

SCHEDULE 14

TESTING & COMMISSIONING

1. SYSTEM TESTING & COMMISSIONING

1.1 General

- (a) DB Co shall plan, schedule, coordinate and execute an overall system Testing & Commissioning Program for the Works.
- (b) Remaining Systems Integration Works shall include:
 - (i) updating and testing the existing head end management platform at the TOCC and BCC, excluding S&TCS as set out in more detail in Schedule 15;
 - (ii) updating and testing the on-board CBTC system; and
 - (iii) such other design, construction and activities specified in the System Integration Management Plan or this Project Agreement to be the responsibility of either the City or RTG.
- (c) DB Co shall ensure that the Works comply with the requirements of this Schedule 14 as follows:
 - (i) The East Works, West Works, and Remaining Works testing and commissioning activities shall comply with the requirements of Section 1 through Section 1.7;
 - (ii) DB Co Trial Running participation shall comply with section 1.8
 - (iii) The Highway Works testing and commissioning activities shall comply with the requirements of this Schedule 14, and Appendix A.
- (d) DB Co shall perform testing and commissioning of the Works in four phases:
 - (i) East Works;
 - (ii) West Works;
 - (iii) Highway Works; and
 - (iv) Remaining Works.
- (e) DB Co shall develop, and the Testing & Commissioning Program shall be comprised of, distinct Testing & Commissioning Plans for each of the four testing and commissioning phases referred to in Section 1.1(d) above.
- (f) The timing of the Testing & Commissioning Program shall support a minimum of 90 days between East Substantial Completion and West Substantial Completion.

- (g) DB Co shall submit the four-part Testing & Commissioning Program within the following timeframes in accordance with Schedule 10 – Review Procedure;
 - (i) Preliminary - within 12 months of Financial Close
 - (ii) Final – no later than 180 days prior to the start of testing and commissioning activities.
 - (iii) IFC – no later than 60 days prior to start of testing and commissioning activities
- (h) DB Co’s Testing & Commissioning Plans will identify FAT, SAT, SIT and the testing and commissioning requirements pursuant to this Schedule 14, Schedule 15-2, Part 1 Article 11 - Systems Integration Program, and Schedule 15-2 Part 3 - Systems.
- (i) [Intentionally deleted]
- (j) Without prejudice to Sections 11.12(j), (k), 18.5 and 18.7 of the Project Agreement, DB Co shall provide all required resources, work processes and management authority to exercise control over the planning, scheduling, co-ordination, prioritization, and delivery of the Works in order to mitigate in accordance with Good Industry Practice, systems integration risks and secure successful project completion (collectively the “**Systems Integrator**” role).
- (k) DB Co shall comply with Good Industry Practice for all required testing and commissioning activities set out in this Schedule 14, Schedule 15-2 Part 1 Article 11- Systems Integration Program, and Schedule 15-2 Part 3 - Systems. DB Co shall provide all of the documentation to the City in accordance with the requirements of Schedule 10 - Review Procedure.
- (l) In order for DB Co to achieve East Substantial Completion and West Substantial Completion, DB Co, in its role as Systems Integrator, shall be responsible for the integration testing of the systems elements described in SIT below and as outlined under this Schedule 14 – Testing & Commissioning.
- (m) DB Co shall develop the Systems Integration Management Plan (SIMP) as referenced in 15-2 Part 1 Article 11 – Systems Integration Program. The Systems Integration Management Plan (SIMP) shall include the SIT to be executed as part of the Testing & Commissioning Program.
- (n) The City and DB Co shall jointly appoint an arm’s length independent third party expert (the “**Systems Integration Verifier**”) to:
 - (i) provide a fast track dispute resolution process for the Parties for disputes related to the integration and function of the communications systems (“**Systems Integration Disputes**”) as outlined in Schedule 27 – Dispute Resolution Procedure;
 - (ii) during the installation, testing, and commissioning phases, review and comment for compliance and clarity on all Submittals related to communications and Train Control;

- (iii) receive upon request any documents that pertain to: (A) integration, testing and commissioning plans, (B) traceability documents, and (C) test and commissioning procedures;
- (iv) review and provide confirmation of successful completion of the Remaining Systems Integration Works; and
- (v) either: (A) issue a report confirming successful completion of Systems Integration Works; or (B) issue a report detailing the matters that the Systems Integration Verifier considers are required to be performed prior to the successful completion of the Systems Integration Works.

