

THE CITY OF EDMONTON
PROJECT AGREEMENT
VALLEY LINE LRT – STAGE 1

Schedule 4

Design and Construction Protocols

**Edmonton Valley Line LRT – Stage 1
Project Agreement – Execution Version
Schedule 4 – Design and Construction Protocols
Date: February 8, 2016**

**VALLEY LINE PROJECT
SCHEDULE 4
DESIGN AND CONSTRUCTION PROTOCOLS**

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- Appendix 4B – Project Specific Submission Requirements*
- Appendix 4C – Project Drawing Standards*

SCHEDULE 4

DESIGN AND CONSTRUCTION PROTOCOLS

1. CITY NOT RESPONSIBLE FOR DESIGN OR CONSTRUCTION

The City's rights of review, consent, acceptance, approval or confirmation of compliance with respect to any aspect of the Design or the Construction, including pursuant to Schedule 2 [*Submittal Review Procedure*] shall be for the City's benefit only, and no review, consent, acceptance, approval or confirmation of compliance by the City's Representative or any other representative of the City shall in any way relieve Project Co of its obligation or responsibility for all aspects of the Design and Construction of the Infrastructure except as may be expressly set out in this Agreement.

2. INTEGRATED PROJECT MANAGEMENT PLAN

2.1 General

- (a) Within 60 days after the Effective Date, Project Co shall prepare and submit an integrated Project management plan, to be administered by Project Co's Representative, (the "***Integrated Project Management Plan***") which defines:
 - (i) the methodology for implementation of an integrated project management approach for the Project;
 - (ii) controls and processes to prevent any single discipline (design, construction, maintenance or operations) from working in isolation from the others;
 - (iii) how the Design Management Plan, the Construction Management Plan and the Operating Concept Plan are integrated to ensure cohesive delivery of the Design, Construction, and Services in compliance with the Project Requirements;
 - (iv) how the Service Provider will be involved throughout the Design and Construction so as to permit the Service Provider to sign the applicable Construction Certificates in accordance with Section 12.1 [*Construction Certificates*] of this Schedule and the final Commissioning Certificate in accordance with Section 10.9 [*Commissioning Certification*] of this Schedule;
 - (v) how Project Co intends to maintain relationships with its Subcontractors;
 - (vi) how on-going communications with the City will be managed;
 - (vii) how communications with Interested Parties and other key stakeholders will be managed; and
 - (viii) how Project risks will be managed, and identifies the specific Project risks that materially affect Project Co's ability to comply with the Project Requirements and Project Co's strategy for mitigation of each such risk.

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- (b) Project Co shall segment the Design and Construction into discrete, logically organized work packages, (each a “**Work Package**”). Each Work Package shall:
 - (i) provide sufficient context to permit the City to understand and review the applicable Design scope in accordance with Schedule 2 *[Submittal Review Procedure]*;
 - (ii) be traceable to the applicable Project Requirements in accordance with the Requirements Management process;
 - (iii) be comprised of a sufficient scope of work to permit logical and efficient management, administration, reporting and review; and
 - (iv) preserve its scope of work as the Work Package delivery progresses throughout Design and Construction.
- (c) Without limiting Section 2.1(a) *[General]* of this Schedule, the Integrated Project Management Plan shall also:
 - (i) define the scope and geographic limits of the Design and Construction activities comprising each Work Package and identify each Site on which Construction related to the Work Package will be performed;
 - (ii) ensure that all parts of the Infrastructure are assigned to the applicable Work Package;
 - (iii) establish a Work Package numbering scheme that ensures that each Work Package has a unique and clear identifier;
 - (iv) describe the sequencing of Work Packages in terms of predecessor and successor relationships between Work Packages; and
 - (v) establish a process for monitoring the progress of each Work Package.
- (d) Project Co shall issue one or more Design Certificates, Construction Certificates and Commissioning Certificates for each Work Package in the forms required by the ABC, or attached as Appendix 4A *[Design & Construction Certificate Forms]* of this Schedule, as applicable.

2.2 Updates to the Integrated Project Management Plan

Prior to implementation of any amendments or updates to the Integrated Project Management Plan, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 *[Submittal Review Procedure]*.

2.3 Compliance with the Integrated Project Management Plan

Throughout the Construction Period, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the Integrated Project Management Plan, and any amendments or updates, which have been accepted by the City.

3. CONSTRUCTION ADMINISTRATION

3.1 Construction Period Joint Committee

3.1.1 General

- (a) Within 20 Business Days after the Effective Date, the City and Project Co shall establish a joint liaison committee (the "**Construction Period Joint Committee**") consisting of the City's Representative and Project Co's Representative and such other members as the parties may agree from time to time.
- (b) The duties and obligations of the Construction Period Joint Committee shall end at the Service Commencement Date, following which any outstanding duties and obligations shall be transferred to the Operating Period Joint Committee.
- (c) The purpose of the Construction Period Joint Committee is to provide a formal forum for the parties to consult and cooperate in all matters relating to the Project during the Construction Period. Any member appointed to the Construction Period Joint Committee will not have any duties or obligations arising out of such appointment independent of such member's duties or obligations to the party making such appointment.
- (d) Members of the Construction Period Joint Committee shall attend Communications Working Group meetings in accordance with the requirements set out in Section 1.3(d)(i) [*Communications Working Group*] of Schedule 12 [*Public Communications and Public Engagement*] to observe and ensure that all Construction activities are aligned with communications and public engagement activities.

3.1.2 Authority

The Construction Period Joint Committee:

- (a) shall only have authority as expressly delegated to it by the City and Project Co, and both parties will give reasonable consideration to delegating appropriate authority to permit efficient decision making with respect to the Project;
- (b) may strike, establish terms of reference for, delegate authority and appoint members having the necessary experience and qualifications to, such sub-committees as the Construction Period Joint Committee may determine are necessary from time to time and all such sub-committees shall report to the Construction Period Joint Committee;
- (c) shall strike, establish terms of reference for, delegate authority and appoint members having the necessary experience and qualifications to, the following sub-committees:
 - (i) Fire Life Safety Sub-committee, as further described in the 'Handbook for Transit Safety and Security Certification' published by the U.S. Department of Transportation, Federal Transit Administration;
 - (ii) Safety and Security Sub-committee, as further described in the 'Handbook for Transit Safety and Security Certification' published by the U.S. Department of Transportation, Federal Transit Administration;

- (iii) System Change and Operations Review Sub-committee, as further described in the 'Handbook for Transit Safety and Security Certification' published by the U.S. Department of Transportation, Federal Transit Administration; and
 - (iv) Commissioning Sub-committee, as further described in Section 10 *[Commissioning]* of this Schedule; and
- (d) shall have no authority to agree to any amendments or to give any waivers of this Agreement.

3.1.3 Meetings

- (a) Meetings of the Construction Period Joint Committee shall be convened on not less than 5 Business Days' notice (which notice will also identify the agenda items to be discussed at the meeting), provided that in an emergency a meeting may be called at any time on such notice as may be reasonable in the circumstances.
- (b) The Construction Period Joint Committee shall be chaired by a representative of the City unless the City requires that a representative of Project Co chair the Construction Period Joint Committee.
- (c) The Construction Period Joint Committee shall meet at least once each month at a location provided by Project Co, within the City of Edmonton (unless otherwise agreed by its members), and at other times as determined by the Construction Period Joint Committee.
- (d) The Construction Period Joint Committee shall accommodate reasonable requests for additional meetings by any member of the Construction Period Joint Committee.
- (e) Project Co shall keep minutes of all meetings and any recommendations of the Construction Period Joint Committee and circulate such minutes to the City within 10 Business Days of the making of the recommendation or the holding of the meeting.
- (f) Project Co shall deliver a copy of the then current look ahead summary prepared in accordance with Section 3.2.1(b)(ii) *[Monthly Progress Report]* of this Schedule, to the City's Representative not less than 5 Business Days prior to each monthly meeting of the Construction Period Joint Committee.

3.2 Construction Period Reporting

3.2.1 Monthly Progress Report

- (a) No later than 7 days after the end of each month, Project Co shall submit a Monthly Progress Report which describes the progress of the Design and Construction during the preceding month.
- (b) Each Monthly Progress Report shall include:
 - (i) an executive summary describing all Project Work completed during the applicable month and the status of ongoing work;

- (ii) a Project look ahead summary describing all planned Project Work activities over the next 30, 60 and 90 days, including details of all associated activities required to be completed by the City (if any); and
- (iii) dashboard narratives on the following topics, each in separate report sections:
 - (A) safety statistics for the previous month, as reported pursuant to Section 7 *[Accidents and Incidents]* of Schedule 11 *[Project Safety Requirements]*;
 - (B) quality issues for the previous month, including a summary of NCR status and audits performed, as reported pursuant to Schedule 9 *[Quality Management]*;
 - (C) financial reporting of the previous month's invoicing against contract value, as reported pursuant to Schedule 16 *[Payment Mechanism]*;
 - (D) environmental inspection reports and issues for the previous month, as reported pursuant to Schedule 10 *[Environmental Performance Requirements]*;
 - (E) Transportation Accommodation reports and issues for the previous month, as reported pursuant to Section 1-4 *[Transportation Management]* of Schedule 5 *[D&C Performance Requirements]*;
 - (F) Design and Construction progress for the previous month, including variances from the Construction Schedule and the Submittal Schedule, and any related issues;
 - (G) any other information or data which describes the previous month's progress or issues related to the Design and Construction; and
 - (H) Project risks, including:
 - (1) descriptions of all Project risks identified during the applicable reporting period that may materially affect Project Co's ability to comply with the Project Requirements, together with Project Co's strategy for mitigation of each such risk; and
 - (2) updates with respect to the status of, and any changes in, each previously identified Project risk, updated to the current reporting period; and
- (iv) progress photographs for each Site that support the assessment of progress.

4. PROJECT CO'S RESPONSIBILITIES

4.1 Design Build Responsibility

Notwithstanding any other provision of this Agreement, Project Co shall:

- (a) have complete responsibility for the Design and Construction of the Infrastructure;
- (b) provide written notice to the City's Representative of any conflict or inconsistency between or among the Project Requirements, as soon as practicable after becoming aware of such conflict or inconsistency between or among the Project Requirements;

- (c) perform and complete the Design, the Construction and all other activities, including Commissioning, in accordance with all terms of this Agreement, so as to provide a low floor, urban, light rail transit system and supporting infrastructure that, at the Service Commencement Date:
 - (i) is complete, safe, secure, operational and fit for the uses of the Infrastructure, as described in the Project Requirements;
 - (ii) shall permit Project Co to perform the Operations and Maintenance in accordance with the requirements of this Agreement;
 - (iii) complies with the specifications, criteria, terms, conditions and mitigation measures described in the applicable Project Approvals, including all Environmental Permits, provided that where more stringent specifications, criteria, terms, conditions or mitigation measures are specified in this Agreement, the provisions of this Agreement shall take precedence over those in the applicable Project Approvals to the extent that they are not in conflict;
 - (iv) is fully integrated with the City's existing transit system and conforms to the SUI requirements described in Part 2 [*Sustainable Urban Integration*] of Schedule 5 [*D&C Performance Requirements*]; and
 - (v) reflects and captures the intent and benefits of the Proposal Extracts;
- (d) ensure that, as at the Service Commencement Date, the Lands are clear of all Temporary Works related to the Design and Construction, including construction site offices;
- (e) maintain a complete, unfolded hard copy, full-sized (nominally A1), original set of:
 - (i) all signed and sealed Design Drawings; and
 - (ii) all shop or fabrication drawings required to be signed and sealed,
 together with all revisions thereto, on 24 lb. bond, until submission to the City. The drawings set shall be logically organized and structured and shall be made available to the City's Representative and the Independent Certifier upon request;
- (f) maintain a complete, hard copy, full-sized (nominally A1), set of all the latest revision and all site mark-ups of:
 - (i) all signed and sealed Design Drawings; and
 - (ii) all shop or fabrication drawings required to be signed and sealed,
 at the Gerry Wright OMF until the Termination Date. The drawings set shall be logically organized and structured and shall be made available to the City's Representative and the Independent Certifier upon request; and
- (g) comply with all Applicable Laws and the City Policies.

Each of the obligations in Sections 4.1(c)(i), 4.1(c)(ii), 4.1(c)(iii), 4.1(c)(iv), and 4.1(c)(v) [*Design Build Responsibility*] of this Schedule are independent obligations, and the fact that Project Co has satisfied one obligation shall be no defence to an allegation that it has failed to satisfy another.

4.2 Standard of Performance for Design and Construction

Project Co shall, at all times during the Construction Period and in all respects, perform the Design and Construction in accordance with Good Industry Practice, the Design and Construction Requirements, and to the standards required by Schedule 5 *[D&C Performance Requirements]*.

4.3 Deficiencies in Design or Construction

Project Co shall, without cost to the City, and without limiting Project Co's obligation to perform the Operations and Maintenance as set out in this Agreement, including Schedule 7 *[O&M Performance Requirements]*, correct:

- (a) any Deficiency that becomes apparent at any time prior to the Service Commencement Date; and
- (b) any Early Handover Deficiencies in accordance with Section 2 *[Warranty]* of Appendix 7B *[Early Handover Items]* of Schedule 7 *[O&M Performance]*.

4.4 Project Approvals for the Design and Construction

Project Co and the City each acknowledge and agree that risk and responsibility for all Project Approvals required for the Design and Construction shall be as specified in this Agreement, including in Schedule 10 *[Environmental Performance Requirements]* and Schedule 28 *[Project Approvals and URP Matters]*.

4.5 LEED Silver Certification

- (a) Project Co shall obtain LEED Silver Certification of those portions of the Gerry Wright OMF specified in Section 5-3.3.2 *[Sustainability and LEED®]* of Schedule 5 *[D&C Performance Requirements]*, in accordance with the following:
 - (i) within 30 days after the Effective Date, Project Co shall register the relevant aspects of the Gerry Wright OMF with the Canadian Green Building Council (CaGBC);
 - (ii) Project Co shall, subject to this Section 4.5(a) *[LEED Silver Certification]*, achieve all necessary prerequisites, credits and points under the LEED Rating System required to achieve the LEED Silver Certification and may in its discretion determine which of the credits and points to pursue, except that Project Co shall not include any points or credits which require any action by or on behalf of the City without the City's prior written consent, which may be granted or withheld in the City's discretion. Where the City consents to the inclusion of points or credits which require any action by or on behalf of the City, the City shall take reasonable steps to cooperate with Project Co in respect of its achievement of such LEED points and credits, provided that such cooperation shall not require that the City incur any liability, cost or expense;
 - (iii) if at any time after registration with CaGBC in accordance with Section 4.5(a)(i) *[LEED Silver Certification]* of this Schedule the requirements to achieve LEED Silver Certification under the LEED Rating System change, and Project Co is required to comply with such change in order to achieve LEED Silver Certification of the Gerry

Wright OMF then Project Co shall forthwith notify the City of such change and such change shall be handled in accordance with Schedule 13 *[Changes]*;

- (iv) Project Co shall compile and submit all required documents for LEED Silver Certification;
- (v) if for any reason Project Co fails to obtain LEED Silver Certification for the Gerry Wright OMF on or prior to such date which is 24 months after the Service Commencement Date, then Project Co shall, upon written demand from the City, promptly and in any event within 3 Business Days pay to the City the amount of
*, Redaction under review as liquidated damages; and

- (vi) upon payment of the amount, if any, owing under this Section 4.5 *[LEED Silver Certification]* Project Co will have no further obligations or liabilities in respect of obtaining LEED Silver Certification, except to provide the City with such information and administrative assistance as the City may reasonably require in relation to obtaining LEED Silver Certification of the Gerry Wright OMF, and for greater certainty the failure to obtain LEED Silver Certification will not be a Termination Event.

- (b) Project Co shall prepare and submit to the City no later than 30 days prior to the Target Service Commencement Date:
 - (i) a LEED project checklist, generally in accordance with CaGBC requirements, together with a written confirmation that, in Project Co's judgment, LEED Silver Certification will be achieved for the relevant aspects of the Gerry Wright OMF as required by this Section 4.5 *[LEED Silver Certification]* of this Schedule; and
 - (ii) a written opinion from a LEED accredited professional, supporting the confirmation described in Section 4.5(b)(i) *[LEED Silver Certification]* of this Schedule.

5. SYSTEM AND SAFETY ASSURANCE

5.1 General

- (a) Project Co shall implement and execute a structured approach to system and safety assurance that includes the following activities as described in further detail in this Section 5 *[System and Safety Assurance]*:
 - (i) independent verification and validation;
 - (ii) the Safety and Security Certification Program;
 - (iii) the System Safety Program;
 - (iv) Requirements Management;
 - (v) the RAM Program; and
 - (vi) Interface Management.

5.2 Independent Verification & Validation

- (a) Project Co shall retain a qualified organization or team of individuals, independent from the Design Team, to verify, validate and certify the safety and security of the Infrastructure, (the “**IV&V Team**”). The IV&V Team shall:
- (i) be part of the Checking Team;
 - (ii) be appointed for the purpose of performing independent verification and validation of the safety and security of the Infrastructure;
 - (iii) be comprised of individuals who have demonstrable experience in the implementation, administration and certification of safety and security programs for transit systems, and who are acceptable to the City acting reasonably;
 - (iv) verify and validate compliance with the Safety and Security Certification Program, while upholding the City’s SUI objectives such that the least intrusive combination of means, which are consistent with Good Industry Practice, are applied to the mitigation of identified Hazards;
 - (v) be responsible to prepare and submit a Safety and Security Certification Verification Report in accordance with Section 5.3.1(c) [*Safety and Security Certification Program*] of this Schedule; and
 - (vi) be responsible to prepare and submit a Project Safety and Security Certificate in accordance with Section 5.3.1(c)(ii) [*Safety and Security Certification Program*] of this Schedule.

5.3 Safety and Security Certification Program

5.3.1 General

- (a) Project Co shall cause the IV&V Team to prepare a program for the verification, validation and certification of the safety and security of the Infrastructure, (the “**Safety and Security Certification Program**”). The Safety and Security Certification Program shall:
- (i) describe the series of processes to be implemented to collectively verify, validate and certify the safety and security of the Infrastructure;
 - (ii) implement the practices described in the ‘*Handbook for Transit Safety and Security Certification*’ published by the U.S. Department of Transportation, Federal Transit Administration;
 - (iii) apply CPTED principles for deterrence of criminal behaviour through natural access control (entry and exit points, fences), and boundaries (clear ownership, clearly marked private spaces) and natural surveillance (visibility, positive social activities), as set out in the City’s *Design Guide for a Safer City*, and as more particularly set out in the Project Requirements;
 - (iv) identify how sub-committees of the Construction Period Joint Committee will support the implementation of the Safety and Security Certification Program by performing the

- functions of the associated safety and security committees as described in the *'Handbook for Transit Safety and Security Certification'* published by the U.S. Department of Transportation, Federal Transit Administration;
- (v) incorporate a hazard analysis process in accordance with the *'Hazard Analysis Guidelines for Transit Projects'* published by the U.S. Department of Transportation, Federal Transit Administration;
 - (vi) identify the standards, consistent with Good Industry Practice, to be used to establish integrity levels and for development and validation of software for equipment, components, systems and sub-systems in which software is performing a safety function;
 - (vii) be co-ordinated with the other system and safety assurance activities described in this Section 5 [*System and Safety Assurance*] of this Schedule; and
 - (viii) include an outline of the contents of the Safety and Security Certification Verification Report.
- (b) Within 90 days after the Effective Date, Project Co shall submit the Safety and Security Certification Program prepared by the IV&V Team.
 - (c) Not less than 10 Business Days prior to the Target Service Commencement Date, Project Co shall cause the IV&V Team to submit:
 - (i) a safety and security certification verification report (the "**Safety and Security Certification Verification Report**") that summarizes the readiness of the Infrastructure for Service Commencement and includes:
 - (A) an executive summary describing the status of the Safety and Security Certification Program;
 - (B) a description of all activities performed under the Safety and Security Certification Program;
 - (C) a description of the current certification status of each element of the Infrastructure;
 - (D) a list of remaining operating restrictions;
 - (E) actions required to mitigate or minimize the consequences of any remaining operating restrictions; and
 - (F) a schedule for eliminating all remaining operating restrictions by the applicable Deficiency Deadline(s); and
 - (ii) a safety and security Certificate, sealed by a professional engineer, in the form attached hereto as Appendix 4A-2 [*Project Safety & Security Certificate*] of this Schedule, (the "**Project Safety and Security Certificate**").

