

Part II Findings

Chapter 3 Planning and Site Investigation Stage (May 2000 to January 2010)

3.1 In this Chapter, reference to "Planning and Site Investigation Stage" covers the preparatory works carried out by the Government and the Corporation in relation to the Project between May 2000 and January 2010 prior to the commencement of the construction of HKS of XRL. The Chapter highlights the background information of the Project and the Project framework, the concession approach adopted by the Government in delivering the Project, the Entrustment Agreements signed between the Government and the Corporation, the monitoring mechanism of the Project, and the site investigation work carried out at this stage. It also presents the observations of the Select Committee based on the evidence obtained from the witnesses and the documents available to it.

Key dates for the "Planning and Site Investigation Stage"

Date	Events
May 2000	HKS of XRL (formerly Regional Express Line ("REL")) was first recommended for implementation under the Railway Development Strategy 2000.
October 2007	The Chief Executive announced in his Policy Address the proposed HKS of XRL as one of ten major infrastructure projects.
Early 2008	RDO of HyD commissioned a consultancy study to review institutional arrangements to ensure efficient implementation of the Project by the Corporation.

8 July 2008	FC approved the funding of \$2.7826 billion for the design and site investigation of the Project.
July 2008	RDO of HyD set up a dedicated team for the Project.
24 November 2008	The Government entered into EA1 with the Corporation for the design and site investigation of the Project.
16 January 2010	FC approved the funding of \$66.8175 billion for the Project, of which \$55.0175 billion was for the railway works and \$11.8 billion was for the non-railway works.
26 January 2010	The Government and the Corporation entered into EA2 for the construction, testing and commissioning of HKS of XRL with a target completion date scheduled for 4 August 2015.

Background information on HKS of XRL

3.2 In the Railway Development Strategy 2000 promulgated in May 2000, REL was one of the railway projects recommended for implementation. Following some development, REL became the HKS of the Guangzhou-Shenzhen-Hong Kong Express Rail Link ("ERL") jointly pursued by the Mainland and Hong Kong. In mid-2007, the Kowloon-Canton Railway Corporation ("KCRC") submitted to the Government a project proposal on HKS of ERL on the basis of the Dedicated Corridor Option⁷.

3.3 Following the merger between KCRC and the Corporation on 2 December 2007 ("the Merger"), the Corporation took over the planning of HKS of ERL. Since then, the acronym for the Project was changed from "ERL" to "XRL" to avoid duplication with the use of the acronym "ERL" for the existing East Rail Line after the Merger.

⁷ Building a dedicated rail track running from the West Kowloon Terminus to the boundary.

3.4 HKS of XRL was one of the ten major infrastructure projects announced in the 2007 Policy Address. On 22 April 2008, the Executive Council ("ExCo") decided that the Corporation would be asked to proceed with the further planning and design of HKS of XRL. According to the LegCo Brief⁸ submitted by the Government to LegCo on the same day, the earliest completion date of HKS of XRL was 2014/2015.

3.5 FC approved on 8 July 2008 a sum of \$2,782.6 million in money-of-the-day ("MOD") prices for the design and site investigation of HKS of XRL which was entrusted to the Corporation for implementation under an Entrustment Agreement (EA1).

3.6 Following the Chief Executive in Council's decision on 20 October 2009 that the Corporation should be asked to proceed with the construction, testing and commissioning of HKS of XRL under the concession approach, FC approved on 16 January 2010 the funding for the railway works (\$55.0175 billion MOD) and the non-railway works (\$11.8 billion MOD) of HKS of XRL, amounting to a total of \$66.8175 billion MOD. As indicated in the funding paper⁹ submitted to FC, the work on HKS of XRL was expected to be completed in 2015.

3.7 On 26 January 2010, the Government and the Corporation entered into the Entrustment Agreement for the construction, testing and commissioning of HKS of XRL, i.e. EA2. Mr WAI Chi-sing, former Director of Highways, informed the Select Committee that the estimated handover date to the Government for the Project, as submitted by the Corporation in the final draft version of EA2, was set at 30 June 2015. As there was a six-week delay in obtaining FC's approval on the funding application of the Project, the estimated handover date of the Project was subsequently changed to 4 August 2015 when EA2 was entered into.

3.8 The Select Committee notes that HKS of XRL is a very large and complex project. It is the world's first all-underground high-speed railway project.¹⁰ When completed, HKS of XRL will connect with the

⁸ Legislative Council Brief, File Ref.: THB(T)CR 1/16/581/99.

⁹ Paper submitted by the Government to the Finance Committee of the Legislative Council, PWSC(2009-10)68.

¹⁰ Report of HKS of XRL Independent Expert Panel, paragraph 2.6.