1.2 Testing & Commissioning Coordinator

- (a) DB Co shall appoint a testing and commissioning coordinator (the “**Testing & Commissioning Coordinator**”) to perform the obligations of DB Co as set out in this Schedule 14.
- (b) The Testing & Commissioning Coordinator shall have the qualifications as outlined in Schedule 9 – Key Individuals.

1.3 Testing & Commissioning Responsibilities

- (a) DB Co shall be responsible for preparing and executing the Testing & Commissioning Plans required to successfully demonstrate that the New City Infrastructure has been designed, constructed and functions in accordance with the Project Agreement. The Testing & Commissioning Plans shall outline the methods and procedures to be utilized to verify compliance with the technical requirements of the Project. The Testing & Commissioning Plans shall be structured to ensure a systematic and thorough evaluation of all individual subsystem components.
- (b) The Testing & Commissioning Coordinator shall be responsible for directing the efforts of DB Co’s Testing & Commissioning Plans and the Testing & Commissioning Team, all aspects of the testing and commissioning process, including coordinating access to test locations, support requirements, test efforts and test activities, and providing overall monitoring of testing and commissioning activities. Additionally, the DB Co Testing & Commissioning Coordinator shall be responsible for coordinating the systems integration testing and system commissioning activities as identified in this Schedule 14, Schedule 15-2, Part 1 Article 11- Systems Integration Program, and Schedule 15-2 Part 3 - Systems.
- (c) DB Co’s Testing & Commissioning Program shall include the following:
 - (i) relationship to safety and security management and other related safety and security requirements;
 - (ii) organization chart of the Testing & Commissioning Team, as per Section 1.4, and their discipline responsibilities including preparation of test plans, procedures, reports, recording of test data, review of test data, reporting and resolution of test failures and anomalies, and coordination of each test effort;

- (iii) resumes of key personnel involved detailing years of experience;
 - (iv) planned resources;
 - (v) specific requirements for the City or other third party interfaces;
 - (vi) testing and commissioning procedures as per Section 1.5; and
 - (vii) testing requirements, sequencing and estimated durations for each test, as defined in Section 1.6 and in accordance with Schedule 12 – Works Scheduling Requirements.
- (d) The Testing & Commissioning Program shall demonstrate how DB Co intends to validate and verify that the functional and technical requirements, performance criteria, quality and safety aspects of the System Infrastructure have been met and that the System Infrastructure has been designed and constructed in conformance with the Project Agreement.
- (e) The Testing & Commissioning Program shall be developed and modified as required to address the evolution of the Project, provided that any amendment to the Testing & Commissioning Program shall be submitted to the City in accordance with Schedule 10 – Review Procedure.
- (f) DB Co shall be responsible for implementing or directing through the SIMP all testing and commissioning activities required to achieve East Substantial Completion, West Substantial Completion, East Final Completion, or West Final Completion (including completion of Remaining Works), , as applicable. Testing and commissioning activities shall include but are not limited to:
- (i) Pre-delivery Tests
 - A. **DB Co Component Testing** – components manufactured by DB Co suppliers shall be inspected and tested in the factory. Component testing shall be undertaken by all DB Co equipment suppliers. The results of all DB Co component testing shall be available for inspection or audit by the City;
 - B. **First Article Testing** – shall be conducted on the first production unit of any DB Co supplied equipment prior to first shipment from the factory to ensure the units are suitable in all respects for the purpose intended;
 - C. **Qualification Testing or Type Testing**– one or more samples of critical DB Co supplied components, which are newly designed and developed and, where prior qualification cannot be demonstrated in a similar and representative environment, shall be subject to qualifications testing. Qualifications testing shall be performed to show compliance of the DB Co supplied equipment with standards as required by the Project Agreement; and
 - D. **Factory Acceptance Test (FAT)** – where appropriate and reasonably practical, DB Co supplied components that will be brought together to

