contractual disallowable cost provisions.		✓	F-26
5.4	<u>Reviewing site entry/exit systems and records</u> - Review the existing entry/ exit site staff recording system in relation to: <ul style="list-style-type: none"> • knowing who is on site; • supporting the payment of people under the commercial model; • knowing who undertook work inspections and who certified work; and • helping to confirm that the required level of supervision and the ratio of supervisors to workers. 		✓	F-27
5.5	<u>Reviewing non-conformance reporting</u>			
5.5.1	- Review current guidance on non-conformance reports (“NCRs”) to ensure clarity and consistency on when NCRs should be issued.		✓	F-28 (408)
5.5.2	- Encourage “near-miss” non-conformance reporting to drive continuous improvement.		✓	F-29
5.5.3	- Maintain a single NCR database across all parties which is accessible to all supervisors and inspectors to allow recurrent issues to be readily identified.		✓	F-30 (408)
5.5.4	- Review and enhance the NCR close-out procedures including effective monitoring arrangements.		✓	F-31 (410)
5.6	<u>Reviewing Project Management Plans (“PMPs”)</u>			
5.6.1	- Make PMPs more comprehensive and relevant to the project by translating generic guidance into project specific requirements while minimising cross-reference to other documents.		✓	F-32
5.6.2	- Consider including an introductory section in PMPs setting out MTRCL’s corporate policies and the project strategic objectives to help steer the development of the project.		✓	F-33

5.6.3	- Include specific details about which PIMS manuals are applicable to a project and job roles.		✓	F-34
5.6.4	- Consider including in the PMP (i) proposals for partnering arrangements and initiatives; (ii) checklists for sub-contract approval procedures; and (iii) commercial management procedures.		✓	F-35
5.7	<u>Reviewing Project Integrated Management System (“PIMS”)</u>			
5.7.1	- Review and update PIMS procedures and manuals, to ensure alignment of project management guidance and procedures with contractual procedures.		✓	F-36 F-37 (467)
5.7.2	- Highlight in the manuals the aspects of the guidance which need to be assessed for the specific circumstances of a project and translated into project-specific guidance in the PMP, and the aspects of PIMS manuals which need to be converted from generic advice into project specific proposals.		✓	F-36 F-39
5.7.3	- Review training (with the contractor where appropriate) on PIMS and contract procedures, including ongoing refresher training and the coverage of any updates to the procedures.		✓	F-38
5.8	<u>As-built drawings requirements and production</u>			
5.8.1	- Review the current documents setting out requirements for as-built drawings to ensure consistency and clarity on roles, responsibilities and procedures, and pull them together in the PMP.		✓	F-40
5.8.2	- Clarify and maintain site records to support the delivery of the contractual requirements for the prompt recording of as-built dimensions and details.		✓	F-41
5.8.3	- Introduce rigorous monitoring of as-built drawing production.		✓	F-42
5.9	<u>Clarifying method statement procedures</u>			
	- Review and clarify the procedures for the submission and acceptance of working method statements.		✓	F-43
6. Monitoring and Verification (“M&V”)				
6.1	<u>Extending the role of the M&V Consultant</u>			
	- Consider extending the role of the M&V Consultant to provide a wider “eyes and ears” role to help protect the Government’s interests in the delivery of the project and to provide high-level monitoring of the project quality assurance systems. Develop the M&V Consultant into the Government’s Project Representative that works more		✓	F-8

	closely within the MTRCL organisation to monitor performance and to identify emerging issues.			
6.2	<u>Reviewing the engagement arrangements of the M&V Consultant</u>			
6.2.1	- Review the lump sum contractual arrangement used to employ the M&V Consultant and consider options which may provide a more effective incentive to be proactive in the execution of its duties and consider options of recovering M&V Consultant's costs from the defaulting party for additional audits as a result of poor performance by the contracting parties.	✓		F-13 F-16
6.2.2	- Ensure that the M&V Consultant is given access to the necessary level of resources if the level of monitoring has to be increased due to concerns about poor performance.	✓		F-15
6.3	<u>Clarifying requirements for the M&V Consultant</u> - Clarify in M&V Consultants' briefs requirements in relation to site audits and surprise checks.	✓		F-14
7. Follow-up Assurance				
7.1	<u>Independent follow-up audit</u> - A follow-up audit be conducted independently of the Government 12 months following the date of the Interim Report to ensure satisfactory progress of proper implementation of the recommended measures in the Interim Report.	✓		479 – 480

List of Abbreviations

APSEC	-	Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers Committee
Audit	-	Independent follow-up audit as recommended by the Commission
Audit Report	-	Audit Report of the Panel
BD	-	Buildings Department
BIM	-	Building Information Modelling
BO	-	Buildings Ordinance
BSC	-	Building Sub-Committee (of the Land and Development Advisory Committee)
CDE	-	Common data environment
Commission	-	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
CoP	-	Code of Practice for Site Supervision
Entrustment Agreement	-	Entrustment Agreement for Construction and Commissioning of the SCL signed between the Government and MTRCL on 29 May 2012
HyD	-	Highways Department
IMS	-	Integrated Management System
Leighton	-	Leighton Contractors Asia Limited
M&V	-	Monitoring and Verification
MTRCL	-	MTR Corporation Limited
NCR	-	Non-conformance report
NEC	-	New Engineering Contract
Panel	-	Independent Audit Panel for Recommendations in the Interim Report of the Commission of Inquiry into the Construction Works at and near the Hung Hom Station Extension under the Shatin to Central Link Project
PCM	-	Project Coordination Meeting
PIMS	-	Project Integrated Management System
PMP	-	Project Management Plan
PPM	-	Project Progress Meeting
PSC	-	Project Supervision Committee

RACI (model)	-	Responsibility, Accountability, Consulted and Informed (model)
RDO	-	Railway Development Office
RISC	-	Request for Inspection and Survey Checks
SCL	-	Shatin to Central Link
SGC	-	SCL Steering Group on Communications
TCPs	-	Technically Competent Persons
THB	-	Transport and Housing Bureau