Mainland's National High-speed Railway Network, enabling passengers to travel between Hong Kong and Mainland cities at a speed of up to 200 km/hour.¹¹

3.9 The Select Committee also notes that HKS of XRL will include a terminus situated in West Kowloon to enable passengers to arrive in and depart from the heart of the city.¹² According to Mr Lincoln LEONG Kwok-kuen, CEO of the Corporation, the excavation work at WKT is one of the largest and deepest excavations ever done in Hong Kong. The work at WKT involves building a four-storey underground structure with the lowest level located some 30 metres below ground. The 11-hectare WKT site area is approximately the size of 15 football fields. The main public area of the terminus incorporates a large atrium with a steel-framed station entrance building. The total construction floor area of the station, all of which underground, is around 380 000 m² – almost two thirds of the floor area of Terminal 1 at the Hong Kong International Airport. The trains will run in parallel tunnels, which will extend underground all the way to Shenzhen, a distance of some 26 km.

The Project framework

Concession approach first adopted

3.10 The Select Committee notes that before the Merger in December 2007, all railway projects had been financed under the ownership approach. Under this approach, the two railway corporations were responsible for the funding, design, construction, operation and maintenance of the railway, and ultimately owned the railway. Since the two railway corporations operated on commercial principles, they would not take up financially non-viable railway projects unless adequate financial support was provided by the Government. The form of funding support for each railway project was considered by the Government on a case-by-case basis. Under the ownership approach, the Government did not bear the risks associated with the construction and the operation of the railway.¹³

¹¹ Report of HKS of XRL Independent Expert Panel, paragraph 1.1.

¹² Report of HKS of XRL Independent Expert Panel, paragraph 2.6.

¹³ Legislative Council Brief, File Ref.: THB(T)CR 1/16/581/99, paragraph 13.

3.11 Upon the implementation of the Merger, the Corporation was granted a service concession by KCRC to operate KCRC's existing and new railway lines under construction. The Corporation was and is responsible for the operation, maintenance and improvement of KCRC's railway systems, including the replacement of the concession assets, during the concession period. It was agreed in the context of the Merger that, for new railway projects which were not natural extensions of the existing network of the Corporation, the Government had the discretion to decide whether to adopt the ownership approach or the concession approach.

3.12 HKS of XRL is the first railway project implemented by the Government under the concession approach. Under the concession approach, the Government funds the construction of the railway and its ancillary infrastructure, bears the construction risk and shares the operation risk of the Project¹⁴, and ultimately owns the railway. Under EA2, the Corporation is entrusted with the design, construction, and testing and commissioning of HKS of XRL. According to the letter dated 18 February 2015 from THB to the Clerk to the Select Committee (**Appendix 7**), upon completion of the railway, the Corporation would be granted a service concession for the operation and the Government would receive service concession payment accordingly.

3.13 The Select Committee notes that in considering whether the ownership or concession approach should be adopted for HKS of XRL in 2008, the Government had in mind the following considerations and finally decided to adopt the concession approach for HKS of XRL:

- (a) XRL was a major cross-boundary infrastructure. HKS of XRL would be connected to the Mainland section which would form part of the national railway network owned by the Mainland authorities. Ownership of HKS of XRL by the Government would facilitate coordination and resolution of interface issues between the Hong Kong and Mainland sections, during both construction and operation.

¹⁴ Paper submitted by the Government to the Subcommittee on Matters Relating to Railways, LC Paper No. CB(1)1749/07-08(01), paragraph 6.

- (b) The financial viability of the Project was subject to a host of factors, including, for example, fare level, fare adjustment mechanism and revenue-sharing mechanism which would need to be discussed with the company running the Mainland section, and the availability of train paths and cross boundary facilities arrangement, which would need to be further negotiated between the Government and the Mainland authorities. In light of these uncertainties, a conservative approach had been adopted in assessing the financial viability of the Project, thus arriving at a substantial funding gap.
- (c) Under the concession approach, the Government could capture the upside of the performance of HKS of XRL under a revenue-sharing mechanism and could get back a fully operational XRL system at the end or upon a termination of the service concession. The Government would also be in a better position to liaise with the Mainland authorities over issues such as allocation of train paths and co-location of boundary control facilities to enhance the long-term profitability of the Project; hence the concession approach would in the long run make more sense for the Government.

Entrustment Agreements between the Government and the Corporation

3.14 The Select Committee notes that in early 2008, HyD commissioned a consultancy study to review the institutional arrangements to ensure efficient implementation of the Project by the Corporation. The Lloyd's Register Rail (Asia) Limited ("Lloyd's") was engaged to carry out the study. One of the key areas investigated by Lloyd's was the project management procedures which should be adopted to deliver the Project if the Project was entrusted to the Corporation by the Government under the concession approach. Lloyd's considered that the Corporation's processes were known to be robust and in line with industry best practices, and the processes were regularly reviewed and audited by external bodies and had been proven and refined through the delivery of many high quality railway projects in Hong Kong and abroad. Lloyd's also identified that, in general, there were many similarities between the processes adopted by the Corporation and the Government.