provide subsystems and systems, that have not previously been demonstrated in service on the Existing Confederation Line, shall first be tested in the factory in a representative operating environment against an agreed upon set of factory acceptance or factory integration test procedures. Once successfully completed, the DB Co supplied system can be deployed to site for installation/verification tests; and,

(ii) Post Installation Checkout (**PICO**).

Post Installation Checkout tests, audits and inspections shall form part of the scope of East Works and West Works to be performed by DB Co in connection with obligations under Schedule 14 – Testing & Commissioning to achieve both East Substantial Completion and West Substantial Completion. Once the deployed component, subsystem, or system has been installed, it shall be verified against the installation drawings to ensure correct installation and that no damage has been sustained in the installation process. Installation of equipment, cabinets, power, grounding, cabling and other equipment shall be compared against installation drawings for correct locations, routing, connectivity, etc. In terms of sequencing these audits/inspections shall be performed as a pre-requisite to the start of the Site Acceptance Testing regime described below.

The Systems Integration Verifier will be notified 21 days in advance of specified PICO, witness PICO and sign-off on all specified PICO verification documentation, related to integration to the extent the same required attendance and sign-off by the System Integration Verifier, as specified in the SIMP

(iii) Site Acceptance Tests (**SAT**)

Site Acceptance tests, audits and inspections shall form part of the scope of East Works and West Works to be performed by DB Co in connection with obligations under Schedule 14 – Testing and Commissioning to achieve both East Substantial Completion and West Substantial Completion. In terms of sequencing these tests shall be conducted following PICO and in accordance with DB Co's Testing & Commissioning Schedule (as defined in Section 1.6 below). Following successful completion of PICO (with no major deficiencies), the components, subsystems or systems installed by DB Co shall undergo start-up tests and then be tested against an agreed upon set of SAT procedures. SAT testing of a system may include some level of integration but is intended to test subsystems independently. The Systems Integration Verifier will be notified 21 days in advance of SAT, witness SAT and sign-off on all SAT reports. The Systems Integration Verifier will be notified in advance of any SAT regression test intended to re-test any equipment that failed the initial SAT, witness SAT regression test and sign-off on all SAT regression test reports. The Systems Integration Verifier will provide written confirmation that DB Co has successfully completed SAT.

Where power, including Traction Power, shall be applied during SAT, site safety procedures will be prepared to reflect this new hazard on the testing and commissioning site.

(iv) Systems Integration Testing (**SIT**)

- A. Once two or more systems have completed SAT, they will be brought together to commence SIT. SIT will also reflect that some system suppliers are expected to be unable to demonstrate all technical requirements without integration with other supplier systems. SIT shall therefore concentrate on intersystem functionality and performance under normal, abnormal, and emergency scenarios. The Systems Integration Verifier will be notified in advance of any SIT regression test intended to re-test any equipment that failed the initial SIT, witness SIT regression test and sign-off on all SIT regression test reports. The Systems Integration Verifier will provide written confirmation that DB Co has successfully completed SIT.
- B. SIT shall include but not be limited to the following tests:
- i. SCADA & Power Supply & Distribution System Integration Tests
 - ii. Vehicle and Infrastructure Integration Tests
 - iii. SCADA and Tunnel Ventilation System Integration Tests
 - iv. BMS and Station Systems Integration Tests
 - v. LMSF and Mainline Integration Tests
 - vi. Vehicle and CBTC System Integration Tests
 - vii. Vehicle and Communications Systems Integration Tests
 - viii. P25 Radio Tests
 - ix. General Integration Tests
- C. SIT shall include but not be limited to the following demonstrations of operational performance requirements, based on the Vehicles achieving the performance characteristics provided by the City:
- i. DB Co shall confirm their SI design is capable of supporting the required minimum headway of two minutes.
 - ii. DB Co shall demonstrate the maximum travel times specified in Schedule 15-2 Part 1 Clause 3.4 (d), while respecting the minimum dwell times specified in Schedule 15-2 Part 1 Clause 3.4 (f);
 - iii. DB Co shall demonstrate other operational capabilities of the SI that can be tested independently of the Existing Confederation Line, including operations in normal, abnormal, and emergency scenarios.