5.3.2 Updates to the Safety and Security Certification Program

Prior to implementation of any amendments or updates to the Safety and Security Certification Program, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [Submittal Review Procedure].

5.3.3 Compliance with the Safety and Security Certification Program

Throughout the Construction Period, Project Co shall implement and comply with, and ensure that the IV&V Team and all Project Co Persons implement and comply with, the Safety and Security Certification Program, and any amendments or updates, which have been accepted by the City.

5.4 System Safety Program

5.4.1 General

- (a) Within 180 days after the Effective Date, Project Co shall prepare and submit a program to certify the safety of the organization, processes and procedures to be used during the Operating Period, (the "**System Safety Program**"). The System Safety Program shall be:
 - (i) developed in accordance with the '*Manual for the Development of Urban Rail Agency System Safety Program Plans*', published by APTA, provided that for the purposes of the Project:
 - (A) the "Urban Rail Agency" shall be Project Co; and
 - (B) the "State Safety Oversight" shall be the City; and
 - (ii) co-ordinated with the Safety and Security Certification Program.
- (b) Project Co shall retain an independent agency, having demonstrable experience performing safety program audits of at least three different LRT systems, and acceptable to the City acting reasonably, (the "**Independent Agency**").
- (c) Not less than 60 days prior to the Target Service Commencement Date, Project Co shall cause the Independent Agency to perform an external safety management peer review of the System Safety Program and prepare a comprehensive external System Safety Program peer review report, in accordance with Section 6.4.2 of the '*Manual for the Development of Urban Rail Agency System Safety Program Plans - Revision #6*', published by APTA.
- (d) The System Safety Program peer review report prepared by the Independent Agency shall include:
 - (i) an executive summary describing the status and readiness of the Service Provider to safely perform the Services along with the key observations and recommendations from the external safety management peer review;
 - (ii) a detailed listing of the activities performed during the peer review; and
 - (iii) a detailed list of all findings arising from the peer review, including Nonconformities, recommendations and observations.

- (e) Within 14 days after receipt of the System Safety Program peer review report prepared by the Independent Agency, Project Co shall prepare and submit to the City a Corrective Action Plan to address all recommendations and observations, and correct all reported Nonconformities. Project Co shall promptly implement all Corrective Actions to which there is no objection by the City and provide confirmation to the City upon implementation of each recommendation and observation, and correction of each Nonconformity.
- (f) Upon completion of all Corrective Actions, and not less than 10 days prior to the Target Service Commencement Date, Project Co shall cause the Independent Agency to do an audit of the System Safety Program and prepare and submit an audit certificate, (the "**Project System Safety Program Audit Certificate**") in the form attached hereto as Appendix 4A-5 [*Project System Safety Program Audit Certificate*] of this Schedule.

5.4.2 Updates to System Safety Program

Prior to implementation of any amendments or updates to the System Safety Program, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [*Submittal Review Procedure*].

5.4.3 Compliance with the System Safety Program

Throughout the Term, Project Co shall implement and comply, and ensure that all Project Co Persons and the Independent Agency comply, with the System Safety Program, and any amendments or updates, which have been accepted by the City.

5.5 Requirements Management

5.5.1 General

- (a) Within 30 days after the Effective Date, Project Co shall prepare and submit a formal protocol for requirements management that identifies, captures, documents, traces, manages, verifies and validates compliance with the Project Requirements, (the "**Requirements Management**").
- (b) The Requirements Management protocol shall include a tool to record and keep current all data and tracking fields required to identify, capture, document, trace, manage, verify and validate compliance with the Project Requirements, including:
 - (i) Design requirements;
 - (ii) Construction requirements;
 - (iii) operational requirements;
 - (iv) safety requirements;
 - (v) security requirements;
 - (vi) environmental requirements;
 - (vii) RAM requirements;

- (viii) functional requirements;
 - (ix) performance requirements;
 - (x) interface requirements;
 - (xi) expandability requirements;
 - (xii) SUI requirements; and
 - (xiii) quality requirements.
- (c) Project Co shall maintain and keep current all Requirements Management data.
 - (d) The Final Design(s) for each Work Package shall include evidence of traceability between the content of the Final Design and all applicable Project Requirements.

5.5.2 Updates to Requirements Management

Prior to implementation of any amendments or updates to the Requirements Management protocol, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [*Submittal Review Procedure*].

5.5.3 Compliance with Requirements Management

Throughout the Term, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the Requirements Management process, and any amendments or updates, which have been accepted by the City.

5.6 Reliability, Availability, Maintainability (RAM) Program

5.6.1 General

- (a) Within 30 days after the Effective Date, Project Co shall prepare and submit a reliability, availability, maintainability program in accordance with *EN 50126-1, Railway Applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*, (the “**RAM Program**”). The RAM Program shall:
 - (i) establish quantified and measurable RAM targets for all equipment, components, systems and sub-systems to assure System and service reliability, availability and maintainability levels sufficient to satisfy the O&M Requirements and all Availability requirements;
 - (ii) guide and co-ordinate the RAM design, analysis, test documentation and certification activities through all Project stages and phases;
 - (iii) employ a consistent approach to RAM analysis across all equipment, components, systems and sub-systems that influence the RAM targets;
 - (iv) account for the appropriate RAM allocations in the applicable designs; and
 - (v) be co-ordinated with the other system and safety assurance activities described in Section 5 [*System and Safety Assurance*] of this Schedule.

- (b) Concurrently with submission of the Commissioning Plan, Project Co shall prepare and submit to the City a final RAM analysis report that:
- (i) provides a narrative description and an overall RAM model for the System demonstrating that the O&M Requirements and all Availability requirements will be achieved;
 - (ii) lists the RAM targets for the System as a whole and for the equipment, components, systems and sub-systems that make up the System;
 - (iii) includes narrative analyses, together with charts, diagrams, modelling or simulations demonstrating the statistical basis and sensitivity of the RAM target contributions from major equipment, components, systems and sub-systems to the RAM target(s) for the System as a whole;
 - (iv) identifies the design, operating and maintenance solutions to control any identified failures and conditions which impact RAM targets; and
 - (v) is prepared and sealed by a professional engineer,
- (collectively, the "***Final RAM Analysis Report***").

5.6.2 Updates to the RAM Program

Prior to implementation of any amendments or updates to the RAM Program, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [*Submittal Review Procedure*].

5.6.3 Compliance with the RAM Program

Throughout the Term, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the RAM Program, and any amendments or updates, which have been accepted by the City.

5.7 Interface Management

5.7.1 General

- (a) Within 30 days after the Effective Date, Project Co shall prepare and submit a formal interface management process (the "***Interface Management***") designed to ensure:
- (i) all interfaces are considered and Integrated in the design and construction of the Infrastructure;
 - (ii) the applicable design performance criteria are co-ordinated during the design of the Infrastructure so that the constructed Infrastructure performs in accordance with the Project Requirements; and
 - (iii) all interface and Integration issues are proactively identified and recorded in an interface register (the "***Interface Register***"), with assigned responsibilities for tracking, resolution and testing of each identified issue.

- (b) The Interface Register shall:
 - (i) include all interface and Integration issues identified through the Requirements Management and Requirements Management Sub-Plan activities;
 - (ii) include all of the data and tracking fields identified in the Interface Management Sub-Plan;
 - (iii) be co-ordinated with the other system and safety assurance activities described in Section 5 [*System and Safety Assurance*] of this Schedule;
 - (iv) be updated to reflect resolution of existing interfaces and addition of new interface and Integration issues as they arise; and
 - (v) be maintained and updated in accordance with the Interface Management Sub-Plan.
- (c) Project Co shall develop and populate the Interface Register with all interface and Integration issues, including the following:
 - (i) LRV wheel to track interface;
 - (ii) LRV pantograph to Overhead Catenary System interface, if applicable;
 - (iii) LRV door threshold to platform gap (horizontal and vertical) interface;
 - (iv) SCADA to end device interfaces;
 - (v) Public Address intelligibility and LRV, Station and Stop surface finish interfaces;
 - (vi) Driver sightlines, Passenger sightlines, CCTV sightlines and other Roadway user sightlines, in each case taking into account all potential obstructions including signals, signs, OCS poles (if applicable), passenger information displays, and landscaping;
 - (vii) noise and vibration from the Infrastructure;
 - (viii) grounding and bonding interfaces;
 - (ix) Electromagnetic Compatibility;
 - (x) Stray Current and corrosion control;
 - (xi) duct bank and access vault drainage requirements; and
 - (xii) cable and duct routing.

5.7.2 Updates to Interface Management

Prior to implementation of any amendments or updates to the Interface Management process, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [*Submittal Review Procedure*].

5.7.3 Compliance with Interface Management

Throughout the Term, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the Interface Management process, and any amendments or updates, which have been accepted by the City.

6. DESIGN, CERTIFICATION, AND SUBMISSION PROCEDURES

6.1 General Design Considerations

- (a) Project Co shall undertake and perform the Design activities so that the design of the Infrastructure:
- (i) is undertaken by a Design Team exercising such degree of care, skill and diligence as would reasonably be expected from consultants qualified to perform services similar in scope, nature and complexity to the Design activities, as of the Effective Date;
 - (ii) includes specific consideration of safety, constructability, operations, maintainability and life cycle cost issues at all stages of the design development process, as appropriate; and
 - (iii) includes consideration of safe, efficient and cost-effective Operation and Maintenance of the Infrastructure.
- (b) Project Co shall appoint a Design Team that:
- (i) includes (as required by Applicable Law or Good Industry Practice) Professional Engineers who are registered or licensed to practice as professional engineers under the *Engineering and Geoscience Professions Act* (Alberta);
 - (ii) includes architects who are registered or licensed to practice as architects under the *Architects Act* (Alberta); and
 - (iii) has sufficient expertise and experience to expeditiously and efficiently perform all of the Design activities in a proper and professional manner to the standards set out in this Agreement.

6.2 Design and Certification Procedure

- (a) Throughout the Term, Project Co shall implement and enforce the design development, certification, submission and implementation procedures set out in:
- (i) this Schedule 4 [*Design and Construction Protocols*]; and
 - (ii) the Design Management Plan, and any subsequent amendments or updates thereto, which have been accepted by the City,
- (collectively, the “***Design and Certification Procedure***”).
- (b) The Design and Certification Procedure shall apply to all Design Data prepared or adopted in connection with the Design and Construction and any other construction activities taking place during the Term, including any further design development or changes to a design once a Submittal has been accepted in accordance with Schedule 2 [*Submittal Review Procedure*].
- (c) Project Co shall ensure that all certification procedures referred to in the Design and Certification Procedure are complied with by the appropriate persons referred to therein, including the members of the Design Team, the Design Builder and any independent team,

engineer or architect within the Design Builder, as the case may be (together, the “**Appropriate Persons**”), and that all Appropriate Persons are at all relevant times duly authorized and qualified to carry out such procedures and to sign the relevant Certificates. Any failure by any Appropriate Person to fulfill the obligations required of them under the Design and Certification Procedure shall be a breach of Project Co’s obligations under this Agreement.

- (d) In the case of an emergency, Project Co may proceed with such measures as are immediately necessary for the protection of persons and/or property prior to complying with the applicable provisions of the Design and Certification Procedure, provided that Project Co shall comply with the provisions of the Design and Certification Procedure as soon as reasonably possible under the circumstances.

6.3 No Limitation

A requirement for certification or for any check, audit or review pursuant to, and for purposes of, this Schedule is in addition to, and does not in any way limit, qualify, replace or relieve Project Co from, the obligation to comply with any other certification, check, audit or review requirement provided elsewhere in this Agreement or in any of the Project Requirements, or pursuant to any Applicable Laws, professional standards or practices.

6.4 Design Management Plan

6.4.1 General

Within 30 days after the Effective Date, Project Co shall prepare and submit a design management plan, (the “**Design Management Plan**”), which shall include:

- (a) an organization chart for all Design activities;
- (b) the identification of the procedures to be used for designing and checking, including:
 - (i) inter-disciplinary Integration and interface between design elements; and
 - (ii) compliance with the Design and Construction Requirements, including adherence to the SUI requirements described in Part 2 [*Sustainable Urban Integration*] of Schedule 5 [*D&C Performance Requirements*] and compliance with environmental obligations described in Schedule 10 [*Environmental Performance Requirements*];
- (c) the following management sub-plans, each as further described in Section 6.4.5 [*Design Management Sub-Plans*] of this Schedule:
 - (i) Requirements Management Sub-Plan;
 - (ii) RAM Sub-Plan;
 - (iii) Interface Management Sub-Plan;
 - (iv) Stray Current Sub-Plan;
 - (v) EMC Control Sub-Plan;

- (vi) Vibration Control Sub-Plan; and
- (vii) Noise Control Sub-Plan;
- (d) the form of review to be undertaken by the Appropriate Persons for each Work Package;
- (e) the identification of the proposed Checking Team(s), including the IV&V Team;
- (f) details of the Integration of the following into the design development process:
 - (i) resolution of design Integration and interface issues;
 - (ii) mitigation of risks and vulnerabilities identified through:
 - (A) the Safety and Security Certification Program; and
 - (B) regular review of the Operating Concept Plan in accordance with Section 8(b) [*Operating Concept Plan*] of this Schedule;
 - (iii) elimination of Deficiencies, Early Handover Deficiencies and other Nonconformities and mitigation of risks identified through the RAM assessments; and
 - (iv) the applicable Project Requirements, including the requirements of Schedule 10 [*Environmental Performance Requirements*];
- (g) details of the timing, development, review and verification of models, mock-ups, and prototypes;
- (h) the contents and format of the Interim Design, if applicable, and Final Design submissions for each Work Package;
- (i) a detailed design review and audit schedule, indicating the dates that Project Co plans to:
 - (i) conduct internal audits of the design verification process;
 - (ii) submit each Interim Design and Final Design;
 - (iii) undertake review meetings in accordance with Section 6.8(e) [*Interim Design Reviews*] of this Schedule; and
 - (iv) verify implementation of the design of the Infrastructure, by field review, during Construction, including during Commissioning and throughout performance of the Deconstruction Work;
- (j) details of the organization and hierarchy of all Design Data;
- (k) details of the plans for implementing, and verifying the implementation of, the design of the Infrastructure throughout the Construction;
- (l) the procedures to be used to ensure compliance with the quality assurance and quality control requirements of Schedule 9 [*Quality Management*];
- (m) details of the plans and procedures for the identification of all Project Intellectual Property pursuant to Schedule 8 [*Intellectual Property*];
- (n) appropriate metrics to measure the progress of the Design activities for each discipline;

- (o) a detailed design submittal schedule and tracker (the “**Submittal Schedule**”) which shall:
 - (i) provide for a progressive and orderly flow of Design Data and other Submittals from Project Co to the City as appropriate to allow sufficient time for consideration of each Submittal by the City’s Representative in accordance with Schedule 2 [*Submittal Review Procedure*], taking into account, after consultation with the City, the volume and complexity of the Submittals and the resources necessary to be available to the City to consider such Submittals;
 - (ii) be in a table format with columns that identify the following for each Submittal:
 - (A) unique tracking number;
 - (B) Submittal name and description of documents, information, and data included in the Submittal;
 - (C) Submittal revision;
 - (D) name of Project Co Person responsible for preparation of the Submittal;
 - (E) Work Package identifier(s) (if applicable);
 - (F) Requirements Management reference(s) to applicable Project Requirement(s);
 - (G) submission status (e.g. not started, in progress, submitted, endorsed, revise and resubmit);
 - (H) target submission date;
 - (I) actual date of submission;
 - (J) cross reference to the applicable Submittal register entry under Section 3.1 [*Submittal Register*] of Schedule 2 [*Submittal Review Procedure*];
 - (K) target date of City endorsement; and
 - (L) endorsement status under Section 4 [*Review Procedure*] of Schedule 2 [*Submittal Review Procedure*]; and
 - (iii) allow adequate time prior to performance of the applicable Design and Construction that is the subject of the applicable Submittal, for review of the Submittal, including all Design Data and safety, security and RAM assessments, by the City and for Project Co to make changes to the Submittals as may be required to account for any comments received from the City.

6.4.2 Updates to the Design Management Plan

Prior to implementation of any amendments or updates to the Design Management Plan, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [*Submittal Review Procedure*].

6.4.3 Compliance with the Design Management Plan

Throughout the Term, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the Design Management Plan, and any amendments or updates, which have been accepted by the City.

6.4.4 Submittal Schedule Updates

- (a) On or before the last day of each month, up to and including, the Service Commencement Date, Project Co shall submit an updated Submittal Schedule to the City. Each updated version of the Submittal Schedule shall:
 - (i) comply with the requirements of Section 6.4.1(o) *[General]* of this Schedule; and
 - (ii) include a design register showing all known, submitted and proposed Design Drawings and other documents, including drawing number or document number, title, certifying engineer, revision number, issued date, and status.
- (b) Project Co shall bear the risk of delays and additional costs caused as a result of: (i) the late, incomplete or non-compliant submission of any Submittal to the City; and (ii) Submittals which are rejected or required to be corrected and resubmitted in accordance with the terms of this Schedule or Schedule 2 *[Submittal Review Procedure]*.

6.4.5 Design Management Sub-Plans

6.4.5.1 Requirements Management Sub-Plan

The Requirements Management Sub-plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 5.5 *[Requirements Management]* of this Schedule;
- (b) include details of the organization, roles and responsibilities for all Requirements Management activities;
- (c) describe the processes and software tool(s) to be used to track and administer the Requirements Management activities;
- (d) list all data categories and fields, including those required by Section 5.5.1(b) *[General]* of this Schedule, to be tracked including all verification and validation data fields;
- (e) describe the process for acquiring, populating and updating the Requirements Management data including the frequency of such updates;
- (f) describe the method for tracking Changes and any impacts; and
- (g) be based on the preliminary Requirements Management Sub-Plan included in the Proposal Extracts.

6.4.5.2 RAM Sub-Plan

The RAM Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the System-wide RAM requirements of Section 5.6 [*Reliability, Availability, Maintainability (RAM) Program*] of this Schedule;
- (b) include details of the organization, roles and responsibilities for all RAM activities;
- (c) define the RAM tasks, deliverables, milestones and the methodology for establishing, assigning and adjusting RAM targets;
- (d) describe the RAM analyses and testing, feedback and reporting to be used to demonstrate compliance with the RAM targets; and
- (e) be based on the preliminary RAM Sub-Plan included in the Proposal Extracts.