Introducing the "check the checker" system

3.15 Lloyd's recommended that the Corporation's current project management procedures should be adopted for the delivery of the Project, but that there should be Government participation in key control processes, and that the Government should be able to conduct monitoring and verification ("M&V") of the Corporation's performance in accordance with the agreements between them. This M&V role was described as "check the checker". It entailed a risk-based sampling approach to verify delivery of the requirements of the Project scope and authorized expenditure. Lloyd's also advised that the Government's resources should be utilized effectively to avoid repetition and micro management of the Project. Lloyd's recommendations were adopted by the Government and formed largely the basis of the Entrustment Agreements for the design and site investigation as well as the construction of HKS of XRL. In November 2008, the Government and the Corporation entered into EA1. In January 2010, the Government and the Corporation entered into EA2.

3.16 As mentioned in paragraph 2.43 of Chapter 2, the Select Committee was given copies of EA1 and EA2 on 4 January 2016¹⁵. The Select Committee notes that under EA2, the Corporation should use its best endeavours to complete, or procure the completion of, the Entrustment Activities (subject to specified exceptions) in accordance with the Entrustment Programme; and to minimize any delay or other effect which any modification may have on the Entrustment Programme¹⁶. In this connection, the Corporation should act in accordance with its management systems and procedures. Moreover, the Government should be entitled to appoint a consultant to help monitor and verify the Corporation's compliance with its obligations under EA2.¹⁷ At any time

¹⁵ Softcopy of EA1 and EA2 can be accessed at the following link:
http://www.legco.gov.hk/yr14-15/english/sc/sc_gshkerl/report/sc_gshkerl-ea1-ea2.pdf

¹⁶ Clause 16.4 of EA2. EA2 defines the term "Entrustment Activities" to mean all activities as detailed in Appendix B to EA2 which are related to specified works and activities. EA2 also defines the term "Entrustment Programme" to mean the programme for the execution of the Entrustment Activities as set out in Appendix C to EA2, as such programme may be adjusted in accordance with the provisions of Clause 8.2 of EA.

¹⁷ Clause 17.10 of EA2.

when the Corporation was in material or persistent breach (or the Government, acting reasonably, suspected that the Corporation was in material or persistent breach) of any of the Corporation's material obligations under EA2, the Government should be entitled to verify the Corporation's compliance with its obligations under EA2.¹⁸

3.17 In the event of any error or omission by the Corporation which constitutes a breach of EA2 by the Corporation as a result of which a re-execution of the Entrustment Activities is necessitated, the Corporation should, if required by the Government, at its own cost re-execute (or procure the re-execution of) such Entrustment Activities to the reasonable satisfaction of the Government.¹⁹

3.18 According to the Government, should there be a delay and to the extent that the delay in question was not covered by any modification or adjustment to the Entrustment Programme, it might amount to a breach of the Corporation's obligations under EA2 and the Government might have a claim against the Corporation for such a breach.

3.19 In addition, the Corporation warranted to the Government on a number of matters, including that the Entrustment Activities relating to the provision of project management services should be carried out with the skill and care reasonably expected of a professional and competent project manager whose role included coordination, administration, management and supervision of design and construction work. Should the delay in question involve a breach by the Corporation of any of its warranties, the Government might have a claim against the Corporation for breach of warranty.²⁰

Monitoring mechanism of the Project, including the roles of HyD and THB of the Government, the Corporation and M&V consultant

Roles of respective parties

3.20 Under the concession approach, the design and construction of the Project is entrusted to the Corporation. In gist, HKS of XRL is a public

¹⁸ Clause 17.11 of EA2.

¹⁹ Clause 5.3 of EA2.

²⁰ Clauses 5.1(A) and 5.2 of EA2.

work project and, according to HyD, the Corporation can be regarded as the Government's agent and project manager for the delivery of the Project. Some of the Corporation's responsibilities under EA2 are listed in paragraphs 3.16 to 3.19 above.

3.21 The Select Committee notes that under the Public Finance Ordinance (Cap. 2), the Controlling Officer for HKS of XRL is Director of Highways who is responsible and accountable for all expenditure for HKS of XRL. The key role of HyD in the implementation of HKS of XRL is to oversee the overall implementation of HKS of XRL and the prudent use of public funds allocated for the Project; to monitor and verify, with the support of an external consultant, that the Corporation properly fulfilled its obligations in accordance with the Entrustment Agreements; and to facilitate the implementation of HKS of XRL by liaising and coordinating with the Corporation and other departments concerned in resolving interface issues and seeking necessary approvals associated with the implementation, commission and operation of HKS of XRL.