- D. The City shall provide vehicles and Operators as needed by DB Co to successfully complete SIT based on the resource requirements documented in the City-approved test plans and test procedures.
- (g) System Testing & Commissioning Verification
- (i) The following commissioning checklist items shall be verified by the Systems Integration Verifier as has having been performed or provided as part of the East Works and West Works in connection with obligations under this Schedule 14 – Testing & Commissioning as conditions to achieving East Substantial Completion and West Substantial Completion:
- A. all System Infrastructure has been installed, tested and certified pursuant to Schedule 15 – Output Specifications;
 - B. all required static and dynamic testing has been completed;
 - C. successful completion of SIT of the East Works, or West Works, as the case may be, to demonstrate that the systems operate in accordance with the requirements of this Project Agreement;
 - D. all specified contractual documentation has been delivered by DB Co;
 - E. all tools and test equipment to maintain the System Infrastructure have been delivered by DB Co;
 - F. DB Co’s required training of operations and maintenance staff has been successfully completed in accordance with Schedule 15-2 Part 1;
 - G. all documentation including drawings and User and Maintenance Manuals have been submitted to the City in accordance with Schedule 10 – Review Procedure;
 - H. DB Co has identified specialized tools and test equipment necessary to maintain the system and all specialized tools and test equipment have been delivered to the City in accordance with Schedule 15 – Output Specifications;
 - I. all New Municipal Infrastructure is installed, tested and certified pursuant to the contractual obligations;
 - J. the Compliance Verification and Validation Matrix has been completed;
 - K. there are no outstanding defects affecting rail systems functionality, including track, signals and communications;
 - L. there are no major safety defects in the System Infrastructure that could affect the safety of personnel or equipment or the safe running of the Systems Infrastructure;

- M. all Stations are substantially complete with only Minor Deficiencies remaining; and
 - N. all hardware, software and licenses for DB Co scope necessary to operate and maintain the System Infrastructure have been delivered by DB Co.
- (h) The Testing & Commissioning Program shall provide for the oversight and monitoring of testing and commissioning activities for the duration of the Project Operations by the City and System Integration Verifier as outlined in 1.3 (g). The City reserves the right to witness any test, audit or inspection.
- (i) In addition to the tests specified in Schedule 15-2 and this Schedule 14 the City and the System Integration Verifier shall have the right, when acting reasonably, to identify specific testing requirements that shall require validation.
- (j) DB Co shall prepare and submit individual test plans and procedures, in accordance with Schedule 10 – Review Procedure for all tests of New City Infrastructure a minimum of 30 days in advance of such tests. DB Co shall provide the City with a minimum of 21 days advance notice of such tests. .
- (k) The DB Co Testing & Commissioning Coordinator shall convene a meeting of the Testing & Commissioning Team to review the Testing & Commissioning Program, set testing and commissioning parameters, designate the responsibilities of the various parties and establish the documentation requirements for each stage of the Works and the commissioning process.
- (l) The DB Co Testing & Commissioning Coordinator shall submit monthly reports to the City and the Systems Integration Verifier detailing the progress of testing and commissioning activities.
- (m) DB Co, in implementing the Testing & Commissioning Program, shall verify that all requirements of the Testing & Commissioning Program have been met, including that:
- (i) the New City Infrastructure has been installed and is operating in accordance with the requirements of this Project Agreement;
 - (ii) the performance of the New City Infrastructure meets the requirements of the Output Specifications and this Project Agreement;
 - (iii) As-built Drawings, Record Drawings, Design Certificates, Construction Certificates, LEED Certification for Moodie LMSF, and operating and maintenance manuals have been provided in accordance with this Project Agreement.
- (n) The City shall provide orientation to the System Infrastructure constructed by DB Co to the Ottawa Emergency Services, including; the Fire Departments, Paramedics, and Police pursuant to Schedule 15-2, Part 1.