6.4.5.3 Interface Management Sub-Plan

The Interface Management Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 5.7 [*Interface Management*] of this Schedule;
- (b) include details of the organization, roles and responsibilities for all interface management activities;
- (c) describe the process to proactively identify, assign responsibility, co-ordinate, track, resolve and test interface and Integration issues;
- (d) describe any software tools to be used for interface management;
- (e) describe the process for incorporating relevant interface and Integration issues into the other system and safety assurance activities;
- (f) be based on the preliminary Interface Management Sub-Plan included in the Proposal Extracts; and
- (g) include an Interface Register based on the preliminary Interface Register included in the Proposal Extracts.

6.4.5.4 Stray Current Sub-Plan

The Stray Current Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 1-2.4 [*Stray Current*] of Schedule 5 [*D&C Performance Requirements*];
- (b) include details of the organization, roles and responsibilities for all Stray Current control and corrosion control activities;
- (c) describe the management and coordination of Stray Current and corrosion control activities and the protective provisions to be employed to control the effects of Stray Current from the Infrastructure; and

- (d) identify the specific industry standard(s) and best practices that will be applied to the control of Stray Current including:
 - (i) the maximum acceptable Stray Current levels;
 - (ii) the analysis supporting the selection of the Stray Current levels; and
 - (iii) design techniques and protective provisions to be used to minimize and mitigate Stray Current;
- (e) identify all components within and outside of the Lands which are at risk from Stray Current from the Infrastructure, including Utilities, Structures, metallic tanks and vessels, grounding installations, signalling and telecommunication installations, adjacent railways and cathodic protection systems, and the means of protection for each;
- (f) identify the residual Stray Current to which each Transportation Structure will be exposed following implementation of all Stray Current protection measures and the additional design measures to be taken into account in achieving the required Design Service Life;
- (g) include an outline of the surveys, testing and test methods that will be used to verify and validate the protective provisions; and
- (h) be based on the preliminary Stray Current Sub-Plan included in the Proposal Extracts.

6.4.5.5 EMC Control Sub-Plan

The EMC Control Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 1-2.3 [*Electromagnetic Compatibility*] of Schedule 5 [*D&C Performance Requirements*];
- (b) include details of the organization, roles and responsibilities for all EMC activities;
- (c) describe the management and coordination of EMC control and the protective provisions to be employed to ensure that the Infrastructure is electromagnetically compatible with its environment;
- (d) identify the industry standard(s) that will be applied to ensure the EMC of the Infrastructure, including corresponding interference emission and susceptibility levels along with the rationale for their selection;
- (e) describe the techniques to be employed during design to minimize interference coupling;
- (f) describe the method(s) to be employed to identify and record all relevant EMI contributors and EMI receivers and identify the applicable emission and susceptibility targets for each;
- (g) describe the process to be employed for categorization of EMC risks including operational, commercial and safety-related risks;
- (h) describe the process to be employed to mitigate identified EMC risks throughout all phases of Design, Construction, Operation and Maintenance;
- (i) summarize the EMC related testing and test methods that will be performed to verify and validate the EMC of the Infrastructure; and

- (j) be based on the preliminary EMC Control Sub-Plan included in the Proposal Extracts.

6.4.5.6 Vibration Control Sub-Plan

The Vibration Control Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 1-2.1.5 [*Vibration Control*] of Schedule 5 [*D&C Performance Requirements*];
- (b) include details of the organization, roles and responsibilities for all vibration control activities;
- (c) describe the method of verification and validation of the protective provisions to be employed to ensure that the vibration from the Infrastructure does not exceed the levels specified in Section 1-2.1.5 [*Vibration Control*] of Schedule 5 [*D&C Performance Requirements*];
- (d) describe the approach(es) to be applied along the LRT Corridor to mitigate vibration from the Infrastructure, including any special treatments in the vicinity of the Winspear Centre and the Citadel Theatre; and
- (e) be based on the preliminary Vibration Control Sub-Plan included in the Proposal Extracts.

6.4.5.7 Noise Control Sub-Plan

The Noise Control Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 1-2.1.3 [*Noise Control*] of Schedule 5 [*D&C Performance Requirements*];
- (b) include details of the organization, roles and responsibilities for all noise control activities;
- (c) describe the methods of verification and validation of the protective provisions to be employed to ensure the noise from the Infrastructure does not exceed the levels specified in Section 1-2.1.3 [*Noise Control*] of Schedule 5 [*D&C Performance Requirements*]; and
- (d) describe the approach(es) to be applied along the LRT Corridor to mitigate noise from the Infrastructure, including any special treatments in the vicinity of the Winspear Centre and the Citadel Theatre; and
- (e) be based on the preliminary Noise Control Sub-Plan included in the Proposal Extracts.

6.5 Design Certification

6.5.1 General

Each Final Design shall be submitted with the associated Design Certificate(s). Each Work Package may be comprised of more than one Final Design.

Project Co shall issue the applicable Design Certificate(s) in accordance with Section 6.5.2 [*Submission of Design Certificates*] of this Schedule for each Work Package, together with the applicable Final Design(s).

For elements of the Infrastructure that are governed by the Alberta Building Code, the Design Certificates shall be in the forms required by the Alberta Building Code. For all other elements of the Infrastructure,

the Design Certificates shall be in the form attached hereto as Appendix 4A-3 [*Certification for Design and Commitment for Field Review*] of this Schedule, and shall be signed and sealed by the Designer.

6.5.2 Submission of Design Certificates

All Design Certificates together with the supporting documentation, shall be submitted to the City in accordance with Schedule 2 [*Submittal Review Procedure*] with original signatures, seals and registration numbers and in such form as to allow the City to perform its review in respect of such Design Certificate without delay.

6.6 Design Submissions

- (a) All submitted Design Data shall be organized in design folders with indexes and sectional dividers.
- (b) All Design Data shall be prepared under the supervision of the Designer. Prior to submission of any Design Data, the Designer and the relevant Checking Team(s) (where applicable) shall satisfy themselves that the Design Data meets all the Project Requirements and otherwise complies with the requirements of this Agreement.

6.7 Models, Mock-Ups, and Prototypes

- (a) Project Co shall prepare and submit the following models and mock-ups:
 - (i) updated operational analysis and modeling in accordance with Section 7.2.4.j [*Overall Operations Plan*] of Schedule 7 [*O&M Performance Requirements*], within 180 days after the Effective Date, and at any time when the design development materially changes the outcome of the model;
 - (ii) Traction Power modeling in accordance with Section 6-2.3 [*Traction Power – General*] of Schedule 5 [*D&C Performance Requirements*] within 180 days after the Effective Date, and at any time when the design development materially changes the outcome of the model;
 - (iii) simulated CCTV camera views, as part of the comprehensive surveillance study in Section 6-1.12.1.D [*General Surveillance Requirements and Coverage*] of Schedule 5 [*D&C Performance Requirements*], with the Final Design of the LRV interior and each Station and Stop; and
 - (iv) any other models or mock-ups specified in the Project Requirements.
- (b) All physical models and mock-ups shall be constructed at locations acceptable to City acting reasonably.
- (c) At least 20 Business Days prior to the anticipated completion of the Prototype Vehicle, Project Co shall provide written notice to the City setting out:
 - (i) the anticipated completion date of the Prototype Vehicle; and
 - (ii) the location at which the Prototype Vehicle will be made available for inspection by the City.

Within 20 Business Days after completion of the Prototype Vehicle, Project Co shall:

- (iii) make the Prototype Vehicle available to the City for its inspection; and
- (iv) provide the City at least 10 Business Days of unimpeded and uninterrupted access to the completed Prototype Vehicle.

6.8 Interim Design Reviews

- (a) At a minimum, Project Co shall submit Interim Designs for:
 - (i) the Tawatinâ Bridge;
 - (ii) the Quarters Tunnel;
 - (iii) each of the Early Handover Items;
 - (iv) the landscaping in the NSRV;
 - (v) SUI design concepts for the Project, including:
 - (A) Valley Line branding including colours and fonts;
 - (B) LRV designs that illustrate exterior colours including branding and livery;
 - (C) LRV designs that illustrate interior colours and patterns;
 - (D) retaining wall finishes, including textures and colours;
 - (E) Noise Attenuation Wall finishes, including textures and colours;
 - (F) Gerry Wright OMF branding;
 - (G) Wayside Equipment Enclosure wrap designs;
 - (H) Stop and Station furnishings including benches, leaning rails and garbage receptacles;
 - (I) Stop and Station wayfinding, including location, colours and fonts of signs;
 - (J) locations of all Passenger Interface Equipment;
 - (K) accessibility treatments at Stops, Stations, Churchill Connector and LRVs;
 - (L) 102 Avenue Tunnel Approach including Chinese gate design illustrating colours and materials;
 - (M) vehicle arrestors illustrating colours, wraps and other treatments; and
 - (N) street lighting poles; and
 - (vi) the fire hall intersection at 66 St and the fire truck access north of 28 Ave in accordance with Section 6-3.3.2.D [*Traffic Controller*] of Schedule 5 [*D&C Performance Requirements*].
- (b) Interim Design submissions shall be informal and shall not be subject to review under the provisions of Schedule 2 [*Submittal Review Procedure*], rather, such informal Interim Design submissions shall be used to inform the City of the development of the design and to provide

an opportunity for a dialogue on compliance with the Project Requirements before the applicable design is complete.

- (c) The content of each Interim Design submission shall be appropriate to the subject and discipline. The information provided shall be adequate to show that the design is proceeding in compliance with the Project Requirements and is taking into consideration the relevant Construction activities, the SUI requirements, the City Activities, the City Works and the Operations and Maintenance.
- (d) Without limiting Section 6.8(c) [*Interim Design Reviews*] of this Schedule, the Construction Period Joint Committee shall determine the design information to be submitted for review in each Interim Design submission, the schedule of such Interim Design submissions, the number of alternative options to be considered for each review, and the scope of each review.
- (e) Project Co shall organize Interim Design, and other review meetings, with the City's Representative for the purpose of reviewing the applicable Interim Designs and other Design Data in accordance with the Design Management Plan. The meetings shall be convened in the City of Edmonton, unless otherwise agreed.
- (f) Project Co shall prepare minutes of all review meetings, including recording the City's comments, and promptly address the comments to the reasonable satisfaction of the City. Copies of the minutes shall be provided to the City within 5 Business Days following the review meeting.
- (g) Project Co shall develop, implement and manage a comment workflow for all Interim Design submissions and other design meetings to capture and provide responses to all informal comments collected.
- (h) The minutes of such meetings, including any City comments included or addressed therein, shall not constitute Changes or Innovation Proposals.

6.9 Independent Checking

- (a) Concurrent with submission of the Design Management Plan, Project Co shall submit a proposal as to the individuals and organizations to serve as the Checking Team, including resumes for each proposed team member, and the proposed terms and conditions of their retainer. The Checking Team shall:
 - (i) be appointed for the sole purpose of performing independent detailed checks of the design;
 - (ii) report directly to Project Co;
 - (iii) be from an organization(s) which is not otherwise affiliated with Project Co or any Project Co Person;
 - (iv) be individuals who are registered or qualified to be registered as professional engineers in their home jurisdiction; and

- (v) provide demonstrable expertise in the following disciplines:
 - (A) geotechnical;
 - (B) structural;
 - (C) finite element analysis on LRV crash-worthiness;
 - (D) tunneling; and
 - (E) track; and
 - (vi) in the case of the IV&V Team, meet the requirements of Section 5.2 [*Independent Verification and Validation*] of this Schedule.
- (b) Project Co shall ensure that the independence of the Checking Team from the Design Team, Project Co and the Design-Builder is maintained at all times. The methods of analysis employed by the Design Team and the Checking Team need not be the same; however, they may consult each other to ensure that the results they are obtaining are directly comparable.
- (c) Project Co shall cause the Checking Team to perform an independent detailed check of the Design Data relating to each Project element listed in Section 6.9(d) [*Independent Checking*] of this Schedule (including calculations, assessments and Design Drawings), and be responsible for:
- (i) conducting design checks to ensure that the design of each element meets the performance requirements set out in this Agreement and that such design is carried out according to Good Industry Practice;
 - (ii) undertaking supplementary analyses to independently verify and confirm the design methodologies and assumptions used;
 - (iii) identifying Deficiencies, Early Handover Deficiencies and other Nonconformities in the design and analyses, and notifying Project Co and the City of unresolved Deficiencies, Early Handover Deficiencies and other Nonconformities; and
 - (iv) preparing and issuing reports and Checking Team Design Certificates.
- (d) Project Co shall cause the Checking Team to independently check the Design Data of the following Project elements:
- (i) geotechnical analysis of slope stability and geotechnical design of slope stabilization for both temporary and permanent works in the NSRV, including the north bank of the NSRV and along Connors Road;
 - (ii) derailment protection measures on Transportation Structures;
 - (iii) geotechnical and structural design of the Tawatinâ Bridge;
 - (iv) structural design of the Kâhasinîskâk Bridge;
 - (v) geotechnical and structural design of the Quarters Tunnel; and
 - (vi) crashworthiness of the LRVs.

- (e) The Design Team and the Checking Team shall each satisfy themselves as to the applicability and accuracy of all computer programs used and shall ensure the validity of the program for each application, and each shall also be responsible for their own interpretation.
- (f) For each applicable Final Design, Project Co shall cause the pertinent Checking Team member(s) to provide a sealed report and a Checking Team Design Certificate in the form attached hereto Appendix 4A-6 [*Checking Team Design Certificate*] of this Schedule, indicating the results of the independent check.
- (g) In addition to the checking procedures required above, Project Co shall ensure that all checking procedures required by APEGA are completed. Documentation of such compliance shall be included in the applicable Final Design submissions.

6.10 Final Designs

Final Designs, including Design Data from all design disciplines, for each Work Package shall be submitted to the City in accordance with Schedule 2 [*Submittal Review Procedure*] and each Final Design shall, at a minimum:

- (a) include Design Certificates and all pertinent Design Data, including Design Drawings and copies of all Project Approvals and design reports, sufficient to demonstrate conformance with the Project Requirements;
- (b) include all information as listed in Appendix 4B [Project Specific Submission Requirements] of this Schedule, to the extent applicable to the Work Package;
- (c) include all applicable Design Data, signed and sealed in accordance with Applicable Law, and the policies and requirements of applicable Governmental Authorities and regulatory agencies, including APEGA, ASET, AAA, and AALA;
- (d) be comprised of designs that are Integrated appropriately, without conflicts, and presented in a consistent format;
- (e) include Design Drawings that are complete, legible, scalable, accurate and provided in the formats and quantities described in Section 2.2.2(d) [*Drawing Submissions*] of Appendix 4C [*Project Drawing Standards*] of this Schedule. Any revisions to previously submitted Design Drawings shall also be complete, legible, scalable, accurate and provided in the formats and quantities described in Section 2.2.2(e) [*Drawing Submissions*] of Appendix 4C [*Project Drawing Standards*] of this Schedule;
- (f) include all pertinent data from the system and safety assurance activities, the pertinent information recorded pursuant to the Requirements Management protocol and an Interface Register extract, for the applicable Final Design to demonstrate that the Final Design conforms to the Project Requirements and is Integrated with the other project disciplines;
- (g) include all applicable Road Safety Audit Certificates, in the form attached hereto as Appendix 4A-1 [*Road Safety Audit Certificate*] of this Schedule, signed and sealed by the Independent Road Safety Auditor and the Designer;

- (h) include all models, mock-ups and studies applicable to the relevant Final Design, or otherwise required to demonstrate compliance with the applicable Project Requirements;
- (i) include all plans and procedures applicable to implementation of the relevant Final Design;
- (j) demonstrate, through comprehensive geotechnical and structural analyses and designs, that the performance requirements and tolerances of the relevant Infrastructure, and each component thereof, shall be met over the applicable Design Service Life;
- (k) detail how the Operations and Maintenance considerations have been incorporated into the applicable Final Design;
- (l) detail how SUI treatments and considerations have been incorporated into the applicable Final Design;
- (m) detail how any comments of the City from, and issues identified during, any Interim Design reviews, and any other comments and issues resulting from internal design reviews, quality control procedures and Checking Team reviews have been addressed in the design;
- (n) include a complete register of all Project Intellectual Property, including Third Party Intellectual Property, Third Party Licensed Software and Third Party Embedded Software, incorporated, embedded or otherwise included in or with, or required for the use of, the applicable Final Design, and copies of all agreements (including confirmatory agreements) regarding the Project Intellectual Property and related Intellectual Property Rights required under this Agreement or otherwise requested by the City, including transfers or assignments to the City of Project Co's rights and licenses to use Project Intellectual Property and related Intellectual Property Rights;
- (o) contain all pertinent correspondence, arranged by subject matter in chronological order; and
- (p) include a neat, bound and indexed set of applicable design calculations initialled by the responsible engineer, who shall be a duly experienced Professional Engineer of the appropriate discipline.

6.11 Objection to Final Design

If the City objects to a Final Design package, including any of the Design Data, in accordance with Schedule 2 *[Submittal Review Procedure]*, the City shall notify Project Co and Project Co shall then:

- (a) make any alterations and additions as necessary so that the Final Design is in accordance with the Project Requirements and all other requirements of this Agreement, all in accordance with Schedule 2 *[Submittal Review Procedure]*;
- (b) subject to the other provisions of this Agreement, submit an Innovation Proposal, or
- (c) dispute the objection by the City in accordance with Schedule 2 *[Submittal Review Procedure]*.

6.12 Adherence to Final Design

Final Designs, including all Design Data, which have been the subject of a Design Certificate that has been submitted to the City in accordance with the Design and Certification Procedure shall not be departed from unless Project Co:

- (a) first revises and resubmits the applicable Final Design, together with:
 - (i) all applicable revised Design Data;
 - (ii) a revised Design Certificate(s); and
 - (iii) all other information required to be submitted with a Final Design pursuant to Section 6.10 [*Final Designs*] of this Schedule,to the City in accordance with Schedule 2 [*Submittal Review Procedure*]; or
- (b) requests that the City consider a field initiated change to the Final Design as a result of unforeseen construction conditions, or emergent circumstances beyond Project Co's control. The City may accept or reject a request pursuant to this Section 6.12(b) [*Adherence to Final Design*] in its discretion, and if a request is accepted the City may impose such conditions as it considers appropriate in the circumstances.

6.12.2 No Construction

Project Co shall not commence or permit the commencement of Construction (including any Temporary Works) or any other construction activities, on any Work Package, unless and until:

- (a) Project Co has satisfied all applicable conditions precedent, as set out in this Agreement, including Schedule 10 [*Environmental Performance Requirements*];
- (b) all Final Designs, including all Design Data and relevant Certificates, required in respect of the relevant Work Package, have been submitted to, and accepted by, the City in accordance with Schedule 2 [*Submittal Review Procedure*]; and
- (c) Project Co has obtained all necessary Project Approvals and fulfilled any other applicable requirements in respect of the relevant Work Package.

6.13 Designer Review during Construction

During Construction, Project Co shall ensure that the Appropriate Person(s), in accordance with the procedures set out in the Design Management Plan, the relevant Quality Documentation and other Project Requirements, examines the Construction and satisfies themselves that the Infrastructure and every part thereof, has been designed, fabricated, constructed, completed, commissioned, tested and maintained in all respects so as to accord with:

- (a) the Design Data in respect of which accepted Design Certificates have been issued; and
- (b) all applicable Project Requirements,

and otherwise to comply in all respects with the requirements of this Agreement.