3.22 According to Professor Anthony CHEUNG Bing-leung, THB is responsible for formulating transport policies and keeping general oversight on implementation of policies. Generally speaking, once an infrastructure project within its portfolio such as the Project has commenced, THB's main focus is to monitor the implementation progress and, where necessary, helps resolve at policy level issues which may affect the delivery of the project. Following established Government practices and division of responsibilities, implementation at the operational level is mainly the responsibility of the relevant departments. Since the commencement of the construction of HKS of XRL in January 2010, THB was carrying out its general oversight role in the implementation of the Project, including the overall programme and project cost. THB and HyD were also working jointly with the Mainland authorities on the development and cross-boundary matters of HKS of XRL.

Monitoring mechanism of the Project

3.23 In April 2010, the Government, vide LC Paper No. CB(1)1573/09-10(04), informed Railways Subcommittee of the Government's monitoring mechanism on the construction of HKS of XRL and its proposal of regular reporting to LegCo on the Project. As stated in the paper, Director of Highways, being the Controlling Officer for the

Project, would lead a Project Supervision Committee. Members of Project Supervision Committee included, among others, representatives of THB (normally a member of staff at Principal Assistant Secretary level) and the Corporation (including the Corporation's Projects Director). Project Supervision Committee would meet on a monthly basis to review progress and to monitor procurement activities, post-tender award cost control and resolution of contractual claims. Project Supervision Committee would also provide steer on matters that would affect the progress of HKS of XRL. The Corporation was required to submit progress reports setting out the latest progress and financial position of the Project. The Select Committee notes that, prior to mid-April 2014, Project Supervision Committee held a total of 44 meetings.

3.24 The Select Committee notes from the same Railways Subcommittee paper that to support and complement Project Supervision Committee's effort, HyD would insert check-points into the Corporation's work processes so that issues of potential concern could be flagged and properly resolved at an early stage. The flowchart on the Government's monitoring mechanism on the construction of the Project is in **Appendix 17**.

3.25 According to the statement from Mr Peter LAU Ka-keung, apart from Project Supervision Committee, an officer at Assistant Director level of HyD held monthly Project Coordination Meetings with the Corporation's General Managers and its Project Managers to monitor various activities for the delivery of the Project including, but not limited to, timely completion of land matters, resolution of third party requests, key issues on design, construction, environmental matters that might have potential impact on the progress and the programme of the Project as well as interface issues with other projects. From January 2010 to mid-April 2014, a total of 50 Project Coordination Meetings were held.

3.26 In addition, an officer, at Chief Engineer level, held monthly Contract Review Meetings with the site supervision staff of the Corporation for major civil and electrical & mechanical ("E&M") works. In case of delay encountered by the Corporation's contractors, the Corporation would report measures being considered to mitigate delay. Up to mid-April 2014, a total of 47 Contract Review Meetings were held. The membership and the terms of reference of Project Supervision Committee, Project Coordination Meeting and Contract Review Meeting appear in **Appendix 18**.

3.27 The Select Committee notes from Professor Anthony CHEUNG Bing-leung's statement that once an infrastructure project has commenced, THB's main focus is to monitor implementation progress and to leave implementation at operational level to the relevant departments. In the case of the Project, HyD assumed the M&V role in the design and construction of the Project. The M&V role was described as the "check the checker" role. HyD would use a risk-based sampling approach to verify the delivery of the requirements of the project scope and the authorized expenditure.

3.28 The Select Committee also notes that HyD had engaged an external consultant, Jacobs (the M&V consultant), to advise and assist in the M&V role. The M&V work of Jacobs focused on cost, programme, safety and quality of HKS of XRL.

3.29 The Select Committee has obtained a copy of the Project Brief of the Consultancy Agreement signed between the Government and Jacobs. The Select Committee notes that the main areas of the M&V work by Jacobs included the following:

- (a) attending the monthly Contract Review Meetings, carrying out regular site visits (joined by HyD staff) and conducting regular audits to verify whether the Corporation has fulfilled its obligations towards the Government under EA2 and implemented the entrusted works in accordance with its project management system for the delivery of HKS of XRL;
- (b) reporting to HyD through monthly reports on the progress of the various work contracts, their potential risks and concerns, as well as any progress delay, and commenting on the appropriateness of the proposed mitigation measures; and
- (c) reporting to HyD through monthly progress meetings discussing major areas of concern.

3.30 The Select Committee also notes that HyD had set up a dedicated division within RDO to oversee the implementation of HKS of XRL. This dedicated division comprised a total of 13 Civil Engineers including a Chief Engineer who was the division head, four Senior Engineers and

eight Engineers as at April 2014. In-house support on the advisory service on E&M works and building submissions were provided.