1.4 Testing & Commissioning Team

- (a) The Testing & Commissioning Team shall be comprised of:

- (i) DB Co Testing & Commissioning Coordinator;
 - (ii) DB Co Testing & Verification Manager;
 - (iii) Systems Integration Verifier
 - (iv) representatives of the City;
 - (v) Independent Certifier; and
 - (vi) where applicable, Subcontractors and representatives of the equipment manufacturers.
- (b) DB Co and each of its Subcontractors shall assign, where applicable, individuals from each relevant trade to the Testing & Commissioning Team and shall ensure that representatives of the City and relevant Systems and equipment manufacturers and testing agencies are present during the DB Co Testing & Commissioning Team meetings.
- (c) DB Co shall provide all necessary labour, materials, equipment, testing apparatus and incidentals necessary to verify performance test of each item of New City Infrastructure provided as part of the Works.
- (d) After Financial Close, the Testing & Commissioning Team shall, when applicable, meet monthly to review the progress of the development of the Testing & Commissioning Program. 60 days prior to the commencement of testing, the Testing & Commissioning Team shall, when applicable, meet weekly to review the progress and schedule of testing and commissioning activities.

1.5 Testing and Commissioning Procedures

- (a) DB Co shall ensure that all regulation and code references in the Reference Documents, in addition to the provisions of Schedule 15 – Output Specifications have been fully complied with.
- (b) The DB Co Testing & Commissioning Coordinator shall plan, prepare documentation and execute the Testing & Commissioning Program process and procedures. Specifically, the DB CO Testing & Commissioning Coordinator or DB Co Testing & Verification Manager shall:
- (i) prepare test plans, schedules and resource requirements;
 - (ii) prepare test procedures;
 - (iii) oversee the performance of tests and documentation of test results;
 - (iv) oversee re-testing, if necessary; and
 - (v) submit certified test reports.
- (c) DB Co shall ensure that each of the requirements set out in this Schedule 14 and those identified in Schedule 15 – Output Specifications are met.

- (d) Training:
- (i) DB Co shall provide operational and maintenance training and manuals for all System Infrastructure including, but not limited to:
 - A. Traction Power/OCS
 - B. S&TCS;
 - C. Communications;
 - D. Fire/life safety and safety and security systems;
 - E. Track and right of way;
 - F. Station facilities equipment and systems;
 - G. LMSF facilities equipment and systems; and
 - H. Tunnel and guideway facilities equipment and systems.
 - (ii) DB Co shall provide a training schedule, training plans and agenda for each training session to the City, submitted in accordance with Schedule 10 - Review Procedure.
 - (iii) The DB Co Testing & Commissioning Coordinator or designated delegate shall attend a sample of every training session to ensure the agenda is maintained and that quality training is provided. One training session for each category shall be video recorded in digital format. The video shall be submitted to the City on appropriate media for City viewing and labelled accordingly.
 - (iv) Training shall be conducted at the operating station for Systems or such DB Co supplied equipment.
 - (v) All training sessions shall be logged and personnel shall be recorded as receiving training. Further refreshers shall be scheduled in line with safety, quality and training requirements.
 - (vi) Operational and maintenance training shall be completed prior to achievement of Substantial Completion.
 - (vii) RTG/City Party shall be responsible for providing training related to Remaining Systems Integration Works.