6.14 Temporary Works

- (a) As a minimum, Final Designs shall be provided for the following Temporary Works:
 - (i) all items intended for public use or potentially affecting public safety;
 - (ii) all Temporary Works related to the stabilization of the north bank of the NSRV and along Connors Road; and
 - (iii) all Temporary Works within the boundaries of Bylaw 7188.
- (b) Final Designs for the Temporary Works shall be submitted to the City in accordance with Schedule 2 *[Submittal Review Procedure]*:
- (c) Without limiting Section 6.9 *[Independent Checking]* of this Schedule, all Design Data relating to any Temporary Works requires an independent check by an the Appropriate Person.
- (d) In performing a check referred to in Section 6.14(c) *[Temporary Works]* of this Schedule, the Appropriate Person shall be satisfied that:
 - (i) the Design Data meets the Project Requirements and otherwise complies with the requirements of this Agreement;
 - (ii) the Temporary Works (as a whole, and the constituent parts) are satisfactory for the safe and proper discharge of Project Co's relevant obligations; and
 - (iii) the Design Data complies with all Applicable Law and the requirements of the relevant Governmental Authorities.

7. CONSTRUCTION

7.1 Construction Management Plan

7.1.1 General

Within 60 days after the Effective Date, Project Co shall prepare and submit a construction management plan, (the "**Construction Management Plan**"), which shall:

- (a) include an organizational chart identifying the entities responsible for performance of each major construction activity;
- (b) include construction staging and site plans, including the anticipated dates for Commencement of Disruptive Activities and End of Active Reclamation for each NSRV Segment;
- (c) include procedures for ensuring coordination of all construction performed by Subcontractors, including manufacturers of materials, plant or equipment;
- (d) include procedures to regularly inform the Communications Manager to ensure that the requirements and activities of the Design & Construction Communications and Public Involvement Plan can be executed;

- (e) describe the QC/QA checks and field review process that will be implemented to ensure compliance of the constructed Infrastructure with the applicable Design Data, including any planned use of Field Review Engineers;
- (f) describe the procedures for accurately redlining on-site, issued for construction, Design Drawings and how revisions to the issued for construction Designs Drawings will be managed;
- (g) describe how lessons learned from similar projects will be implemented;
- (h) include procedures for identifying and correcting Deficiencies, Early Handover Deficiencies and other Nonconformities;
- (i) include the following construction sub-plans, each as further described in Section 7.2 [*Construction Management Sub-Plans*] of this Schedule:
 - (i) Construction Noise Control Sub-Plan; and
 - (ii) Construction Vibration Control Sub-Plan;
- (j) describe the approach to managing the construction constraints described in Section 1-3.1 [*Construction Constraints*] of Schedule 5 [*D&C Performance Requirements*]; and
- (k) be based on the preliminary Construction Management Plan included in the Proposal Extracts.

7.1.2 Updates to the Construction Management Plan

Prior to implementation of any amendments or updates to the Construction Management Plan, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 [*Submittal Review Procedure*].

7.1.3 Compliance with the Construction Management Plan

Throughout the Construction Period, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the Construction Management Plan, and any amendments or updates, which have been accepted by the City.

7.2 Construction Management Sub-Plans

7.2.1 Construction Noise Control Sub-Plan

The Construction Noise Control Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 1-3.6 [*Construction Noise*] of Schedule 5 [*D&C Performance Requirements*];
- (b) describe the strategy to minimize Construction noise;
- (c) describe the truck routes to be used for each Site;
- (d) describe the truck movement restrictions within each Site, including limits on speed and reverse manoeuvres with back-up alarms;

- (e) identify any special mitigation measures to be employed at noise-sensitive locations, including the Winspear Centre and Citadel Theatre, and in the vicinity of festivals/events; and
- (f) be consistent with the preliminary Construction Noise Control Sub-Plan included in the Proposal Extracts.

7.2.2 Construction Vibration Control Sub-Plan

The Construction Vibration Control Sub-Plan shall:

- (a) describe the processes and procedures required to satisfy the requirements of Section 1-3.7 [*Construction Vibration Control*] of Schedule 5 [*D&C Performance Requirements*];
- (b) describe the strategy to minimize vibration impacts;
- (c) list all vibration-generating equipment and processes to be employed in the Construction;
- (d) identify any special mitigation measures to be employed to mitigate vibration impacts at the Winspear Centre and Citadel Theatre, and in the vicinity of festivals/events;
- (e) identify minimum separation distances between operating vibration-generating equipment and buildings; and
- (f) be consistent with the preliminary Construction Vibration Control Sub-Plan included in the Proposal Extracts.

7.3 Skilled Workers

Project Co shall employ or cause the Design-Builder to employ a sufficient number of appropriately qualified and skilled workers to perform the Construction in compliance with this Agreement.

7.4 Control of the Construction

Project Co shall have total control of the Construction and shall effectively direct and supervise the Construction so that it is undertaken in compliance with the terms of this Agreement. Project Co shall be responsible for all construction means, methods, techniques, sequences and procedures with respect to the Construction and for coordinating the various elements of the Construction, and nothing in this Agreement (including this Schedule) shall be interpreted as giving any responsibility for the above to the City, the City's Representative or any other representative or agent of the City, or to the Independent Certifier.

7.5 Construction Drawings

- (a) Project Co shall have all issued for construction Design Drawings on-site and available for review throughout the Construction Period.
- (b) All on-site issued for construction Design Drawings shall be redlined, as required to confirm As Built information, such that the actual state of construction is accurately reflected on the on-site issued for construction Design Drawings at all times.

- (c) Upon completion of the construction, and prior to issuance of the Completion Certificate for the applicable Work Package, the original copy of each final redlined issued for construction Design Drawing shall be returned to the Designer for creation of the final Record Drawing.
- (d) Copies of each final redlined issued for construction Design Drawing shall be submitted to the City in accordance with Schedule 2 [*Submittal Review Procedure*], and retained as an As Built copy until superseded by the associated Record Drawing.

7.6 Emergency Measures

Project Co shall, for purposes of managing emergency and crisis incidents during Construction:

- (a) develop a crisis communications and issues management protocol between the City, Project Co and Emergency Services in accordance with Section 2.4 [*Crisis Communications*] of Schedule 12 [*Public Communications and Public Engagement*]. The crisis communications and issues management protocol shall be consistent, and integrated, with the Emergency Response Plan;
- (b) develop and communicate procedures for on-site fire response, including contact information for local fire and other Emergency Services, to all site personnel;
- (c) provide a 24-hour hotline, advertised for emergency use only, (and post the phone number in prominent locations at each Site) for notification of Construction related emergencies;
- (d) provide a community liaison officer to act as a single point of contact with Project Co regarding construction and development issues. The community liaison officer will also support the City's lead role in addressing all Crisis Communications in accordance with Section 2.4 [*Crisis Communications*] of Schedule 12 [*Public Consultation and Public Engagement*];
- (e) maintain and provide access to all properties on, and adjacent to the Lands, including maintenance of all overhead clearances for use by emergency response vehicles; and
- (f) co-ordinate the development and implementation of emergency evacuation and response plans with the City to accommodate festivals and events, including any set-up and tear-down periods as described in Section 1-3.1.2 [*Festivals & Events*] of Schedule 5 [*D&C Performance Requirements*].

7.7 City's Access to Lands

- (a) Without limiting, and in addition to, the access rights described elsewhere in this Agreement, Project Co shall ensure that the City and its delegates, subject to complying with all reasonable safety procedures, including any relevant health and safety plans for the carrying out of the Construction and Project Co's and/or the Design Builder's reasonable site rules, have access to:
 - (i) attend the Lands and view and observe the Construction at any time throughout the Construction Period;
 - (ii) attend and observe all aspects of the Commissioning Work;

- (iii) attend the Lands to perform City Works in accordance with Section 1-1.3 [*City Works*] of Schedule 5 [*D&C Performance Requirements*];
 - (iv) perform independent inspections/tests as described in Section 7.2 [*City Audits*] of Schedule 9 [*Quality Management*]; and
 - (v) during normal working hours, visit any site or workshop where materials, plant or equipment are being manufactured, prepared or stored for use in the Construction, for the purposes of general inspection and of attending any test, investigation or Commissioning Work being carried out in respect of the Design or Construction.
- (b) The City and its delegates shall have the right to attend all monthly progress meetings and site meetings, including meetings between Project Co and the Design Builder or its Subcontractors and Project Co shall provide reasonable advance notice of the time and location of all such meetings to the City.
 - (c) Project Co shall cooperate with the City to arrange for tours of the Lands at reasonable times during the Construction Period for interested persons, in a way that does not unreasonably interfere with the progress of the Construction.

7.8 Inspection

Prior to the Service Commencement Date, Project Co shall, upon request by the City, including detailed reasons for the request, open up for inspection by the City or its delegates any part of the Infrastructure which the City, acting reasonably, believes is defective and:

- (a) if the parties agree, or if it is determined in accordance with the Dispute Resolution Procedure that there are no Deficiencies, Early Handover Deficiencies or other Nonconformities in the relevant part of the Infrastructure, and Project Co complied with the requirements of Section 7.7 [*City's Access to Lands*] of this Schedule and Section 8 [*Permitted Access*] of Schedule 15 [*Independent Certifier*], then the exercise of such rights shall be treated as a Relief Event and be subject to Section 13 [*Relief Events*] of the Agreement;
- (b) if the parties agree, or if it is determined in accordance with the Dispute Resolution Procedure, that any relevant part of the Infrastructure contains Deficiencies, Early Handover Deficiencies or other Nonconformities, then:
 - (i) Project Co shall rectify and make good such Deficiencies, Early Handover Deficiencies or other Nonconformities;
 - (ii) any consequence of such rectification or making good Deficiencies, Early Handover Deficiencies or other Nonconformities shall be carried out by Project Co at no cost to the City; and
 - (iii) Project Co shall not be entitled to any extension of time to the Construction Schedule in relation to such rectification and making good of such Deficiencies, Early Handover Deficiencies or other Nonconformities; and

- (c) if the parties are unable to reach agreement in accordance with Sections 7.8(a) or 7.8(b) *[Inspection]* above, then the matter shall, at the request of either party, be referred to the Dispute Resolution Procedure. If, in order to maintain compliance with the Construction Schedule, it is necessary to proceed in respect of the matter in Dispute, the parties shall proceed in accordance with the position of the City, provided that Project Co proceeding in accordance with the City's position shall be a Relief Event if the relevant matter in Dispute is determined in favour of Project Co.

7.9 City Project Meetings

At the City's request, Project Co's Representative shall attend meetings to update the City on the progress of the Design and Construction and to discuss any issues that have arisen. These meetings shall not be held more frequently than weekly unless mutually agreed otherwise.

8. OPERATING CONCEPT PLAN

- (a) Within 30 days after the Effective Date, Project Co shall, in consultation with the Design-Builder and the Service Provider, prepare and submit an operating concept plan, (the "**Operating Concept Plan**"), which shall include:
 - (i) predicted Travel Times;
 - (ii) preliminary time tables for Passenger Service;
 - (iii) daily Passenger Service start-up and shut-down strategies;
 - (iv) preliminary details of the Maximum Operating Speed for each section of Track;
 - (v) an outline of an Incident Management and Service Recovery Plan, meeting the requirements of Section 7.2.3 *[Incident Management and Service Recovery Plan Submittal]* of Schedule 7 *[O&M Performance Requirements]*;
 - (vi) an outline of the Operating Rule Book, meeting the requirements of Section 6.4 *[System Safety Program Requirements]* of Schedule 7 *[O&M Performance Requirements]*;
 - (vii) an outline of the Standard Operating Procedures, meeting the requirements of Section 6.4 *[System Safety Program Requirements]* of Schedule 7 *[O&M Performance Requirements]*; and
 - (viii) preliminary results of an operational analysis and model demonstrating that items (i) to (v) are in compliance with the Project Requirements.
- (b) Project Co shall review the Operating Concept Plan at regular intervals throughout the design development process to ensure Integration of the design with the Operating Concept Plan, in accordance with the Integrated Project Management Plan.
- (c) Project Co shall update the Operating Concept Plan regularly during the design development process to ensure that the Operating Concept Plan and the design at all times remain compliant with the Project Requirements.

9. ASSET TAGGING AND REGISTER

9.1 Asset Tagging

- (a) Project Co shall, in consultation with the City, supply and affix asset identification tags to all Equipment, including all components thereof, to the level of line replaceable units, including:
- (i) On-track Vehicles;
 - (ii) Structures;
 - (iii) OCS poles;
 - (iv) transformers;
 - (v) Power Operated Switch Machines;
 - (vi) hand throw switches;
 - (vii) switch blowers;
 - (viii) Switch Position Indicators;
 - (ix) Relays;
 - (x) street lights;
 - (xi) CCTV cameras;
 - (xii) Road Traffic Signal poles, cantilevers and luminaires;
 - (xiii) LRT Traffic Signal fixtures;
 - (xiv) Block Signals;
 - (xv) Traffic Controller cabinets;
 - (xvi) Utility Complexes;
 - (xvii) Data Centres; and
 - (xviii) tunnel ventilation fans.
- (b) Each asset identification tag shall include a unique numerical identifier.

9.2 Asset Register

Within 120 days after the Effective Date, Project Co shall create, maintain, update and share with the City, an asset register of all items required to be tagged with an asset identification tag pursuant to Section 9.1 [*Asset Tagging*] of this Schedule (the "**Asset Register**"). The Asset Register shall be consistent with the City's Asset Classification and Numbering System, and be incorporated into the Overall Maintenance Strategy and the Five Year Maintenance Plan and, for each item included in the Asset Register, Project Co shall, as applicable, record, or provide a remotely accessible link to, the following information:

- (a) unique numerical identifier;

- (b) make, model and device type, where applicable;
- (c) asset tag number;
- (d) serial number, where applicable;
- (e) executive software name, version, date installed, and checksum, where applicable;
- (f) application software name, version, date installed, and checksum, where applicable;
- (g) purchase order or equipment purchase contract identifier;
- (h) equipment supplier and contact information for the equipment supplier;
- (i) installed location;
- (j) date installed;
- (k) inspection and Maintenance activity details in accordance with Section 3.1.2 *[Asset Tagging and Register]* of Schedule 7 *[O&M Performance Requirements]*;
- (l) anticipated replacement date or timeframe;
- (m) manufacturer warranty start date and expiry date, where applicable;
- (n) required Utility or other connections;
- (o) applicable drawings;
- (p) operation and maintenance manual(s) , where applicable;
- (q) complete quantitative and baseline performance data, including applicable Commissioning data; and
- (r) any other information that may be agreed upon by the City and Project Co.

10. COMMISSIONING

10.1 Commissioning Manager

- (a) Project Co shall retain a qualified Commissioning manager (the “**Commissioning Manager**”) at least 24 months prior to the Target Service Commencement Date who shall:
 - (i) have a minimum of 10 years of demonstrable experience in commissioning of light rail transit systems;
 - (ii) be registered or qualified to be registered as a professional engineer in his/her home jurisdiction;
 - (iii) is acceptable to the City, acting reasonably; and
 - (iv) be responsible for planning, implementation, management and oversight of all Commissioning Work and for preparation of all Commissioning documentation, records and Integration testing.
- (b) Project Co shall cause the Commissioning Manager to:

- (i) conduct and complete all tests and inspections, including all pre-commissioning and Commissioning Work, required by this Agreement and Good Industry Practice; and
- (ii) prepare and submit to the City and the Independent Certifier all Commissioning Certificates and copies of the applicable documentation, records and reports required to:
 - (A) demonstrate to the Independent Certifier, the City and all applicable Governmental Authorities, that all applicable equipment, components, systems and sub-systems, and the fully Integrated System comply with the Project Requirements;
 - (B) establish a baseline for comparing performance, determining deterioration over the applicable Design Service Life and assessing the sufficiency and performance of the Overall Maintenance Strategy and each Five Year Maintenance Plan;
 - (C) demonstrate that the System is ready for, and has met all of the conditions precedent for, Service Commencement;
 - (D) validate the technical performance of individual equipment, components, systems and sub-systems;
 - (E) demonstrate Integration of the individual equipment, components, systems and sub-systems into the System;
 - (F) demonstrate that all Commissioning test equipment has been properly calibrated and that such calibration is documented and traceable to the applicable standards;
 - (G) validate the safety and security of the Infrastructure in accordance with the Safety and Security Certification Program;
 - (H) confirm the System meets the RAM targets set out in the RAM Sub-Plan;
 - (I) demonstrate that the Infrastructure is electromagnetically compatible with its environment and achieves emission and susceptibility targets set out in the EMC Control Sub-Plan;
 - (J) demonstrate that the Stray Current emissions from the Infrastructure are compliant with the levels set out in the Stray Current Sub-Plan;
 - (K) demonstrate that noise levels do not exceed the levels set out in the Noise Control Sub-Plan; and
 - (L) demonstrate that vibration levels do not exceed the levels set out in the Vibration Control Sub-Plan.

10.2 Commissioning Sub-Committee

- (a) Not less than 9 months prior to the first scheduled activity of the Commissioning Work, the City and Project Co shall establish, and maintain until the Service Commencement Date, a

joint liaison committee (the “**Commissioning Sub-Committee**”) consisting of the Commissioning Manager, Project Co’s Representative, the City’s Representative, and such other members as the parties may agree from time to time.

- (b) The Commissioning Sub-Committee shall be a sub-committee of the Construction Period Joint Committee and is intended to provide a formal forum for the parties to consult and cooperate in all matters relating to Commissioning, including discussion, clarification, planning and coordination of the Commissioning Work.
- (c) The Commissioning Sub-Committee shall meet at least once every 4 weeks and more frequently from time to time as necessary. If any member of the Commissioning Sub-Committee requests an additional meeting, the parties shall act reasonably in accommodating this request. Meetings of the Commissioning Sub-Committee shall be convened on not less than 2 Business Days’ notice (which notice shall also identify the agenda items to be discussed at the meeting and include the, then current, Commissioning Schedule), provided that in the case of urgency a meeting may be called at any time on such notice as may be reasonable in the circumstances. The Commissioning Sub-Committee shall be chaired by the Commissioning Manager unless the City requires that a representative of the City chair the Commissioning Sub-Committee.
- (d) Project Co shall keep minutes of all recommendations, action items and meetings of the Commissioning Sub-Committee and circulate such minutes to the City within 5 Business Days of the making of the recommendation, identification of the action item or the holding of the meeting. Meeting minutes shall clearly identify all agreed upon items

10.3 Minimum Commissioning Requirements

- (a) For the purpose of this Schedule 4 [*Design and Construction Protocols*] successful completion of a Commissioning step, inspection or test shall mean that the step, inspection or test has demonstrated compliance of the System, or portion thereof, with the applicable Project Requirements.
- (b) Project Co shall ensure that:
 - (i) all testing equipment used for taking or recording Commissioning data is properly calibrated and that such calibration is documented and traceable to the applicable standards;
 - (ii) all test results are signed and dated by the tester and the Commissioning Manager;
 - (iii) where a Nonconformity or Deficiency is discovered, it is promptly rectified, and all affected equipment, components, systems and sub-systems are re-tested until they meet the applicable Project Requirements;
 - (iv) where a Nonconformity, or potential Nonconformity, is discovered during Commissioning, the applicable Nonconformity, or potential Nonconformity, is investigated and the source or cause of the Nonconformity, or potential Nonconformity, is determined and rectified prior to proceeding with further Commissioning of the affected equipment, components, systems or sub-systems;

- (v) testing of systems and sub-systems encompasses:
 - (A) device and operational testing of the individual systems and sub-systems, including their components; and
 - (B) end-to-end testing, confirming all integrated systems and sub-systems operate in accordance with the applicable Project Requirements;
- (vi) subject to complying with all reasonable safety procedures, including any relevant health and safety plans for the carrying out of the Commissioning Work and Project Co's and/or the Design-Builder's reasonable site rules, the City's Representative, designated City Persons and the Independent Certifier, and their delegates, have access to all Infrastructure throughout the Commissioning;
- (vii) the Independent Certifier, the City's Representative, designated City Persons and their delegates receive reasonable advance notice of, and have full access to attend, all testing, inspection and Commissioning of all parts of the System, including individual pieces of equipment, components, systems and sub-systems;
- (viii) copies of all inspection and test procedures, test results, technical documentation and other data and photographs recorded or observed by Project Co or any Project Co Person are submitted to the Independent Certifier and to the City upon request; and
- (ix) to the greatest extent practicable, all test data is recorded electronically. Where electronic recording of test data is impracticable, such test data shall be recorded manually and tabulated in a neat, consistent and methodical manner, and Project Co shall manually enter such data into a digital platform.