Communication/reporting mechanism between the Corporation and the Government in respect of the progress of the Project

3.31 The Select Committee observes that under the Entrustment Agreements, the Corporation was responsible for the overall management of the Project. In fulfilling its responsibility, the Corporation had to comply with its own management systems and procedures. The Corporation also had an obligation to provide information concerning any matter relating to HKS of XRL as requested by the Government.

3.32 As stated in paragraph 3.23, Director of Highways, being the Controlling Officer for HKS of XRL, led a high-level inter-departmental Project Supervision Committee. The Committee held monthly meetings with the Corporation and the related Government departments to review project progress, and to monitor procurement activities, post-tender award cost control and resolution of contractual claims. At the meetings, HyD also conveyed the comments from the M&V consultant to the Corporation on progress matters. When the Corporation reported programme delay and proposed mitigation measures, the Government, with the support of the M&V consultant, provided comments to the Corporation for follow-up.

3.33 The Corporation held internal monthly project report meetings among the General Managers, Project Managers and Construction Managers to monitor the progress of HKS of XRL. Representatives from HyD (officers at Senior Engineer level) attended such meetings. The Corporation was also required to submit relevant information to HyD. Upon request, the Corporation would arrange briefing for HyD and the M&V consultant, and/or the other Government departments on issues that might have bearing on the cost, quality or progress of the works.

3.34 The M&V consultant carried out technical audits on the master programme regularly in addition to the regular M&V works. Issues covered in the audits included adequacy of the work programmes, status of the master programme, measures to recover any accrued delay and their impact, etc.

3.35 As required by EA2, the Corporation submitted monthly progress reports to the Government, which provided information on the Project's financial situation and expenditure forecast, safety performance, status of contracts procurement, a summary of progress under individual contracts and any major issues, etc. The Corporation also reported to the Government the overall project progress in terms of percentage completion against the planned figure. Delays in individual contracts were also shown on the Entrustment Programme. In particular, the following regular reports and information were submitted to HyD which were provided to the M&V consultant, as appropriate:

- (a) Briefing and reports on the progress and areas of concern in individual contracts provided at the monthly Contract Review Meetings.
- (b) Briefing on progress and site problems in individual contracts provided at monthly site visits by the M&V consultant's and HyD's staff.
- (c) Monthly cost reports on actual/forecast expenditure, variations, claims and other cost changes with supporting justifications submitted to the Project Control Group meetings (please see **Appendix 19** for its membership and terms of reference).
- (d) Information on key project activities progress matters and interfacing related to coordination with other Government departments provided at the monthly Project Coordination Meetings.
- (e) Monthly Progress Reports and presentations on overall project progress and expenditures, progress of individual contracts, intended mitigation or DRMs, and issues of concern submitted to the monthly Project Supervision Committee meetings.

Observations

Site investigation issues

3.36 The Select Committee notes that unforeseen site conditions are said to be one of the major reasons for the project delay by HyD and the Corporation. The Select Committee has thus examined whether there were deficiencies in the execution of the site investigation for the Project, in particular, the site investigation carried out at the WKT site.

Background information on site investigation at WKT site

3.37 According to the 1st IBC Report²¹, the site investigation work at the WKT site was carried out in phases between 2008 and 2010. Before and after site possession, the Corporation obtained information from over 600 drill holes covering all areas of the work site, with the exception of the former Jordan Road area. The drill holes used in that process were spaced on average 14.4 metres apart. The Corporation indicated that this was in line with the relevant Government guidelines, and was also closer than the industry norm. However, due to the vertical formation of bedrock at this site, even with such closely spaced bore holes, it was possible to miss weak seams of rock and sub-surface boulders.

3.38 The Select Committee notes that at the location of the former City Golf Club, prior to the Corporation taking possession of the premises, the site investigation work had been carried out only at the pedestrian footpath and the car parking areas of the Club. It was only after re-possession of the Club site upon the expiry of an extended tenancy or licence that a full site investigation could be carried out covering the remaining areas of the Club.

3.39 In addition, due to the heavy daily volume of traffic using the eight-lane Jordan Road, road closure for site investigation had not been pursued in the early stages in order to avoid major traffic blockages. The ground conditions under Jordan Road were not adequately documented until the road was eventually re-directed after the construction had begun. Hence the ground conditions and the extensive

²¹ First Report by the Independent Board Committee on the Express Rail Link Project, paragraphs 4.10 to 4.12.

utilities (and how closely laid and intertwined these utilities were) under Jordan Road could not be mapped out prior to the commencement of the construction.

3.40 Further, according to a paper submitted by the Corporation to Railways Subcommittee in May 2014²², up to 31 March 2014, while the southern part of the 810A work area (WKT) using the bottom-up method had been excavated down to B4 level, part of the northern area of the site using the top-down method still required the removal of approximately 78 000 cubic metres of fresh bedrock, out of 100 000 cubic metres of rock, to reach B4 level.