1.6 DB Co Testing & Commissioning Submittals

- (a) DB Co shall prepare and submit to the City, test plans and procedures and test forms, verification forms and performance test forms for all equipment and Systems. Test plans and procedures should provide full traceability to the requirements of Schedule 15 – Output Specifications. Test procedures should include but not be limited to the following:

- (i) test objectives including compliance matrices identifying the relevant Project Agreement clauses that are being verified and validated;
 - (ii) required safety methods and prerequisite training required;
 - (iii) associated tests and pass/fail criteria;
 - (iv) reference specifications/standards and supporting literature;
 - (v) staffing requirements including requirements from the City or other third parties;
 - (vi) test methods;
 - (vii) required instrumentation, equipment, facilities and supporting systems;
 - (viii) test location;
 - (ix) pass/fail criteria;
 - (x) identification of professional personnel and resumes of those responsible for sign-off; and
 - (xi) test results and recommendations.
- (b) DB Co shall submit test plans and procedures to the City for review and approval a minimum of 60 days prior to the respective test.
- (c) DB Co shall create the Testing & Commissioning Schedule as specified in Schedule 12 – Works Scheduling Requirements. The Testing & Commissioning Schedule shall include: RTG’s static and dynamic testing; SIT activities related to the Remaining Systems Integration Works; SIT of Vehicle/S&TCS integration; and the SIT demonstrations of operational performance requirements.
- (d) DB Co shall clearly identify all upcoming testing and commission activities in Informal Implementation Schedules, as defined in Schedule 12- Works Scheduling Requirements.
- (e) DB Co shall prepare and submit monthly updates on the progress of testing and commissioning activities in accordance with Schedule 33 – Works Report Requirements.
- (f) DB Co shall prepare and submit to the City detailed commissioning manuals for each item of New City Infrastructure provided as part of the East Works, West Works, Highway Works and Remaining Works, as applicable (the “**Manuals**”) in accordance with Schedule 10 – Review Procedure.
- (g) The Manuals shall include:
- (i) name and logo as directed by the City;
 - (ii) name of the Project;
 - (iii) Project number;

- (iv) identification of each item of System Infrastructure, New Municipal Infrastructure or Highway Works, as applicable;
 - (v) the date that each system item was tested/verified;
 - (vi) the signature of the DB Co Testing & Commissioning Coordinator;
 - (vii) issue and date;
 - (viii) document version control;
 - (ix) document amendments table;
 - (x) test reports;
 - (xi) configuration control records;
 - (xii) equipment check sheets (start-up, verification and performance) for each item of the System Infrastructure, New Municipal Infrastructure or Highway Works, as applicable, provided as part of the Works; and
 - (xiii) interim and final acceptance check sheets for each item of the System Infrastructure, New Municipal Infrastructure or Highway Works, as applicable.
- (h) DB Co shall prepare and submit operations and maintenance manuals in accordance with the requirements of Schedule 10 - Review Procedure.
- (i) DB Co shall prepare and submit configuration control records in the format provided by the City and in accordance with the requirements of Schedule 10 - Review Procedure.
- (j) DB Co shall provide a minimum of two years' worth of consumables for all elements of the System Infrastructure in accordance with the manufacturers' recommendations for maintenance for each element, in addition to the spare parts requirements under the Interface Agreement.

1.7 Coordination with the City and Independent Certifier

- (a) The DB Co Testing & Commissioning Coordinator shall co-ordinate with the City and Independent Certifier throughout the testing and commissioning process. This co-ordination shall include:
- (i) review of test, verification and performance test forms;
 - (ii) review of testing progress management forms and performance testing;
 - (iii) review of the DB Co Testing & Commissioning Program;
 - (iv) review of the Testing & Commissioning Schedule;
 - (v) witnessing of installation and performance testing;

- (vi) review of the training curriculum and materials as outlined in Schedule 15-2, Part 1, Article 17 – Operations Training, and scheduling;
 - (vii) review of the operations and maintenance manuals;
 - (viii) sample witnessing of seasonal performance testing as applicable;
 - (ix) review of the test reports;
 - (x) attendance at Testing & Commissioning Team meetings; and
 - (xi) reporting progress of the Testing & Commissioning Program.
- (b) The Independent Certifier shall review compliance matrices to ensure traceability between testing requirements and testing procedures.