10.4 Commissioning Plan

10.4.1 General

- (a) Not less than 18 months prior to the Target Service Commencement Date, Project Co shall prepare and submit to the City and to the Independent Certifier a detailed plan setting out the commissioning activities, requirements and applicable acceptance criteria, training and other activities Project Co intends to carry out to fully commission the System and to satisfy the requirements of this Section 10 [*Commissioning*], (the "**Commissioning Plan**"), The Commissioning Plan shall:
 - (i) be prepared by, or under the direction of, the Commissioning Manager;
 - (ii) include an initial Commissioning Register to be used for monitoring the Commissioning Work;
 - (iii) include a short description of all equipment, components, systems, sub-systems and processes to be inspected, tested or demonstrated as part of the Commissioning Work;
 - (iv) include a detailed list of the Commissioning deliverables to be submitted;

- (v) include a description and diagram illustrating the structure and sequence of the Commissioning Work;
- (vi) describe the process for demonstrating compliance with the RAM Program, the System Safety Program and the Safety and Security Certification Program and the other Project Requirements;
- (vii) include the organization and responsibilities of each member of Project Co's Commissioning team, including the involvement of the Service Provider, Appropriate Person(s) and the IV&V Team;
- (viii) provide a description of the procedures and Commissioning rules to be implemented to manage hazards during Commissioning arising from Train movements, energized Traction Power and active Track switches, adjacent and crossing vehicular traffic, pedestrians, and other members of the public;
- (ix) include a description of Project Co's system for managing Commissioning documentation and records of tests, inspections, quality assurance and training, to demonstrate how the requirements of Section 10.3 *[Minimum Commissioning Requirements]* of this Schedule will be satisfied;
- (x) include an initial high level schedule for performance of the Commissioning Work, which schedule shall be consistent with the Project Milestones and then current Construction Schedule. The high level schedule shall identify:
 - (A) the timing and location of all Commissioning Work, including all testing, inspection, and training activities;
 - (B) a narrative describing all locations and Grade Crossings impacted by each Commissioning Work activity, including details of the protective measures for vehicular traffic, pedestrians and cyclists to be employed during the performance of the applicable Commissioning Work; and
 - (C) for each condition precedent for Service Commencement, the date upon which Project Co anticipates completing the relevant Commissioning Work; and
- (xi) include a list of the Test Procedures for conducting the Commissioning Work.

10.4.2 Updates to the Commissioning Plan

Prior to implementation of any amendments or updates to the Commissioning Plan, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 *[Submittal Review Procedure]*.

10.4.3 Compliance with the Commissioning Plan

Project Co shall implement and comply, and ensure that all Project Co Persons engaged in the Commissioning Work comply, with the accepted Commissioning Plan, and any subsequent amendments or updates to the Commissioning Plan which have been accepted by the City.

10.5 Commissioning Schedule

- (a) At least 10 Business Days prior to the commencement of Commissioning Work, Project Co shall prepare and submit a detailed schedule for the applicable Commissioning Work, (each, a “**Commissioning Schedule**”). Each Commissioning Schedule shall:
 - (i) update the high level schedule included in the Commissioning Plan to provide details of the applicable Commissioning Work to be performed and the timing of all applicable Commissioning Work, including all testing, inspection, and training activities;
 - (ii) be consistent with the Project Milestones and the then current Construction Schedule; and
 - (iii) be safe, reasonable, practicable and in accordance with Good Industry Practice.
- (b) Project Co shall be responsible for the coordination and scheduling of all Commissioning Work and shall perform all Commissioning Work in accordance with the applicable accepted Commissioning Schedule.

10.6 Commissioning Constraints

- (a) All Commissioning Work activities that:
 - (i) are not intended to test and demonstrate Operation during Peak Periods; and
 - (ii) have the potential to disrupt adjacent or crossing vehicular traffic,shall be performed during Off Peak Periods.
- (b) All Commissioning Work activities shall comply with the Operating Rule Book and Standard Operating Procedures.
- (c) Project Co shall coordinate all Commissioning Work activities with the City’s commissioning activities described in Section 10.7 [*City Works Commissioning*] of this Schedule.

10.7 City Works Commissioning

The City shall provide at least 10 days written notice to Project Co in advance of performing any commissioning activities related to the City Works identified in Section 1-1.3 [*City Works*] of Schedule 5 [*D&C Performance Requirements*].

10.8 Commissioning Documents

10.8.1 Commissioning Register

- (a) Not less than 30 days before the first scheduled activity of the Commissioning Work, Project Co shall prepare and submit a register identifying and listing all activities to be performed as part of the Commissioning Work, (the “**Commissioning Register**”). The Commissioning Register shall include data fields to:
 - (i) record the Test Procedure document number and version to be used to perform each activity;

- (ii) record the Test Report document number to be used to record each activity;
- (iii) record the actual date(s) of each activity;
- (iv) record the pass/fail status of each activity;
- (v) specify the sample rate or test frequency for each activity;
- (vi) identify the Project Co Person responsible for performing each activity;
- (vii) identify the Project Co Person responsible for witnessing each activity; and
- (viii) identify the reference or document number of the standard, inspection checklist or procedure that shall be used to conduct each activity.

10.8.2 Test Procedures

- (a) Not less than 30 days before the scheduled date of the associated Commissioning Work activity, Project Co shall prepare and submit detailed inspection and test procedures for the relevant Commissioning Work activity, (the "**Test Procedures**"). Each set of Test Procedures shall:
 - (i) be assigned a unique document number that corresponds with the reference or document number identified for the corresponding activity in the Commissioning Register;
 - (ii) describe the purpose of the document and how the test or inspection activity shall be performed;
 - (iii) uniquely identify the equipment, component, system or sub-system undergoing the inspection or test;
 - (iv) include a description and diagram of the test configuration set-up, including test equipment connections and test points;
 - (v) include enumerated, step by step, instructions for performing the inspections or tests, along with pass/fail criteria and provision to record the results;
 - (vi) provide Requirements Management traceability of the Project Requirements applicable to the inspection or test; and
 - (vii) include detailed procedures and Commissioning rules to manage hazards during Commissioning as further described in Section 10.4.1(a)(viii) [*General*] of this Schedule.
- (b) Without limiting Section 10.8.2(a) [*Test Procedures*] of this Schedule, the Test Procedures for each of the following elements shall include the tests specified in this Section 10.8.2(b):
 - (i) LRV Test Procedures shall be in accordance with Good Industry Practice, and include:
 - (A) LRV commissioning type tests (static and dynamic);
 - (B) LRV commissioning routine tests (static and dynamic); and
 - (C) LRV system Integration tests (static and dynamic); and

- (ii) Test Procedures for equipment described in Part 6 *[Systems]* of Schedule 5 *[D&C Performance Requirements]*, shall be in accordance with Good Industry Practice, and include:
 - (A) equipment and sub-system functional tests;
 - (B) system functional tests; and
 - (C) system Integration tests; and
- (iii) Test Procedures for equipment described in Part 5 *[Facilities]* of Schedule 5 *[D&C Performance Requirements]*, shall be in accordance with Good Industry Practice, and include:
 - (A) equipment and sub-system functional tests;
 - (B) system functional tests; and
 - (C) system Integration tests; and
- (iv) Test Procedures for Traffic Signal Equipment shall be in accordance with Good Industry Practice, and include:
 - (A) equipment and sub-system functional tests; and
 - (B) checklist items contained in the Traffic Signal Commissioning Report, a copy of which is included in the Disclosed Data; and
- (v) Test Procedures for the SUP of the Tawatinâ Bridge shall include dynamic performance tests as set out in Section 4-3.4.8 *[Dynamic Behaviour]* of Schedule 5 *[D&C Performance Requirements]*; and
- (vi) Test Procedures for the Kâhasinîskâk Pedestrian Bridge shall include dynamic performance tests as set out in Section 4-3.7.4 *[Dynamic Behaviour]* of Schedule 5 *[D&C Performance Requirements]*.

10.8.3 Test Reports

- (a) Project Co shall prepare and submit a test report for each activity listed in the Commissioning Register (each, a “**Test Report**”), no more than 28 days after the associated activity has been performed. Each Test Report shall:
 - (i) document the results for the applicable activity listed in the Commissioning Register;
 - (ii) be assigned a unique document number that matches the reference or document number identified for the corresponding activity in the Commissioning Register;
 - (iii) contain a reference to the corresponding Test Procedure;
 - (iv) record the date of the inspection or test;
 - (v) record the equipment used in the inspection or test and applicable calibration results;
 - (vi) contain legible results, as recorded during the test or inspection;

- (vii) include sample calculations demonstrating how the results were obtained from measured data;
 - (viii) include, where appropriate, photographs and other documentation;
 - (ix) include a summary and conclusion of the test or inspection; and
 - (x) identify any Deficiencies and Nonconformities.
- (b) Not less than 30 days prior to the first scheduled Commissioning Work activity, Project Co shall develop and implement an inspection and test recording system that permits ready retrieval of all inspection and test results. All inspection and test results shall be provided to the City upon request.

10.9 Commissioning Certification

- (a) Project Co shall issue a separate Commissioning Certificate for each applicable Commissioning Work activity described in the Commissioning Register, and a final Commissioning Certificate for the whole of the System. The Commissioning Certificates shall be in the form attached hereto as Appendix 4A-7 [*Commissioning Certificate*] of this Schedule.
- (b) All Commissioning Certificates, together with the applicable Test Report(s) and applicable supporting documentation, shall be submitted to the City in accordance with Schedule 2 [*Submittal Review Procedure*] and to the Independent Certifier, with original signatures, seals and registration numbers and in such form as to allow the City to perform its review in respect of such Commissioning Certificates without delay.
- (c) The Commissioning Manager shall sign and seal all Commissioning Certificates, and an authorized representative of the Service Provider shall also sign and seal the final Commissioning Certificate.

10.10 Commissioning Test Report

Within 30 days after the Service Commencement Date, Project Co shall cause the Commissioning Manager to compile, prepare and submit a comprehensive commissioning test report to the City (the "**Commissioning Test Report**"). The Commissioning Test Report shall include:

- (a) a description of all Commissioning Work, together with detailed records of all results, data and observations obtained during the Commissioning;
- (b) copies of all relevant Test Procedures and the corresponding test or inspection results;
- (c) a copy of all applicable Test Reports;
- (d) sample calculations demonstrating how the test or inspection results were obtained from measured data;
- (e) photographs and other documentation;
- (f) all signed off quality control inspection sheets with final calibrations, set points, measurements and inspection results; and

- (g) a baseline report covering each tested piece of equipment, component, system and sub-system, including all quantitative data required to establish a baseline for comparing performance, determining deterioration over the applicable Design Service Life and assessing the sufficiency and performance of the Overall Maintenance Strategy and each Five Year Maintenance Plan,

and each section of the Commissioning Test Report shall be:

- (h) formally reviewed by the Designer to confirm conformance of the System to the Project Requirements and the applicable design; and
- (i) signed and sealed by the Appropriate Person(s), where required to be so signed and sealed, and signed by the Commissioning Manager.

11. TRAINING

11.1 Training Plan

Without limiting the training and certification requirements set out in Section 6.4.5 [*Operations and Maintenance Staffing and Training Plan*] of Schedule 7 [*O&M Performance Requirements*], not less than 6 months prior to the Target Service Commencement Date, Project Co shall:

- (a) develop and submit a description and schedule of all training and education required to be provided to the City's staff so as to:
 - (i) enable the City to:
 - (A) operate the Surveillance System;
 - (B) perform the City Security Obligations pursuant to Schedule 29 [*Security Matters*];
 - (C) perform the City Activities, including such training as is necessary to ensure a sufficient level of familiarity with the layout and key security elements of the System to permit the safe and efficient performance of such activities;
 - (D) generate user configurable querying and report generation in accordance with Section 8 [*Remote Data Queries*] of Schedule 7 [*O&M Performance Requirements*];
 - (E) access and interpret read only data from the Asset Management System; and
 - (ii) enable ETS operators to access and use the Davies Transit Centre;
- (b) provide details of the training to be provided to City staff, including the following information, as applicable:
 - (i) a course syllabus;
 - (ii) training methods and plans;
 - (iii) training tools such as simulators; and
 - (iv) training locations, durations, dates and times,

(collectively, the "**Training Plan**").

11.2 Training Delivery

All training shall be provided in the City of Edmonton.

Not less than 1 month, and not more than 3 months, prior to the Target Service Commencement Date, Project Co shall submit all relevant training materials to the City along with a final training schedule. Project Co shall provide all training sessions for City's staff, in accordance with the Training Plan and the final training schedule, such that all City staff shall have the opportunity to receive training prior to the Target Service Commencement Date. The City shall cause representatives of the City to attend the applicable training sessions held in accordance with the accepted Training Plan and schedule; provided that the failure on the part of any City staff to attend training sessions held in accordance with the accepted Training Plan and schedule shall not result in any delay to the achievement of Service Commencement.

12. RECORD DOCUMENTATION AND FINAL REPORTING

12.1 Construction Certificates

(a) Project Co shall, in accordance with the procedures set out in the Design Management Plan, the relevant Quality Documentation and the other Project Requirements, submit a Construction Certificate for each Work Package, to the Independent Certifier and the City, within 30 days after commencement of Construction on any successor Work Package (as identified in the Integrated Project Management Plan), and in any event, prior to making an application for:

- (i) Completion of any element of the Infrastructure that is included in the applicable Work Package, in accordance with Section 13 [*Completion*] of this Schedule; or
- (ii) Service Commencement, in accordance with Section 14 [*Service Commencement*] of this Schedule.

Construction Certificates for Temporary Works and for decommissioning or removal of designated existing infrastructure only need to be submitted prior to making an application for Service Commencement, in accordance with Section 14 [*Service Commencement*] of this Schedule.

(b) The Construction Certificates shall contain, or refer to and be submitted with, all information used to verify and confirm that the Work Package covered by the Construction Certificate has been:

- (i) constructed in accordance with the applicable Final Design; and
- (ii) completed in accordance with the applicable Project Requirements.

(c) For elements of the Infrastructure that are governed by the Alberta Building Code, the Construction Certificates shall be in the forms required by the Alberta Building Code. For all other elements the Construction Certificates shall be in the form attached hereto as Appendix 4A-4 [*Construction Certificate - Assurance of Professional Review and Compliance*] of this

Schedule, and shall be signed and sealed by the Designer and by an authorized representative of the Service Provider.

12.2 Final Design and Construction Report

Within 60 days after the Service Commencement Date, Project Co shall prepare and submit to the City a final report on the Design and Construction (the "***Final Design and Construction Report***"). The Final Design and Construction Report shall show the details and progression of the Design and Construction for each portion of the Infrastructure and will include, as a minimum:

- (a) an executive summary of Project scope;
- (b) Design Team information;
- (c) Design notes and checknotes;
- (d) Construction team information;
- (e) the As Built schedule, compared against the Baseline Construction Schedule;
- (f) Quality Management System reports in accordance with Schedule 9 [*Quality Management*];
- (g) a statistical summary of safety accidents, near miss incidents, public safety incidents and injuries;
- (h) lessons learned; and
- (i) As Built reports for each of the following:
 - (i) Transportation Structure(s), with each As Built report to include:
 - (A) shop drawings for fabrication;
 - (B) weld procedures;
 - (C) mill reports for stressing strand;
 - (D) stress-strain curves for stressing strand;
 - (E) stressing calculations;
 - (F) girder camber and deflection records including final girder profiles;
 - (G) stay cable acceptance testing reports;
 - (H) mill certificates;
 - (I) non-destructive test reports, including Charpy impact, hardness, radiography, ultrasonic, magnetic particle, and dye penetrant reports;
 - (J) heat treatment records;
 - (K) concrete and asphalt mix designs;
 - (L) pile driving, pile drilling and foundation records;
 - (M) location and details of remaining substructure elements from demolished structures;

- (N) concrete test results;
 - (O) post-tensioning and stressing records, including for ground anchors and stay cables;
 - (P) material testing results, including gradation analysis for backfill materials;
 - (Q) ground anchor testing records; and
 - (R) any other information recorded as part of the QMS and required to document material properties or construction details;
- (ii) Track, with the As Built report to include:
- (A) records of Special Trackwork tolerances;
 - (B) conformity/deviations between specified tolerances and actual Track conditions;
 - (C) the dates when measurements were taken;
 - (D) the name and designation of the Track to which the measurements apply;
 - (E) the chainage of each point where measurements are made at finite points, or the chainage at intervals not exceeding 3m where measurements are made continuously;
 - (F) the design grades and the As Built variations from design grades and design centreline;
 - (G) the design and As Built gauge and superelevation and variations thereof;
 - (H) shop drawings for Special Trackwork; and
 - (I) mill certificates, welding procedures and records.

The Track As Built report shall be titled "Reports of Conformity to Trackwork Tolerances" and shall have all information separated by Track;

- (iii) Traffic Signals, with the As Built Reports for Traffic Signal Equipment at each signalized intersection to include:
- (A) Traffic Signal Record Drawings (with a copy to be placed within the Traffic Controller cabinet in a weather protected pouch);
 - (B) Traffic Controller database (in both hardcopy format and digital format in native controller database format);
 - (C) bench test results; and
 - (D) "Flashing Operation" and "Full Operation" checklists in accordance with Section 6-3.3.2.C.7 [*Traffic Controller*] of Schedule 5 [*D&C Performance Requirements*]; and
- (j) a summary and notes of all public communications and engagement activities undertaken during the Construction Period.

12.3 Record Drawings

12.3.1 System Record Drawings

- (a) Within 90 days after the Service Commencement Date, Project Co shall prepare and submit to the City all Record Drawings for the System. The Record Drawing for the System shall:
 - (i) incorporate all As Built information contained on the final, redlined, issued for construction Design Drawings;
 - (ii) be provided in the formats and quantities described in Section 2.2.2(f) *[Drawing Submissions]* of Appendix 4C *[Project Drawing Standards]* of this Schedule; and
 - (iii) be signed and sealed by the Designer in accordance with Applicable Law, and the policies and requirements of applicable Governmental Authorities and regulatory agencies, including APEGA, ASET, AAA, and AALA.

12.3.2 Early Handover Item Record Drawings

- (a) Within 90 days after each Early Handover Item is Completed and turned over to the City, Project Co shall prepare and submit to the City all Record Drawings for the relevant Early Handover Work. The Record Drawings for the Early Handover items shall:
 - (i) incorporate all As Built information contained on the final, redlined, issued for construction Design Drawings;
 - (ii) be provided in the formats and quantities described in Section 2.2.2(f) *[Drawing Submissions]* of Appendix 4C *[Project Drawing Standards]* of this Schedule; and
 - (iii) be signed and sealed by the Designer in accordance with Applicable Law, and the policies and requirements of applicable Governmental Authorities and regulatory agencies, including APEGA, ASET, AAA, and AALA.