Site investigation prior to commencement of construction

3.41 The Select Committee is of the view that, at the time when FC approved funding for the construction of HKS of XRL and when EA2 was signed on 26 January 2010, the site investigation work had not yet been completed for the following reasons:

- (a) According to the statement of Dr Philco WONG Nai-keung, Projects Director of the Corporation, during the site investigation process, access was not available before site possession of certain areas such as Jordan Road, the public transport interchange between Austin Road and Kowloon stations and the central portion of the City Golf Club used as a golf driving range. In particular, before re-possession of the land at the City Golf Club, investigation at the site was only possible at the perimeters and the car parking areas of the Club.
- (b) Mr WAI Chi-sing informed the Select Committee at the open hearing on 2 June 2015 that the site investigation carried out in 2009 did not include the location of the former City Golf Club as the Government had acceded to the request of the operator to extend its operation until December 2009. A complete site investigation was only

²² Paper submitted by the MTR Corporation Limited to the Subcommittee on Matters Relating to Railways, LC Paper No. CB(1)1354/13-14(01), paragraph 29.

carried out in 2010 after re-possession of the land and the same was completed after June 2010.²³

- (c) As for Jordan Road, Mr Lincoln LEONG Kwok-kuen, CEO of the Corporation, stated in his statement that, due to the heavy daily volume of traffic using the eight-lane Jordan Road, road closure for the site investigation work was not possible. The ground conditions under Jordan Road could not be adequately documented until the road was moved from its original location after construction had started. It is for this reason that the ground conditions and the extensive utilities (and how closely laid and intertwined these utilities were) under Jordan Road could not be mapped out prior to the construction work commencing.
- (d) The Select Committee has asked THB whether the Corporation had made any request to the Government for a temporary closure of Jordan Road for the site investigation work before the commencement of the construction of WKT. THB replied on 18 February 2015 (**Appendix 7**) and stated that the construction of WKT at Jordan Road fell within contract 811B (West Kowloon Terminus Approach Tunnels (South)) which had commenced in August 2010. According to HyD's available records, before the commencement of the contract, there was one record of request made by the Corporation in March 2010 to carry out trial trench excavation for water-mains laying across Jordan Road

²³ Minutes of evidence of open hearing of the Select Committee, 2 June 2015, pages 25 to 27; and the Official Record of Proceedings of the Legislative Council, 11 June 2014, page 14827. At that Council meeting, the Secretary for Transport and Housing, Professor Anthony CHEUNG Bing-leung, pointed out that the Government noted that the geological memoir mentioned by Ms Claudia MO, which was conducted by the Kowloon-Canton Railway Corporation in 1997 at Austin Station of the West Rail, as well as the other geological memoirs completed on the relevant projects in the area of the West Kowloon Terminus Station North in the early period, had been included in the relevant contracts, i.e. the contractual documents of contract 810A on West Kowloon Terminus Station North, to serve as reference information for the contractors concerned.

outside the WKT boundary. This application was approved by HyD in March 2010.

The Select Committee considers that notwithstanding the need to carry out site investigation before work began in the Project, the Corporation did not conduct as soon as possible full site investigation at the City Golf Club, resulting in the time allowed for site investigation to be further compressed. This showed that the Corporation was lacking in alertness to the complex ground conditions in the area concerned.

Whether underground conditions were known before construction

3.42 The Select Committee considers that the higher-than-industry norm site investigation work should have minimized, albeit not eliminated, the possibility of unforeseen site conditions but this was not the case in reality. The Select Committee is dismayed by the fact that the enormous quantity of underground bedrock at WKT was not discovered at an earlier stage so that appropriate actions could be taken in time.²⁴

3.43 Notwithstanding the incomplete site investigation, Mr WAI Chi-sing informed the Select Committee that, prior to the commencement of the construction of HKS of XRL, both he and the Corporation had been aware of the underground conditions and the complex underground utilities at the WKT site when he was Director of Highways prior to June 2010. There was also no record showing that the Corporation had drawn to the attention of HyD or himself the magnitude of the difficulties in removing the bedrock at WKT before he left the office of Director of Highways in June 2010. As for the cost of removing the underground bedrock, Mr WAI Chi-sing advised that it had been included in the estimated cost of the Project. The work for removing the bedrock had also been included in the relevant tender documents.

3.44 Mr Peter LAU Ka-keung informed the Select Committee at the open hearing on 21 April 2015 that, according to the assessment of HyD, there was no substantial difference between the quantity of rock estimated

²⁴ Members voted on Mr Gary FAN Kwok-wai's proposal to amend paragraph 3.42. The proposal was defeated (please refer to paragraphs 6 and 7 of the Minutes of Proceedings of the meeting held on 7 June 2016 in this Report).

during the site investigation and at the current stage but time was required to excavate the volume of rock present.