1.8 Trial Running

- (a) After Substantial Completion the City will undertake Trial Running of the System Infrastructure on the East Works and West Works to validate that the fully integrated system functions in accordance with the requirements of this Project Agreement. Without prejudice to Sections 11.12(j), (k), 18.5 and 18.7 of the Project Agreement, Trial Running for the East Works, and West Works shall demonstrate that the specified travel times, headways and operational performance requirements outlined in Schedule 15-2, Part 1, Article 3 can be achieved, based on the Vehicles achieving the performance characteristics provided by the City. Trial Running shall be integrated with regular revenue service on the Existing Confederation Line operating segment and extended along the East Works, or West Works, as the case may be. Passengers shall not be carried on the new operating segments during the Trial Running period. The Trial Running shall simulate the operation of the full regular scheduled service on the System Infrastructure for a minimum 21 day period. For the purposes of this Project Agreement, Trial Running shall be deemed completed upon completion of the minimum 21 days of Trial Running without an interruption due to warranty work for at least 14 consecutive days. Completion of Trial Running shall be a condition of East Final Completion and West Final Completion, as the case may be, provided that Trial Running completion has not been achieved within 90 days of the relevant Substantial Completion Date for reasons other than due to the fault of DB Co or any DB Co Party, Trial Running shall be deemed to have been completed for the purposes of the Final Completion under this Project Agreement.
- (i) The fundamental objective of Trial Running is to test and exercise the respective System Infrastructure, including all subsystems, that comprise the relevant works, operating personnel and operating procedures to demonstrate the East Works and West Works can reliably implement passenger service without interruptions. This can be subdivided into the following key objectives:
- (A) to validate the performance of the East and West System Infrastructure with operating and maintenance staff who are trained on the operation

and maintenance of the System Infrastructure and Standard Operating Procedures;

- (ii) The following are DB Co's responsibility during Trial Running
 - (A) DB Co's Testing and Commissioning Team shall participate on a day to day basis. DB Co shall actively participate with the City Representative in the daily meetings to; review performance, service availability and delay issues as they relate to East Works or West Works and review any maintenance and rehabilitation services on the East Works or West Works for the System Infrastructure that could potentially affect System Infrastructure operation or public safety.
 - (B) DB Co shall use the Trial Running period to review the operating data and evaluate system reliability, availability, and maintainability performance for the East Works and West Works. Using prescribed procedures, data on service deviations will be collected and assigned against the specific subsystems down to the Line Replaceable Unit (LRU) level. The database shall provide verification of system reliability to the LRU level.

APPENDIX A INSPECTION, COMMISSIONING AND HANDOVER

NEW MTO INFRASTRUCTURE

For clarity, the obligations of DB Co in this Appendix A are in addition to and not in substitution of any other requirements for commissioning of the Works and/or any other requirements in respect of the New MTO Infrastructure contained in the Project Agreement or this Schedule 14, including, for clarity, the process and requirements set out in Section 25 of the Project Agreement. The obligations in this Appendix A are in respect of New MTO Infrastructure only.

1. INSPECTION, COMMISSIONING AND HANDOVER

1.1 Interim Inspection of New MTO Infrastructure

- (a) DB Co shall comply with all requirements set out in this Schedule 14 – Testing & Commissioning (including, for clarity, this Appendix A) as well as all requirements set out in Section 25.16 of the Project Agreement in connection with interim inspections of New MTO Infrastructure.
- (b) DB Co shall notify the City of achievement of all milestones set out in the Inspection and Test Plan in respect of New MTO Infrastructure as well as all Witness Points and Hold Points in respect of New MTO Infrastructure.