13. COMPLETION

13.1 Tawatinâ Bridge SUP Completion

13.1.1 Advance Notice of Application for Completion of Tawatinâ Bridge SUP

Project Co acknowledges that the Independent Certifier will need sufficient time to complete any inspections, consult with the City and Project Co, and review the list of Tawatinâ Bridge SUP Deficiencies, and accordingly Project Co shall:

- (a) at least 20 days (but no more than 30 days) before the anticipated Completion date for the Tawatinâ Bridge SUP, deliver to the Independent Certifier and the City's Representative a notice setting out:
 - (i) a description of all outstanding Design and Construction to be completed by Project Co prior to the Completion of the Tawatinâ Bridge SUP; and

- (ii) a list of all Tawatinâ Bridge SUP Deficiencies and incomplete Design and Construction that Project Co is aware of at the time of the notice; and
- (b) assist the Independent Certifier to make any advance inspections requested by the Independent Certifier.

13.1.2 Conditions Precedent to Completion of Tawatinâ Bridge SUP

Tawatinâ Bridge SUP completion shall only be achieved if, at the time of certification, the following conditions precedents have been satisfied:

- (a) Design and Construction of the Tawatinâ Bridge SUP is complete and the applicable Design Certificates and Construction Certificates have been accepted by the City acting reasonably;
- (b) the following Commissioning tests have been completed and the associated Commissioning Certificate has been accepted by the City acting reasonably:
 - (i) dynamic performance tests as set out in Section 4-3.4.8 [*Dynamic Behaviour*] of Schedule 5 [*D&C Performance Requirements*] and applying only the following excitations:
 - (A) rhythmic jumping of a single person at the fundamental vertical frequency of the Tawatinâ Bridge SUP at the location with the highest acceleration amplitude;
 - (B) continuous jogging by five persons over the Structure, separated by approximately 2-3 m, and synchronized at the vertical frequency between 1.5 Hz and 4.0 Hz that produces the highest vertical acceleration amplitude on the Tawatinâ Bridge SUP; and
 - (C) continuous jogging by five persons over the Tawatinâ Bridge SUP, separated by approximately 2-3 m, and synchronized at the horizontal frequency between 1.5 Hz and 4.0 Hz that produces the highest horizontal acceleration amplitude on the Tawatinâ Bridge SUP;
- (c) Tawatinâ Bridge SUP is safe for public use and protective measures are in place to protect Tawatinâ Bridge SUP users from ongoing Construction work associated with the Tawatinâ Bridge; and
- (d) the following Trail accesses are provided:
 - (i) from Cameron Avenue to the north terminus of the Tawatinâ Bridge SUP; and
 - (ii) connectivity between the Tawatinâ Bridge SUP and the north terminus of the footbridge over 98th Avenue;

13.1.3 Application for Completion Certificate of Tawatinâ Bridge SUP

If Project Co believes it has achieved the requirements for Completion and complied with Section 13.1.1 [*Advance Notice of Application for Completion of Tawatinâ Bridge SUP*] of this Schedule, then Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for the Tawatinâ Bridge SUP Completion Certificate.

13.1.4 Inspection for Completion Certificate of Tawatinâ Bridge SUP

No later than 10 Business Days after Project Co delivers:

- (a) an application for Completion pursuant to Section 13.1.3 [*Application for Completion Certificate of Tawatinâ Bridge SUP*] of this Schedule; and
- (b) all relevant Certificates and supporting documentation in accordance with the Project Requirements to confirm that all conditions precedent as described in Section 13.1.2 [*Conditions Precedent to Completion of Tawatinâ Bridge SUP*] of this Schedule have been satisfied,

to the City's Representative and the Independent Certifier, the parties shall require the Independent Certifier to, in co-operation with Project Co's Representative and the City's Representative:

- (c) review and verify the accuracy of the listed Deficiencies and incomplete Design or Construction;
- (d) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent as described in Section 13.1.2 [*Conditions Precedent to Completion of Tawatinâ Bridge SUP*] of this Schedule have been satisfied; and
- (e) perform an inspection of the Tawatinâ Bridge SUP to determine whether Completion has been achieved.

13.1.5 Deficiency List of Tawatinâ Bridge SUP

- (a) Prior to, and as a condition of, issuance of the Tawatinâ Bridge SUP Completion Certificate, Project Co shall, in co-operation with the City and the Independent Certifier, prepare a complete list of Tawatinâ Bridge SUP Deficiencies and incomplete Design or Construction and deliver to the City and the Independent Certifier the list of Tawatinâ Bridge SUP Deficiencies.
- (b) Subject to the right of the parties to refer matters related to the accuracy or completeness of the list of Tawatinâ Bridge SUP Deficiencies to the Dispute Resolution Procedure, the list of Tawatinâ Bridge SUP Deficiencies shall include all items required by the City to be included on such list.

13.1.6 Certification of Completion of Tawatinâ Bridge SUP

The City and Project Co shall cause the Independent Certifier, within 5 Business Days of the commencement of the inspection under Section 13.1.4 [*Inspection for Completion Certificate of Tawatinâ Bridge SUP*] of this Schedule, to either:

- (a) issue the Tawatinâ Bridge SUP Completion Certificate, (the "***Tawatinâ Bridge SUP Completion Certificate***"), stating the Completion date, to the City and Project Co; or
- (b) notify Project Co and the City's Representative of its decision not to issue the Tawatinâ Bridge SUP Completion Certificate and state the reasons in detail for such decision, including what further work may be required to achieve Completion.

13.1.7 Refusal to Certify Completion of Tawatinâ Bridge SUP

The Independent Certifier shall refuse to issue the Tawatinâ Bridge SUP Completion Certificate only if:

- (a) the Tawatinâ Bridge SUP does not meet the conditions precedent specified in Section 13.1.2 [*Conditions Precedent to Completion of Tawatinâ Bridge SUP*] of this Schedule;
- (b) the Tawatinâ Bridge SUP is not safe for use by the public; or
- (c) any other conditions or requirements under this Agreement for Completion of the Tawatinâ Bridge SUP have not been satisfied or complied with.

13.1.8 Completion of Further Work for Completion Certificate of Tawatinâ Bridge SUP

In the event of service of a notice by the Independent Certifier under Section 13.1.6(b) [*Certification of Completion of Tawatinâ Bridge SUP*] of this Schedule, Project Co shall issue to the Independent Certifier and the City a notice not less than 5 Business Days but no more than 15 Business Days prior to the date upon which Project Co expects to complete such further work or other measures necessary or appropriate to remedy or remove the cause of the Independent Certifier's refusal to issue the Tawatinâ Bridge SUP Completion Certificate. Upon Project Co notifying the Independent Certifier and the City that such further work or measures necessary or appropriate have been completed, the City and Project Co shall cause the Independent Certifier to commence, within 5 Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 13.1.2 [*Conditions Precedent to Completion of Tawatinâ Bridge SUP*] of this Schedule through to this Section, inclusive, shall thereafter apply to such notice *mutatis mutandis*.

13.1.9 Correction of Tawatinâ Bridge SUP Deficiencies

Upon issuance of the Tawatinâ Bridge SUP Completion Certificate, Project Co shall proceed expeditiously to correct each Deficiency listed in the list of Tawatinâ Bridge SUP Deficiencies by the date that is 60 days after the Tawatinâ Bridge SUP Completion date, or such later date as may be reasonably required to provide sufficient time to correct the Tawatinâ Bridge SUP Deficiencies and that is agreed by the City, acting reasonably, provided that all Tawatinâ Bridge SUP Deficiencies shall be corrected prior to the Service Commencement Date. Each Deficiency listed in the list of Tawatinâ Bridge SUP Deficiencies shall have its own deadline for completion (each, a "**Tawatinâ Bridge SUP Deficiency Deadline**"). Nothing in Section 13.1 [*Tawatinâ Bridge SUP Completion*] of this Schedule limits Project Co's responsibilities for correction of Deficiencies that are identified after the preparation of the list of Tawatinâ Bridge SUP Deficiencies.

13.1.10 Submissions by the City's Representative

The City may, at any time, following receipt of notice given by Project Co pursuant to Section 13.1.1 [*Advance Notice of Application for Completion of Tawatinâ Bridge SUP*] or 13.1.8 [*Completion of Further Work for Completion Certificate of Tawatinâ Bridge SUP*] of this Schedule, and prior to the Independent Certifier issuing the Tawatinâ Bridge SUP Completion Certificate, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the Tawatinâ Bridge SUP Completion Certificate have been satisfied and, if applicable, any reasons as to why the City considers that the Tawatinâ Bridge SUP Completion Certificate should not be issued. The Independent

Certifier shall consider such submissions in determining whether to issue the Tawatinâ Bridge SUP Completion Certificate.

13.1.11 No Limitation

The issuance of the Tawatinâ Bridge SUP Completion Certificate shall be without prejudice to and shall not in any way limit the rights and obligations of the parties under and in accordance with this Agreement.

13.2 Kâhasinîskâk Bridge Completion

13.2.1 Advance Notice of Application for Completion of Kâhasinîskâk Bridge

Project Co acknowledges that the Independent Certifier will need sufficient time to complete any inspections, consult with the City and Project Co, and review the list of Kâhasinîskâk Bridge Deficiencies, and accordingly Project Co shall:

- (a) at least 20 days (but no more than 30 days) before the anticipated Completion date for the Kâhasinîskâk Bridge, deliver to the Independent Certifier and the City's Representative a notice setting out:
 - (i) a description of all outstanding Design and Construction to be completed by Project Co prior to Completion of the Kâhasinîskâk Bridge; and
 - (ii) a list of all Kâhasinîskâk Bridge Deficiencies and incomplete Design and Construction that Project Co is aware of at the time of the notice; and
- (b) assist the Independent Certifier to make any advance inspections requested by the Independent Certifier.

13.2.2 Conditions Precedent to Completion of Kâhasinîskâk Bridge

Kâhasinîskâk Bridge completion shall only be achieved if, at the time of certification, the following conditions precedents have been satisfied:

- (a) Design and Construction of the Kâhasinîskâk Bridge is complete and the applicable Design Certificates and Construction Certificates have been accepted by the City acting reasonably;
- (b) Commissioning tests have been completed and the associated Commissioning Certificate has been accepted by the City acting reasonably;
- (c) Kâhasinîskâk Bridge is safe for public use and protective measures are in place to protect Kâhasinîskâk Bridge users from ongoing Construction work in the vicinity of the Kâhasinîskâk Bridge; and
- (d) the following Trail accesses are provided:
 - (i) from the intersection of 96th Avenue/96A Street to the north terminus of the Kâhasinîskâk Bridge; and
 - (ii) from the existing Trail, south of Connors Road, to the south terminus of the Kâhasinîskâk Bridge.

13.2.3 Application for Completion Certificate of Kâhasinîskâk Bridge

If Project Co believes it has achieved the requirements for Completion and complied with Section 13.2.1 *[Advance Notice of Application for Completion of Kâhasinîskâk Bridge]* of this Schedule, then Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for the Kâhasinîskâk Bridge Completion Certificate.

13.2.4 Inspection for Completion Certificate of Kâhasinîskâk Bridge

No later than 10 Business Days after Project Co delivers:

- (a) an application for Completion pursuant to Section 13.2.3 *[Application for Completion Certificate of Kâhasinîskâk Bridge]* of this Schedule; and
- (b) all relevant Certificates and supporting documentation in accordance with the Project Requirements to confirm that all conditions precedent as described in Section 13.2.2 *[Conditions Precedent to Completion of Kâhasinîskâk Bridge]* of this Schedule have been satisfied,

to the City's Representative and the Independent Certifier, the parties shall require the Independent Certifier to, in co-operation with Project Co's Representative and the City's Representative:

- (c) review and verify the accuracy of the listed Deficiencies and incomplete Design or Construction;
- (d) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent as described in Section 13.2.2 *[Conditions Precedent to Completion of Kâhasinîskâk Bridge]* of this Schedule have been satisfied; and
- (e) perform an inspection of the Kâhasinîskâk Bridge to determine whether Completion has been achieved.

13.2.5 Deficiency List of Kâhasinîskâk Bridge

- (a) Prior to, and as a condition of, issuance of the Kâhasinîskâk Bridge Completion Certificate, Project Co shall, in co-operation with the City and the Independent Certifier, prepare a complete list of Kâhasinîskâk Bridge Deficiencies and incomplete Design or Construction and deliver to the City and the Independent Certifier the list of Kâhasinîskâk Bridge Deficiencies.
- (b) Subject to the right of the parties to refer matters related to the accuracy or completeness of the list of Kâhasinîskâk Bridge Deficiencies to the Dispute Resolution Procedure, the list of Kâhasinîskâk Bridge Deficiencies shall include all items required by the City to be included on such list.

13.2.6 Certification of Completion of Kâhasinîskâk Bridge

The City and Project Co shall cause the Independent Certifier, within 5 Business Days of the commencement of the inspection under Section 13.2.4 *[Inspection for Completion Certificate of Kâhasinîskâk Bridge]* of this Schedule, to either:

- (a) issue the Kâhasinîskâk Bridge Completion Certificate (the “**Kâhasinîskâk Bridge Completion Certificate**”), stating the Completion date, to the City and Project Co; or
- (b) notify Project Co and the City’s Representative of its decision not to issue the Kâhasinîskâk Bridge Completion Certificate and state the reasons in detail for such decision, including what further work may be required to achieve Completion.

13.2.7 Refusal to Certify Completion of Kâhasinîskâk Bridge

The Independent Certifier shall refuse to issue the Kâhasinîskâk Bridge Completion Certificate only if:

- (a) the Kâhasinîskâk Bridge does not meet the conditions precedent specified in Section 13.2.2 [*Conditions Precedent to Completion of Kâhasinîskâk Bridge*] of this Schedule;
- (b) the Kâhasinîskâk Bridge is not safe for use by the public; or
- (c) any other conditions or requirements under this Agreement for completion of the Kâhasinîskâk Bridge have not been satisfied or complied with.

13.2.8 Completion of Further Work for Completion Certificate of Kâhasinîskâk Bridge

In the event of service of a notice by the Independent Certifier under Section 13.2.6(b) [*Certification of Completion of Kâhasinîskâk Bridge*] of this Schedule, Project Co shall issue to the Independent Certifier and the City a notice not less than 5 Business Days but no more than 15 Business Days prior to the date upon which Project Co expects to complete such further work or other measures necessary or appropriate to remedy or remove the cause of the Independent Certifier’s refusal to issue the Kâhasinîskâk Bridge Completion Certificate. Upon Project Co notifying the Independent Certifier and the City that such further work or measures necessary or appropriate have been completed, the City and Project Co shall cause the Independent Certifier to commence, within 5 Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 13.2.2 [*Conditions Precedent to Completion of Kâhasinîskâk Bridge*] of this Schedule through to this Section, inclusive, shall thereafter apply to such notice *mutatis mutandis*.

13.2.9 Correction of Kâhasinîskâk Bridge Deficiencies

Upon issuance of the Kâhasinîskâk Bridge Completion Certificate, Project Co shall proceed expeditiously to correct each Deficiency listed in the list of Kâhasinîskâk Bridge Deficiencies by the date that is 60 days after the Kâhasinîskâk Bridge Completion date, or such later date as may be reasonably required to provide sufficient time to correct the Kâhasinîskâk Bridge Deficiencies and that is agreed by the City, acting reasonably, provided that all Kâhasinîskâk Bridge Deficiencies shall be corrected prior to the Service Commencement Date. Each Deficiency listed in the list of Kâhasinîskâk Bridge Deficiencies shall have its own deadline for completion (each, a “**Kâhasinîskâk Bridge Deficiency Deadline**”). Nothing in Section 13.2 [*Kâhasinîskâk Bridge Completion*] of this Schedule limits Project Co’s responsibilities for correction of Deficiencies that are identified after the preparation of the list of Kâhasinîskâk Bridge Deficiencies.

13.2.10 Submissions by the City's Representative

The City may, at any time, following receipt of notice given by Project Co pursuant to Section 13.2.1 [*Advance Notice of Application for Completion of Kâhasinîskâk Bridge*] or 13.2.8 [*Completion of Further Work for Completion Certificate of Kâhasinîskâk Bridge*] of this Schedule, and prior to the Independent Certifier issuing the Kâhasinîskâk Bridge Completion Certificate, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the Kâhasinîskâk Bridge Completion Certificate have been satisfied and, if applicable, any reasons as to why the City considers that the Kâhasinîskâk Bridge Completion Certificate should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the Kâhasinîskâk Bridge Completion Certificate.

13.2.11 No Limitation

The issuance of the Kâhasinîskâk Bridge Completion Certificate shall be without prejudice to and shall not in any way limit the rights and obligations of the parties under and in accordance with this Agreement.

13.3 Early Handover Item Completion

13.3.1 Advance Notice of Application for Completion of Early Handover Item

Project Co acknowledges that the Independent Certifier will need sufficient time to complete any inspections, consult with the City and Project Co, and review the list of Early Handover Deficiencies associated with the applicable Early Handover Item, and accordingly Project Co shall:

- (a) at least 20 days (but no more than 30 days) before the anticipated Completion date of each Early Handover Item, deliver to the Independent Certifier and the City's Representative a notice setting out:
 - (i) a description of all outstanding Design and Construction to be completed by Project Co prior to Completion of the applicable Early Handover Item; and
 - (ii) a list of all Early Handover Deficiencies and incomplete Design and Construction associated with the applicable Early Handover Item that Project Co is aware of at the time of the notice; and
- (b) assist the Independent Certifier to make any advance inspections requested by the Independent Certifier.