3.45 The Select Committee notes from the statement of Mr Lincoln LEONG Kwok-kuen, CEO of the Corporation, that *"[a]s the project involves approximately 25 km of underground tunnels and an underground station as deep as 30 metres below surface level, ground conditions are a major determinant of project progress. Unfavourable ground conditions have been a significant cause of delay. These conditions include higher than anticipated rock head levels, weak seams, the presence of cobbles and boulders, high water inflows and the presence of underground steel obstructions. These conditions were often unanticipated despite extensive site investigation"*. His view was echoed by Mr Henry CHAN Chi-yan, Principal Government Engineer/Railway Development of HyD, who explained to the Select Committee that even with site investigation, it was impossible to know every rock detail. Mr Henry CHAN Chi-yan said that, in large-scale projects, it was very difficult to provide an accurate estimate of underground conditions.

3.46 Mr Lincoln LEONG Kwok-kuen also informed the Select Committee at the open hearing on 15 July 2015 that extensive site investigation had indeed been carried out prior to the commencement of construction. However, even with closely-spaced bore holes used in the site investigation, it was still possible and likely that weak seams of rocks and subsurface boulders would be missed, and the actual ground conditions were worse than those originally envisaged during the site investigation.

3.47 The Select Committee is of the view that many construction projects have to deal with underground utilities and ground conditions and has enquired at a hearing why it was particularly difficult for the WKT site. In response, Mr Mark LOMAS, Project Manager-Technical Support of the Corporation, said that the WKT site was formed from a very complex series of reclamations over a number of years. It was almost 700 metres long from the start of the structure under 811B, north of Jordan Road, down to the south of Jordan Road and all the way down to the diaphragm wall near the Victoria Harbour. The complexity of the site posed different construction challenges. He said that, on a project of this scale and nature, these kinds of problems were inevitable and, whilst they were able to overcome many of these challenges through hard work,

unfortunately, they were unable to overcome all the challenges that occurred at WKT.

3.48 Dr Philco WONG Nai-keung, Projects Director of the Corporation, also informed the Select Committee in his statement that, although public utilities, such as power and lighting cables, were known to exist and were charted to an extent, the configuration, spread²⁵, alignment and slack²⁶ within the utilities and the locations of the utilities joints, as well as the interrelationship between the various services, could not be properly identified until possession of the site was taken for construction.

3.49 Mr WAI Chi-sing and Dr Philco WONG Nai-keung also explained to the Select Committee that site investigation could only provide underground information of particular bore holes. In many cases, there would be a difference between the actual distribution and the kinds of underground rock and the results of site investigation.

3.50 The Select Committee considers that, since full site investigation had not been conducted at the location of the former City Golf Club and Jordan Road covering a substantial area prior to the construction work commencing, the contingency period set by the Corporation should have been lengthened to absorb risks brought by unexpected ground conditions.

3.51 The Select Committee considers that the setting of the timetable to complete the Project by 4 August 2015 imprudent. The Corporation as the project manager should have allowed a longer contingency period to cater for unforeseen ground conditions as site investigation was known to have its limitations.²⁷

²⁵ The term "spread" refers to the manner in which a number of cables are bundled together.

²⁶ The term "slack" refers to the extent to which cables can be moved out of the way of construction works.

²⁷ Members voted on Mr Gary FAN Kwok-wai's proposal to amend paragraph 3.51. The proposal was defeated (please refer to paragraphs 12 and 13 of the Minutes of Proceedings of the meeting held on 7 June 2016 in this Report).

New role of the Government under the concession approach and deficiencies of EA2

3.52 The Select Committee notes the differences between the ownership approach adopted in development of railway projects in the past and the concession approach adopted for the Project. The rationale of the Government in adopting the concession approach for this Project is given in paragraph 3.13 of this Chapter.

3.53 The Select Committee observes that, under the ownership approach, the Government's role in monitoring the implementation of railway projects had been more passive because the Government's involvement was essentially financial in that it would bridge a funding gap either by providing a capital grant or by granting development rights to the Corporation for construction of railway lines found to be financially not viable. The Corporation would then build, own and run the railway line upon completion at its own risk and cost. Whereas under the concession approach, the Government would own the railway system, pay for the project and assume the construction risks.²⁸

3.54 The Select Committee has studied the respective responsibilities of the Government and the Corporation in respect of the management of the Project under EA2, as set out in paragraphs 3.14 to 3.30 of this Chapter.