1.2 Final Inspection of New MTO Infrastructure

- (b) DB Co shall comply with all requirements set out in this Schedule 14 – Testing & Commissioning (including this Appendix A) as well as all requirements set out in Section 25.16 of the Project Agreement in connection with final inspections of New MTO Infrastructure.
- (c) Prior to final inspection of New MTO Infrastructure, DB Co shall, in addition to all other requirements set out in Section 25.16 of the Project Agreement:
 - (i) remove all temporary work no longer required from the site subject to final inspection, including but not limited to fencing, sign board, samples, and any other items not considered to be part of New City Infrastructure or New MTO Infrastructure, except for those items required for ongoing Works; and
 - (ii) clean all New MTO Infrastructure prior to Handover following final inspection of such New MTO Infrastructure including:
 - (A) sweeping/spraying of roads, boulevards and sidewalks;
 - (B) flushing of sewers; and
 - (C) cleaning out of catch basins, maintenance holes, and valve chambers, all taking into account ongoing Works.
- (d) The final inspection of New MTO Infrastructure shall be completed pursuant to Section 25.16 of the Project Agreement. The Final Inspection Checklist included in Exhibit 1 to this Appendix shall be signed off by all representatives completing the final inspection.

1.3 Pre-Conditions to Handover of New MTO Infrastructure

In addition to any other requirements in the Project Agreement, DB Co shall complete the following activities prior to, and as a condition of, Handover of New MTO Infrastructure:

- (a) paving of all road surfaces;
- (b) completion of all structures and drainage systems;
- (c) full operation of all traffic lighting and signalization;
- (d) completion of all permanent pavement markings at all intersections and on all major roads;
- (e) installation of all regulatory, warning and guide signing;
- (f) installation of all median and roadside barrier and other safety devices;
- (g) installation of all illumination;
- (h) installation of all ITS/ATMS equipment and civil infrastructure;
- (i) installation of all safety devices;
- (j) signing of the New MTO Infrastructure in accordance with PHM-125;
- (k) return of all construction staging areas located on the MTO Lands to their original condition or a condition otherwise acceptable to City;
- (l) issuance of a completed and signed Stage 4 Road Safety Audit Certificate in respect of the Highway Work to the City Representative;
- (m) clearing and removal of all debris, superfluous materials and equipment from Highway Corridor Lands, as defined in Schedule 20 - Lands;
- (n) submission to the City Representative of all MTO Construction Certificates in respect of Handover, in accordance with Appendix B of Schedule 10 – Review Procedure; and
- (o) submission to the City Representative of a complete set of As-built Drawings, and Record Drawings in accordance with the requirements of Article 16 of Schedule 15-2 Part 1.

EXHIBIT 1 TO APPENDIX A – NEW MTO INFRASTRUCTURE

Commissioning Requirements and Sign Off

Item	Comments	Sign-Off
<p>Final Inspection of the Highway Works</p> <p>representation from</p> <ul style="list-style-type: none"> • Independent Certifier • DB Co 	<p>The Project Agreement is intended to allow the Independent Certifier to review the completed Highway Work and ensure that there are no safety issues and that correct signing is in place.</p> <p>It is also important to confirm that all legislative and regulatory requirements are in place such as regulations for stop signs or speed limit signs.</p> <p>Items for review include <u>but are not limited to:</u></p> <ul style="list-style-type: none"> • Signs (correct and supported by required regulations) • Pavement markings Alignment • Signals- temporary removals and permanent in place • Bike Lanes/Ped sidewalks in conformance with contract • Utility company sign offs Traffic signal operations • Illumination • PHM-125 signed • Commercial and private entrances • Any safety devices are correctly located and operational i.e. guide rail, illumination, active advance warning signs etc. • Final electrical inspection • All contractor testing documentation available and submitted to City Zone painting restored • Maintenance activities completed • All guiderail installed and verification of mounting heights • Signs restored and replaced if damaged by contractor • Erosion control temporary devices removed • All claims resolved 	<p>No obvious safety issues are present on this section of highway and all legislative and regulatory requirements are in place.</p> <hr/> <p>DB Co, P.Eng.</p> <hr/> <p>Independent Certifier</p>