13.3.2 Conditions Precedent to Completion of Early Handover Item

Completion of each Early Handover Item shall only be achieved if, at the time of certification, the following conditions precedents have been satisfied:

- (a) Design and Construction of the Early Handover Item is complete and the applicable Design Certificates and Construction Certificates have been accepted by the City acting reasonably;
- (b) the Early Handover Item is safe for public use and protective measures are in place to protect Early Handover Item users from ongoing Construction work in the vicinity of the Early Handover Item; and

- (c) if the Early Handover Item:
 - (i) is a road, crosswalk, sidewalk or Shared Use Path, the following have been submitted to, and accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*:
 - (A) all applicable Traffic Signal Equipment As Built drawings, as set out in Section 1(f) *[Final Design Drawing Contents]* of Appendix 4B *[Project Specific Submission Requirements]* of this Schedule;
 - (B) Pre-Opening Road Safety Audit(s), where applicable;
 - (C) Road Safety Response Report(s) for the applicable Pre-Opening Road Safety Audit(s); and
 - (D) all applicable As Built Roadway drawings, as set out in Section 1(a) *[Final Design Drawing Contents]* of Appendix 4B *[Project Specific Submission Requirements]*;
 - (ii) is the Whitemud Drive Pedestrian Bridge, unimpeded and safe pedestrian access is provided to both ends of the bridge, and the following have been submitted to, and accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*:
 - (A) Pre-Opening Road Safety Audit;
 - (B) Road Safety Response Report for the applicable Pre-Opening Road Safety Audit; and
 - (C) all applicable As Built bridge drawings;
 - (iii) is the Existing Whitemud Drive Bridge, the following have been submitted to, and accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*:
 - (A) all applicable Traffic Signal Equipment As Built drawings, as set out in Section 1(f) *[Final Design Drawing Contents]* of Appendix 4B *[Project Specific Submission Requirements]* of this Schedule;
 - (B) Pre-Opening Road Safety Audit;
 - (C) Road Safety Response Report for the applicable Pre-Opening Road Safety Audit; and
 - (D) all applicable As Built bridge drawings;
 - (iv) is Stormwater Management infrastructure, the following have been submitted to, and accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*:
 - (A) all applicable As Built drawings, as set out in Section 1(b) *[Final Design Drawing Contents]* of Appendix 4B *[Project Specific Submission Requirements]* of this Schedule; and
 - (B) inspection and testing results for inspections and tests set out in Section 22.0 of the *Valley Line LRT Project Drainage Design Guidelines and Construction Standards*;

- (v) is the City Fibre:
 - (A) all of the tests set out in Section 6-1.8M *[Fibre Optic Backbone]* of Schedule 5 *[D&C Performance Requirements]* have been successfully completed;
 - (B) all test results and software has been submitted to the City as required by Section 6-1.8O *[Fibre Optic Backbone]* of Schedule 5 *[D&C Performance Requirements]*, and accepted by the City in accordance with Schedule 2 *[Submittal Review Procedure]*; and
 - (C) Project Co has provided the City with notice of completion and access to the terminated fibre strands in accordance with Section 1-1.3 *[City Works]* of Schedule 5 *[D&C Performance Requirements]*;
- (vi) is (are) City Cabinets, City-FDF, Churchill Connector Building SCADA, or C-Cure Card Readers:
 - (A) Project Co has provided the City with a notice of completion and access to the applicable equipment in accordance with Section 1-1.3 *[City Works]* of Schedule 5 *[D&C Performance Requirements]*;
- (vii) are Station and Stop advertising screens and signs:
 - (A) Project Co has provided the City with a notice of completion and access to the advertising screens and signs at the applicable Station or Stop in accordance with Section 1-1.3 *[City Works]* of Schedule 5 *[D&C Performance Requirements]*;
- (viii) are street lights, the following have been submitted to, and accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*:
 - (A) all applicable As Built drawings, as set out in Section 1(g) *[Final Design Drawing Contents]* of Appendix 4B *[Project Specific Submission Requirements]* of this Schedule; and
 - (B) inspection and testing results obtained in accordance with the procedures set out in the "Testing and Certification" section of the City's *Valley Line Road and Walkway Lighting Construction and Material Standards*.

13.3.3 Application for Completion Certificate of Early Handover Item

If Project Co believes it has achieved the requirements for Completion and complied with Section 13.3.1 *[Advance Notice of Application for Completion of Early Handover Item]* of this Schedule, in respect of an Early Handover Item, then Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for the applicable Early Handover Completion Certificate.

13.3.4 Inspection for Completion Certificate of Early Handover Item

No later than 10 Business Days after Project Co delivers:

- (a) an application for Completion pursuant to Section 13.3.3 *[Application for Completion Certificate of Early Handover Item]* of this Schedule; and

- (b) all relevant Certificates and supporting documentation in accordance with the Project Requirements to confirm that all conditions precedent as described in Section 13.3.2 [*Conditions Precedent to Completion of Early Handover Item*] of this Schedule have been satisfied,

to the City's Representative and the Independent Certifier, the parties shall require the Independent Certifier to, in co-operation with Project Co's Representative and the City's Representative:

- (c) review and verify the accuracy of the listed Early Handover Deficiencies and incomplete Design or Construction;
- (d) review all other relevant Certificates and supporting documentation to determine whether all applicable conditions precedent as described in Section 13.3.2 [*Conditions Precedent to Completion of Early Handover Item*] of this Schedule have been satisfied; and
- (e) perform an inspection of the Early Handover Item to determine whether Completion has been achieved.

13.3.5 Deficiency List of Early Handover Item

- (a) Prior to and as a condition of issuance of the Completion Certificate, Project Co shall, in co-operation with the City and the Independent Certifier, prepare a complete list of Early Handover Deficiencies and incomplete Design or Construction and deliver to the City and the Independent Certifier the list of Early Handover Deficiencies associated with the applicable Early Handover Item.
- (b) Subject to the right of the parties to refer matters related to the accuracy or completeness of the list of Early Handover Deficiencies to the Dispute Resolution Procedure, the list of Early Handover Deficiencies shall include all items required by the City to be included on such list.

13.3.6 Certification of Completion of Early Handover Item

The City and Project Co shall cause the Independent Certifier, within 5 Business Days of the commencement of the inspection under Section 13.3.4 [*Inspection for Completion Certificate of Early Handover Item*] of this Schedule, to either:

- (a) issue an Early Handover Completion Certificate (an "**Early Handover Completion Certificate**"), stating the Completion date of the applicable Early Handover Item, to the City and Project Co; or
- (b) notify Project Co and the City's Representative of its decision not to issue the Early Handover Completion Certificate and state the reasons in detail for such decision, including what further work may be required to achieve Completion of the applicable Early Handover Item.

13.3.7 Refusal to Certify Completion of Early Handover Item

The Independent Certifier shall refuse to issue the Early Handover Completion Certificate only if:

- (a) the Early Handover Item does not meet the conditions precedent specified in Section 13.3.2 [*Conditions Precedent to Completion of Early Handover Item*] of this Schedule;
- (b) the Early Handover Item is not safe for use by the public; or

- (c) any other conditions or requirements under this Agreement for Completion of the Early Handover Item have not been satisfied or complied with.

13.3.8 Completion of Further Work for Completion Certificate of Early Handover Item

In the event of service of a notice by the Independent Certifier under Section 13.3.6(b) [*Certification of Completion of Early Handover Item*] of this Schedule, Project Co shall issue to the Independent Certifier and the City a notice not less than 5 Business Days but no more than 15 Business Days prior to the date upon which Project Co expects to complete such further work or other measures necessary or appropriate to remedy or remove the cause of the Independent Certifier's refusal to issue the Early Handover Completion Certificate. Upon Project Co notifying the Independent Certifier and the City that such further work or measures necessary or appropriate have been completed, the City and Project Co shall cause the Independent Certifier to commence, within 5 Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 13.3.2 [*Conditions Precedent to Completion of Early Handover Item*] of this Schedule through to this Section, inclusive, shall thereafter apply to such notice *mutatis mutandis*.

13.3.9 Correction of Early Handover Item Deficiencies

Upon issuance of an Early Handover Completion Certificate, Project Co shall proceed expeditiously to correct each Early Handover Deficiency listed in the applicable list of Early Handover Deficiencies by the date that is 60 days after the applicable Early Handover Item Completion date, or such later date as may be reasonably required to provide sufficient time to correct the Early Handover Deficiencies and that is agreed by the City, acting reasonably. Each Early Handover Deficiency listed in the list of Early Handover Deficiencies shall have its own deadline for completion (each, an "**Early Handover Deficiency Deadline**"). Nothing in Section 13.3 [*Early Handover Item Completion*] of this Schedule limits Project Co's responsibilities for correction of Early Handover Deficiencies that are identified after the preparation of the applicable list of Early Handover Deficiencies.

13.3.10 Submissions by the City's Representative

The City may, at any time, following receipt of notice given by Project Co pursuant to Section 13.3.1 [*Advance Notice of Application for Completion of Early Handover Item*] or 13.3.8 [*Completion of Further Work for Completion Certificate of Early Handover Item*] of this Schedule, and prior to the Independent Certifier issuing the Early Handover Completion Certificate for an Early Handover Item, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the applicable Early Handover Completion Certificate have been satisfied and, if applicable, any reasons as to why the City considers that the Early Handover Completion Certificate should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the Early Handover Completion Certificate for an Early Handover Item.

13.3.11 No Limitation

The issuance of the Early Handover Completion Certificate shall be without prejudice to and shall not in any way limit the rights and obligations of the parties under and in accordance with this Agreement.

14. SERVICE COMMENCEMENT

14.1 Advance Start-Up Notice

- (a) Not less than 180 days prior to the date on which Service Commencement is anticipated to occur, Project Co shall submit a notice to the City confirming:
 - (i) the anticipated Service Commencement Date; and
 - (ii) details of any events or circumstances that have the capacity to impact Project Co's ability to achieve Service Commencement on or before the anticipated Service Commencement Date;(the "**Advance Start-up Notice**").
- (b) If Project Co has at any time reason to believe that the anticipated date for Service Commencement will be delayed by more than 5 Business Days from the date specified in the Advance Start-up Notice, Project Co shall:
 - (i) issue a notice informing the City of the revised date on which Service Commencement is anticipated to occur; and
 - (ii) an explanation of the reason for the delay.

14.2 Advance Notice of Application for Service Commencement

- (a) Project Co acknowledges that the Independent Certifier will need sufficient time to complete any inspections, consult with the City and Project Co, and review the lists of Deficiencies and Early Handover Deficiencies, and accordingly Project Co shall:
 - (i) at least 30 days (but no more than 45 days) before the anticipated date of Service Commencement, deliver to the Independent Certifier and the City's Representative a notice setting out:
 - (A) a description of all outstanding Design and Construction to be completed by Project Co prior to Service Commencement; and
 - (B) a list of all Deficiencies, Early Handover Deficiencies and incomplete Design and Construction that Project Co is aware of at the time of the notice; and
 - (ii) assist the Independent Certifier to make any advance inspections requested by the Independent Certifier.
- (b) If Project Co has at any time reason to believe that the anticipated date of Service Commencement will be delayed or, subject to Section 5.6(a) [*Service Commencement*] of this Agreement, achieved earlier by more than 5 Business Days, it shall issue a fresh notice informing the Independent Certifier and the City's Representative of the new date on which Service Commencement is anticipated to occur.

14.3 Conditions Precedent to Service Commencement

Service Commencement shall only be achieved if, at the time of certification, the following conditions precedent have been satisfied:

- (a) all Design and Construction has been completed in accordance with the Project Requirements, save for minor incomplete work or minor deficiencies for which the estimated cost of correction, as determined by the Independent Certifier, does not exceed Redaction under review Total Capital Cost Amount;
- (b) the System is Available, safe and permits uninterrupted and unobstructed public use;
- (c) “substantial performance” of the Infrastructure, as defined in the Builder’s Lien Act (Alberta) has been achieved;
- (d) the list of Service Commencement Deficiencies has been submitted;
- (e) all of the Deficiencies, Early Handover Deficiencies and any incomplete Design or Construction included in:
 - (i) the list of Tawatinâ Bridge SUP Deficiencies issued pursuant to Section 13.1.5 *[Deficiency List of Tawatinâ Bridge]* of this Schedule; and
 - (ii) the list of Kâhasinîskâk Bridge Deficiencies issued pursuant to Section 13.2.5 *[Deficiency List of Kâhasinîskâk Bridge]* of this Schedule;have been corrected;
- (f) all of the Early Handover Deficiencies and any incomplete Design or Construction identified on a list of Early Handover Deficiencies issued pursuant to Section 13.3.5 *[Deficiency List of Early Handover Item]* of this Schedule for which the applicable Early Handover Deficiency Deadline is on or before the Target Service Commencement Date have been corrected;
- (g) all Design Certificates, Construction Certificates and Commissioning Certificates have been submitted to, and accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*;
- (h) all Completion Certificates have been issued by the Independent Certifier, including:
 - (i) the Tawatinâ Bridge SUP Completion Certificate;
 - (ii) the Kâhasinîskâk Bridge Completion Certificate; and
 - (iii) all Early Handover Completion Certificates;
- (i) reports certifying completion of all NSRV Segments have been issued by the Independent Certifier in accordance with Section 1.19 *[Completion and Handback of Landscaping, Native Forest Restoration and Naturalization]* of Schedule 10 *[Environmental Performance Requirements]*;
- (j) Building Occupancy Permits have been obtained for all Building Structures to which the ABC applies;

- (k) for each City Works activity listed in Table 1-1.3 [*City Works*] of Schedule 5 [*D&C Performance Requirements*], the applicable minimum period of time following completion of all applicable antecedent works has elapsed, unless the City has provided written notification to Project Co and the Independent Certifier that the applicable City Works are complete;
- (l) at least 180 days has expired from the submission of the Advance Start-up Notice to the City;
- (m) a Project System Safety Program Audit Certificate has been issued by the Independent Agency and submitted to the City;
- (n) a Safety and Security Certification Verification Report and Project Safety and Security Certificate has been issued by the IV&V Team and submitted to the City;
- (o) a LEED project checklist and written opinion have been delivered to the City in accordance with Section 4.5(b) [*LEED Silver Certification*] of this Schedule;
- (p) all training has been delivered in accordance with the accepted Training Plan and schedule;
- (q) a copy of all final, redlined, issued for construction Design Drawings have been submitted to the City in accordance with Section 7.5(d) [*Construction Drawings*] of this Schedule;
- (r) all warranty certificates that are required to be transferred to the City under this Agreement have been so transferred;
- (s) final cleaning has been completed in accordance with Section 1-8.4.3 [*Final Cleaning*] of Schedule 5 [*D&C Performance Requirements*];
- (t) an Operating Period Environmental Management System, to which the City has no objection, has been submitted in accordance with Section 1.23 [*Environmental Matters Specific to Operating Period*] of Schedule 10 [*Environmental Performance Requirements*];
- (u) the LRV Commissioning Certificates for all LRVs required to provide the Design Capacity, including all necessary spares as determined in accordance with the RAM Program, have been submitted to the City; and
- (v) all measures contained in the accepted In-Service Road Safety Response Report have been implemented in accordance with Section 3-2.3.1.3 [*Road Safety Audits*] of Schedule 5 [*D&C Performance Requirements*].

14.4 Application for Service Commencement

If Project Co believes it has achieved the requirements for Service Commencement and complied with Section 5.6 [*Service Commencement*] of the Agreement and Section 14.2 [*Advance Notice of Application for Service Commencement*] of this Schedule, then Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for Service Commencement.

14.5 Inspection for Service Commencement

No later than 10 Business Days after Project Co delivers:

- (a) an application for Service Commencement pursuant to Section 14.4 [*Application for Service Commencement*] of this Schedule; and

- (b) all relevant Certificates and supporting documentation in accordance with the Project Requirements to confirm that all conditions precedent as described in Section 14.3 [*Conditions Precedent to Service Commencement*] of this Schedule have been satisfied,

to the City's Representative and the Independent Certifier, the parties shall require the Independent Certifier to, in co-operation with Project Co's Representative and the City's Representative:

- (c) review and verify the accuracy of the listed Deficiencies, Early Handover Deficiencies and incomplete Design or Construction;
- (d) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent as described in Section 14.3 [*Conditions Precedent to Service Commencement*] of this Schedule have been satisfied; and
- (e) perform an inspection of the Infrastructure to determine whether Service Commencement has been achieved.

14.6 Deficiency List

- (a) Prior to, and as a condition of, issuance of the Certificate of Service Commencement, Project Co shall, in co-operation with the City and the Independent Certifier, prepare a complete list of Deficiencies, Early Handover Deficiencies and incomplete Design or Construction (the "**Service Commencement Deficiencies**") and deliver to the City and the Independent Certifier the list of Service Commencement Deficiencies, together with the Independent Certifier's reasonable estimate of the cost to correct each such Service Commencement Deficiency.
- (b) Subject to the right of the parties to refer matters related to the accuracy or completeness of the list of Service Commencement Deficiencies to the Dispute Resolution Procedure, the list of Service Commencement Deficiencies shall include all items required by the City to be included on such list.

14.7 Certification of Service Commencement

The City and Project Co shall cause the Independent Certifier, within 5 Business Days of the commencement of the inspection under Section 14.5 [*Inspection for Service Commencement*] of this Schedule, to either:

- (a) issue the Certificate of Service Commencement for the Infrastructure (the "**Certificate of Service Commencement**"), stating the Service Commencement Date, to the City and Project Co; or
- (b) notify Project Co and the City's Representative of its decision not to issue the Certificate of Service Commencement and state the reasons in detail for such decision, including what further work may be required to achieve Service Commencement.

14.8 Refusal to Certify Service Commencement

The Independent Certifier shall refuse to issue the Certificate of Service Commencement only if:

- (a) the Infrastructure does not meet the conditions precedent specified in Section 14.3 [*Conditions Precedent to Service Commencement*] of this Schedule;
- (b) all, or any portion of, the Infrastructure is not safe to operate;
- (c) all, or any portion of, the Infrastructure is not safe for use by the public; or
- (d) any other conditions or requirements under this Agreement to the achievement of Service Commencement have not been satisfied or complied with.

14.9 Completion of Further Work for Service Commencement

In the event of service of a notice by the Independent Certifier under Section 14.7(b) [*Certification of Service Commencement*] of this Schedule, Project Co shall issue to the Independent Certifier and the City a notice not less than 5 Business Days but no more than 15 Business Days prior to the date upon which Project Co expects to complete such further work or other measures necessary or appropriate to remedy or remove the cause of the Independent Certifier's refusal to issue the Certificate of Service Commencement. Upon Project Co notifying the Independent Certifier and the City that such further work or measures necessary or appropriate have been completed, the City and Project Co shall cause the Independent Certifier to commence, within 5 Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 14.3 [*Conditions Precedent to Service Commencement*] of this Schedule through to this Section, inclusive, shall thereafter apply to such notice *mutatis mutandis*.

14.10 Correction of Service Commencement Deficiencies

Upon issuance of the Certificate of Service Commencement, Project Co shall proceed expeditiously to correct each Service Commencement Deficiency listed in the list of Service Commencement Deficiencies by the date that is 60 days after the Service Commencement Date, or such later date as may be reasonably required to provide sufficient time to correct the Service Commencement Deficiencies and that is agreed by the City, acting reasonably. Each Service Commencement Deficiency listed in the list of Service Commencement Deficiencies shall have its own deadline for completion (each, a "**Service Commencement Deficiency Deadline**"). Nothing in Section 14 [*Service Commencement*] of this Schedule limits Project Co's responsibilities for correction of Deficiencies or Early Handover Deficiencies that are identified after the preparation of the list of Service Commencement Deficiencies.

14.11 Submissions by the City's Representative

The City may, at any time, following receipt of notice given by Project Co pursuant to Section 14.2 [*Advance Notice of Application for Service Commencement*] or Section 14.9 [*Completion of Further Work for Service Commencement*] of this Schedule, and prior to the Independent Certifier issuing the Certificate of Service Commencement, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the Certificate of Service Commencement have been satisfied and, if applicable, any reasons as to why the City considers that the Certificate of Service

Commencement should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the Certificate of Service Commencement.

14.12 No Limitation

The issuance of a Certificate of Service Commencement shall be without prejudice to and shall not in any way limit the rights and obligations of the parties under and in accordance with this Agreement.

14.13 Disputed Certificate

A Certificate of Service Commencement issued by the Independent Certifier will be final and not referable to the Dispute Resolution Procedure or otherwise subject to dispute between the parties.

Appendix 4A

DESIGN & CONSTRUCTION CERTIFICATE FORMS

CONTENTS

Form of:

1. Road Safety Audit Certificate
2. Project Safety & Security Certificate
3. Certification for Design and Commitment for Field Review
4. Construction Certificate - Assurance Of Professional Review And Compliance
5. Project System Safety Program Audit Certificate
6. Checking Team Design Certificate
7. Commissioning Certificate

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: Road Safety Audit Certificate for the following project:
Valley Line (102 Ave to Mill Woods Town Centre)
 Form of Certificate for certifying that a Detailed Design Road Safety Audit has been carried out in accordance with the Project Requirements.

CERTIFICATE

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "**Agreement**").

I certify that the Final Design of [_____]
insert applicable road segment(s)

has been the subject of a Detailed Design Road Safety Audit in accordance with Section 3-2.3 [Road Safety Audits] of Schedule 5 [D&C Performance Requirements], the Design Management Plan, the Design Quality Management Plan and all other relevant provisions of the Agreement. The Independent Road Safety Auditor's report and statement certifying that the Detailed Design Road Safety Audit has been carried out are attached.