3.55 The Select Committee observes that, on paper, the concession approach, EA2, the monitoring mechanism, the communication channels between the Government and the Corporation were carefully designed to provide guidelines for stakeholders to follow as well as different check points at different levels to ensure delivery of the Project on time and within budget. As stated by Mr WAI Chi-sing at a hearing, *"the systems were already there but they are not alive, the people who use them are alive"*. The Select Committee takes Mr WAI Chi-sing's words to mean that the Government officers who have been monitoring the Project did not make better use of the systems already in place when performing their duties.²⁹

²⁸ Report of HKS of XRL Independent Expert Panel, paragraph 2.3.

²⁹ Members voted on Mr Gary FAN Kwok-wai's proposal to amend paragraph 3.55. The proposal was defeated (please refer to paragraphs 19 and 20 of the Minutes of Proceedings of the meeting held on 7 June 2016 in this Report).

3.56 As stated in paragraph 3.19, the Corporation has to carry out the Entrustment Activities with the skill and care reasonably expected of a professional and competent project manager whose role includes coordination, administration, management and supervision of the design and the construction work.

3.57 Professor Anthony CHEUNG Bing-leung informed the Select Committee at the hearing on 21 December 2015 that, under EA2, the Corporation as the project manager had the responsibility to monitor and deliver the Project. The Government adopted the indirect "check the checker" M&V role recommended by Lloyd's back in 2008. The Select Committee was also informed by Professor Anthony CHEUNG Bing-leung that, other than as the checker, the Corporation also had the duty to deliver the Project. HyD needed the Corporation to provide information for its work in its role as the checker of the checker. Professor Anthony CHEUNG Bing-leung said that there were approximately 750 employees within the Corporation engaged in the Project, compared to about 40 staff within HyD and the M&V consultant.

3.58 Professor Anthony CHEUNG Bing-leung admitted to the Select Committee that, with the benefit of hindsight, the "check the checker" approach had flaws. He also said at an open hearing that, if the concession approach were to be adopted again in future, the content of the Entrustment Agreement should be reviewed.

Institutional arrangements to be improved

3.59 The Select Committee notes IEP's recommendation that the institutional arrangements in concession agreements should be improved. To this end, it is important to set up robust institutional arrangements, introduce incentives and penalties, allow step-in arrangements to allow the Government to take over the relevant project, and conduct quantitative risk analysis to establish baseline parameters including schedule and cost.³⁰

3.60 Mr Peter LAU Ka-keung stated in his statement that HyD would accept the above recommendation generally. HyD agrees that there is a need to improve the institutional arrangements in concession agreements

³⁰ Report of HKS of XRL Independent Expert Panel, paragraph 7.2.

and to clearly define the obligations, duties, roles and responsibilities of the contracting parties. HyD considers that, before proceeding to another Entrustment Agreement adopting the concession approach, there is a need to carry out a detailed study probably by engaging a consultant and taking into account the experience gained from the implementation of the Project, the suggestions recommended by IEP and overseas experience.

3.61 The Select Committee also notes the view of Mr WAI Chi-sing that a lack of cooperation and trust amongst the stakeholders might have led to the project delay. Mr WAI Chi-sing suggested that, in future, the spirit of cooperation and trust between the contracting parties should be emphasized in Government work contracts.

3.62 The Select Committee considers that, under the concession approach, while HyD might have over-relied on the Corporation to deliver the Project on time and within budget, the Corporation might have been taking the view that it was only required to use its best endeavours to complete the Project under EA2, without having to bear the risk of project delay and cost overrun.

3.63 The Select Committee is of the view that, although the Corporation was entrusted with the design, construction, and testing and commissioning of HKS of XRL and had a duty to deliver the Project, HyD should have played a more active and proactive role in monitoring the Project regardless of the size of staff engaged in the Project and whether or not such role was expressly stipulated in the Entrustment Agreement. Given the considerable scale and cost of the Project and the fact that HKS of XRL is the first railway project carried out under the concession approach, the Select Committee considers that the Government, as the ultimate owner of HKS of XRL and guardian of public fund, should have been monitoring more closely the construction of the Project and taking to heart its important role in the Project.

3.64 The Select Committee considers that the lack of initiative on the part of HyD in monitoring the Project might have been brought about by the knowledge of the good track record of the Corporation in delivering railway projects. The Select Committee also suspects that the lack of practical experience and expertise in building railway lines within the Government might also have contributed to a lack of confidence within HyD/RDO in playing a more active and proactive monitoring role over

the work of the Corporation, which was considered an expert in this area.³¹

3.65 The Select Committee considers that, when the Government implements large-scale railway projects in future, they will have to substantially improve the concession approach with reference to experience gained in the Project.

³¹ Members voted on Mr Gary FAN Kwok-wai's proposal to delete paragraph 3.64. The proposal was defeated (please refer to paragraph 27 of the Minutes of Proceedings of the meeting held on 7 June 2016 in this Report).