Signed: _____
 Independent Road Safety Auditor
 Name: _____
 Title: _____
 Date: _____
 Address: _____

(Affix Professional Seal In Space Above)

I certify that the Final Design of [_____]
insert applicable road segment(s)

has been the subject of a Detailed Design Road Safety Audit in accordance with Section 3-2.3 [Road Safety Audits] of Schedule 5 [D&C Performance Requirements], the Design Management Plan, the Design Quality Management Plan and all other relevant Project Requirements and that all observations and recommendations in the Independent Road Safety Auditor's report and in the Road Safety Response Report have been satisfactorily addressed and resolved.

Signed: _____
 Designer (Principal) Name: _____
 Title: _____
 Date: _____
 Address: _____

(Affix Professional Seal In Space Above)

PROJECT SAFETY & SECURITY CERTIFICATE

GENERAL INFORMATION

To: The City of Edmonton Date: _____
Re: Project Safety & Security Certificate for the following project:
Valley Line (102 Ave to Mill Woods Town Centre)

CERTIFICATE

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "Agreement").

The undersigned hereby gives assurance that all safety and security requirements have been successfully completed in accordance with the Safety and Security Certification Program and that the Infrastructure is certified for revenue service, subject only to the following noted restrictions:

RESTRICTIONS

Restrictions (List restrictions if any):

PROFESSIONAL ENGINEER

I certify that I am a registered professional engineer, and

I am a member of the firm _____ and I sign this Certificate on behalf of the firm

Print Name

Date

Signature

Initials Sample

Address

Address

Phone

(Affix Professional Seal in Space Above)

GENERAL INFORMATION

To: The City of Edmonton Date: _____

Re: Certification for Design and Commitment for Field Review for the following project:
Valley Line (102 Ave to Mill Woods Town Centre)

DESIGN SUBMISSION

Submission Number: _____

Submission Name: _____

Work Package: _____

Contents of Design Submission: _____

(See document / drawing list attached)

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "**Agreement**").

I hereby give assurance that the Final Design of the:

- ARCHITECTURAL _____
- CIVIL _____
 Road Drainage Utilities Track _____
- ELECTRICAL _____
- GEOTECHNICAL _____
 Temporary Work Permanent Work _____
- LANDSCAPING, NATIVE FOREST RESTORATION, AND NATURALIZATION _____
- LIGHT RAIL VEHICLE _____
- MECHANICAL _____
- OTHER STRUCTURE _____
- SYSTEM INTEGRATION _____
- SYSTEMS _____
- TRACTION POWER _____
- TRAFFIC SIGNAL _____
- TRANSPORTATION STRUCTURE _____
- TUNNEL _____
- OTHER (SPECIFY): _____

components of the plans and supporting documents prepared by this registered professional for the Valley Line Work Package _____, comply with the Project Requirements and the Applicable Laws.

CERTIFICATION FOR DESIGN AND COMMITMENT FOR FIELD REVIEW



Initials _____

The undersigned hereby undertakes to be responsible for field reviews of the above referenced components during Construction.

Initials _____

The undersigned also undertakes to notify the City in writing as soon as practical if the undersigned's contract for field reviews is terminated at any time prior to the Service Commencement Date.

REGISTERED PROFESSIONAL

I certify that I am a registered professional, and

I am a member of the firm _____ and I sign this Certificate on behalf of the firm

Print Name

Date

Signature

Initials Sample

Address

Address

Phone

(Affix Professional Seal in Space Above)

Note: The above letter must be signed by a registered professional, where a registered professional means a person who is registered or licensed to practice as a Professional Engineer under the Alberta Engineering and Geoscience Professions Act or as an architect under the Alberta Architects Act.

**CONSTRUCTION CERTIFICATE
ASSURANCE OF PROFESSIONAL REVIEW AND COMPLIANCE**

GENERAL INFORMATION

To: The City of Edmonton Date: _____
 Re: Construction Certificate for the following project:
Valley Line (102 Ave to Mill Woods Town Centre)

Submission Number: _____
Submission Name: _____
Work Package: _____

DESIGN / BUILD CERTIFICATION

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "**Agreement**").

I hereby give assurance that the Construction of the:

- ARCHITECTURAL _____
- CIVIL _____
 Road Drainage Utilities Track _____
- ELECTRICAL _____
- GEOTECHNICAL _____
 Temporary Work Permanent Work _____
- LANDSCAPING, NATIVE FOREST RESTORATION, AND NATURALIZATION _____
- LIGHT RAIL VEHICLE _____
- MECHANICAL _____
- OTHER STRUCTURE _____
- SYSTEM INTEGRATION _____
- SYSTEMS _____
- TRACTION POWER _____
- TRAFFIC SIGNAL _____
- TRANSPORTATION STRUCTURE _____
- TUNNEL _____
- OTHER (SPECIFY): _____

components of Valley Line Work Package _____ have been:

- (i) constructed in accordance with the applicable Final Design; and
- (ii) completed in accordance with the applicable Project Requirements.

**CONSTRUCTION CERTIFICATE
ASSURANCE OF PROFESSIONAL REVIEW AND COMPLIANCE**



I certify that I am a registered professional, and I am a member of the firm _____ and I sign this Certificate on behalf of the firm.

Print Name

Date

Signature

Initials Sample

Address

Address

Phone

(Affix Professional Seal in Space Above)

Note: The above must be signed by a registered professional, where a registered professional means a person who is registered or licensed to practice as a Professional Engineer under the Alberta Engineering and Geoscience Professions Act or as an architect under the Alberta Architects Act.

SERVICE PROVIDER CERTIFICATION

The Service Provider hereby confirms that Work Package _____, as constructed, can be operated and maintained in accordance with the applicable O&M Requirements. I certify that I am a registered professional, and I am a member of the firm _____ and I sign this Certificate on behalf of the firm.

Print Name

Date

Signature

Initials Sample

Address

Address

Phone

(Affix Professional Seal in Space Above)

Note: The above must be signed by a person who is registered or licensed to practice as a Professional Engineer under the Alberta Engineering and Geoscience Professions Act.

GENERAL INFORMATION

To: The City of Edmonton Date: _____
Re: Project System Safety Program Audit Certificate for the following project:
Valley Line (102 Ave to Mill Woods Town Centre)

CERTIFICATE

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "Agreement").

The undersigned hereby certifies that the Valley Line System Safety Program has been the subject of a safety audit and has been determined to satisfy the objectives of the APTA Manual for the Development of Urban Rail System Safety Program Plans and is certified for revenue service, subject only to the following noted restrictions.

RESTRICTIONS

Restrictions (List restrictions if any):

PROFESSIONAL ENGINEER

I certify that I am a registered professional engineer, and

I am a member of the firm _____ and I sign this Certificate on behalf of the firm.

Print Name

Date

Signature

Initials Sample

Address

Address

Phone

(Affix Professional Seal in Space Above)

CHECKING TEAM DESIGN CERTIFICATE

GENERAL INFORMATION

To: The City of Edmonton Date: _____

Re: Checking Team Design Certificate for the following project:
Valley Line (102 Ave to Mill Woods Town Centre)

Form of certificate to be used by the Checking Team for certifying the design of infrastructure forming part of, or to be incorporated into, the Infrastructure and requiring an independent check, in accordance with Schedule 4 *[Design and Construction Protocols]* to the Agreement.

CERTIFICATE

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "**Agreement**").

I certify that the Checking Team has the requisite professional qualifications, skill and experience to perform an independent check of the Design Data referred to herein in accordance with the requirements of the Agreement.

I certify that the Checking Team has performed an independent check of the Design Data for Work Package _____ for [*Name of the design component and list all elements of the component included in the Design Data*] listed in the Schedule hereto [*and annexed*] and utilizing the standards of care, skill and diligence that, in accordance with the standards of our profession, are required of experienced professionals undertaking such an independent check, and that in our professional opinion the:

- a) design, methodologies and assumptions are consistent with Good Industry Practice; and
- b) said Design Data meets performance expectations outlined in the Agreement, including Design Submittal No. _____ dated _____, as amended by the following:

Independent Checking Engineer

I certify that I am a registered professional engineer, and

I am a member of the firm _____ and I sign this Certificate on behalf of the firm and on behalf of the Checking Team

 Print Name

 Date

 Signature

 Initials Sample

 Address

 Address

 Phone

(Affix Professional Seal in Space Above)

COMMISSIONING CERTIFICATE



GENERAL INFORMATION

To: The City of Edmonton
Re: Commissioning Certificate for the following project: Valley Line (102 Ave to Mill Woods Town Centre)
Date: _____

Submission Number: _____
Submission Name: _____
Indicate Work Package, or System: _____

COMMISSIONING MANAGER CERTIFICATION

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and TransEd Partners General Partnership dated February 8, 2016 (the "Agreement").

I hereby give assurance that:

I have fulfilled my obligations for Commissioning as outlined in Section 10.1 [Commissioning Manager] of Schedule 4 [Design and Construction Protocols] for:

[] Work Package _____ Commissioning Certificate, certifying that all applicable equipment, components, systems and sub-systems, of the Work Package operate in accordance with the Project Requirements and are ready for, and have met the Commissioning requirements for, application for Commissioning Certificate in accordance with Section 10 [Commissioning] of Schedule 4 [Design and Construction Protocols]; or

[] System Final Commissioning Certificate, certifying that all applicable equipment, components, systems and sub-systems, of the System have met the Commissioning requirements in accordance with Section 10 [Commissioning] of Schedule 4 [Design and Construction Protocols], and operate in accordance with the Project Requirements and are ready for application for Service Commencement.

I certify that I am a registered professional, and I am a member of the firm _____ and I sign this Certificate on behalf of the firm.

Print Name _____

Date _____

Signature _____

Initials Sample _____

Address _____

Address _____

Phone _____

(Affix Professional Seal in Space Above)

**SERVICE PROVIDER CERTIFICATION
TO BE SIGNED FOR FINAL COMMISSIONING CERTIFICATE**

The Service Provider hereby confirms that the System, as Commissioned, can be operated and maintained in accordance with the applicable O&M Requirements.

I certify that I am an authorized representative of the Service Provider, and I sign this Certificate on behalf of the Service Provider.

Print Name

Date

Signature

Initials Sample

Address

Address

Phone

Appendix 4B

PROJECT SPECIFIC SUBMISSION REQUIREMENTS

1. FINAL DESIGN DRAWING CONTENTS

The contents of the Final Designs for each discipline shall contain the appropriate amount of information to demonstrate compliance with the Project Requirements, and shall include:

- (a) for all Roadway Final Designs:
 - (i) removal plans;
 - (ii) alignment plans to be drawn at 1:500 and contain all of the following:
 - (A) key plan;
 - (B) streets / avenues / roads labels;
 - (C) lane widths;
 - (D) pavement markings;
 - (E) roadway bus pads;
 - (F) bus shelter pads;
 - (G) bus stop locations;
 - (H) lawn mower accesses;
 - (I) drop noses;
 - (J) alley and crossing;
 - (K) at-grade road crossings;
 - (L) turn bay lengths;
 - (M) turn bay tangents;
 - (N) local businesses / schools: labeled;
 - (O) taper lengths;
 - (P) design and posted speeds;
 - (Q) corner radii;
 - (R) survey monuments;
 - (S) existing sidewalks;
 - (T) ramps;
 - (U) proposed property lines;
 - (V) project limits;
 - (W) pipeline crossings;
 - (X) existing curb lines;
 - (Y) crosswalk markings;

- (Z) surface utilities;
 - (AA) control line with stationing;
 - (BB) bus stop number;
 - (CC) existing trees;
 - (DD) existing and proposed retaining walls;
 - (EE) existing planters/planting locations;
 - (FF) existing and proposed fences;
 - (GG) existing private walks; and
 - (HH) proposed private walk connectors/reconstruction;
- (iii) profiles to be drawn at 1:500H / 1:100V and contain the following:
- (A) existing lip / existing ground profile;
 - (B) proposed lip profile;
 - (C) elevations;
 - (D) stationing;
 - (E) pi points;
 - (F) proposed slopes;
 - (G) vpi stations and elevations;
 - (H) vertical curve data;
 - (I) k value;
 - (J) proposed lane profiles as required;
 - (K) plan/profile format;
 - (L) false grading at sag locations for vertical curves;
 - (M) strip grading at every 10m;
 - (N) labeling of profiles as required;
 - (O) proposed walk profiles as required;
 - (P) flow arrows on plan view; and
 - (Q) vpi stationing and elevations on plan view;
- (iv) cross sections to be drawn at 1:100h / 1:50v and contain the following:
- (A) existing and proposed property lines;
 - (B) x-falls;
 - (C) lane width dimensions;

- (D) proposed pavement structure;
 - (E) proposed street lights and power poles;
 - (F) cross section location on plan view;
 - (G) existing trees, fire hydrants, street lights, power poles;
 - (H) wick drains;
 - (I) identify and label lanes direction (eb / wb / nb / sb);
 - (J) draw existing ground;
 - (K) proposed trees, walks, shared use path (sup);
 - (L) proposed retaining walls; and
 - (M) existing and proposed fence;
- (b) for all drainage Final Designs:
 - (i) sewer removal/abandonment plans;
 - (ii) sewer relocation plan/profile drawings drawn at 1:500h / 1:100v;
 - (iii) new drainage system plan and profile drawings drawn at 1:500h / 1:100v; and
 - (iv) track drainage plans;
 - (c) for all Deconstruction Work Final Designs:
 - (i) an overall site plan; and
 - (ii) a plan of remaining below grade structures;
 - (d) for all URP Work Final Designs:
 - (i) existing Utility plans drawn at 1:500; and
 - (ii) proposed Utility plans drawn at 1:500;
 - (e) for all landscaping Final Designs:
 - (i) tree and plant removal plans;
 - (ii) tree protection details;
 - (iii) soil and material plans;
 - (iv) planting plans and details; and
 - (v) furnishing plans;
 - (f) for all Traffic Signal Equipment Final Designs:
 - (i) Traffic Signal Equipment location plans;
 - (ii) site drawings;
 - (iii) timing sheets;

- (iv) logic wiring diagrams;
 - (v) shop drawings of all traffic signal poles used;
 - (vi) Traffic Controller cabinet wiring diagrams; and
 - (vii) Traffic Signal Equipment typical details;
- (g) for all street lighting Final Designs:
- (i) photometric result drawings; and
 - (ii) pole location plans.

Appendix 4C

PROJECT DRAWING STANDARDS

PROJECT DRAWING STANDARDS

1. DRAFTING GUIDELINES AND INSTRUCTIONS

1.1 General

- (a) This Appendix 4C [*Project Drawing Standards*] applies to all hard copy and electronic drawing submissions.
- (b) All electronic drawings shall be submitted in a format compatible with Autodesk 2014 or newer products.
- (c) All electronic files submitted shall be virus free.
- (d) The Project coordinate system is NAD83 - 3TM referenced to the 114° meridian.
- (e) All drawings shall be submitted in GRID coordinates.
- (f) All drawings shall be legible and scalable.

1.2 Drawing Layout

- (a) All drawings shall be completed in metric units.
- (b) Drawing files shall be drawn at 1:1.
- (c) The scanning of hard copy drawings to produce the required drawing files is not acceptable. Only vector based (CAD) drawings are to be used.
- (d) The file name shall be the same as the drawing number.
- (e) The scale selected for a particular drawing will depend on the information to be shown on the drawing. The scales are based on full-sized, nominally A1, drawings. The preferred scales to be used on all drawings are as in Table 4C-1:

Table 4C-1. Preferred Drawing Scales

Type of Drawing		Preferred
Overall Plans		1:500
Plan / Profiles	Horizontal	1:500
	Vertical	1:100
Architectural / Structural Plans		1:100
Details		1:20

1.3 Drafting

The following is a list of drafting guidelines and instructions for the Project:

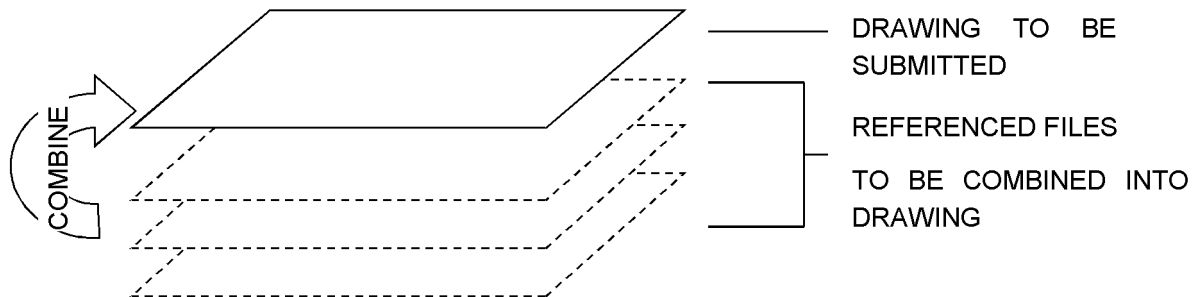
- (a) all line work must be accurate and all intersections must be trimmed;

- (b) all drawing files must be purged of and audited for redundant and unnecessary information;
- (c) all lettering shall be in capitals except metric SI unit symbols which are to follow SI practice (e.g. mm, m, km, kN, MPa);
- (d) when associated with a number, symbols shall always be used (e.g. 16 m, not 16 metre). However, in text the unit shall be spelled out in full;
- (e) when a decimal fraction is used, a leading zero shall be placed in front of the decimal point;
- (f) do not abbreviate unless required to save space. Do not abbreviate in notes;
- (g) when abbreviating, use only standard abbreviations, and use without periods;
- (h) place annotations as close as possible to the relevant item to eliminate or reduce the length of leaders;
- (i) where possible annotations shall be in full and positioned to be readable from the bottom of the plan;
- (j) river and stream names shall follow the shape of the feature;
- (k) use a space between numbers and units (e.g. 100 mm);
- (l) cross references to other drawings in notes shall refer to the other drawing number;
- (m) all dimensions shall be ground dimensions. Stations may be given in either grid or ground coordinates. The chosen system shall be specified in the general notes and used uniformly across all drawings sets;
- (n) skew angles shall be given to the nearest minute;
- (o) all drawing sets shall have consistent presentation. Design teams shall be coordinated so that all like drawings are presented in a uniform manner;
- (p) each drawing package shall include legends for all linetypes and symbols; and
- (q) design drawings shall illustrate what is to be constructed, and shall not show multiple options.

2. DRAWING MANAGEMENT

2.1 Drawing Organization

- (a) For all CAD submissions all referenced files shall be bound together into one file.



2.2 Submissions

2.2.1 General

- (a) An index listing of all drawings included in the drawing set shall be shown on the first sheet of the set.
- (b) All objects on layers that are turned off or frozen shall be deleted from the drawing.
- (c) All drawings shall be drawn at a scale of 1:1.
- (d) Confirm that any externally referenced files are correctly attached.

2.2.2 Drawing Submissions

- (a) Presentation drawings for providing information to Communications Stakeholders shall be provided upon request. These are usually larger drawings, images, and charts that may be mounted on foamcore for display, and are intended to be used at open houses, Communications Stakeholder meetings, council presentations, internal meetings, or other gatherings. These drawings shall be submitted:
- (i) in hard copy and mounted, if requested; and
 - (ii) electronically, in the following formats:
 - (A) PDF;
 - (B) AutoCAD, Revit, CorelDraw, Power Point, or Jpeg; and
 - (C) scanned to TIFF (if hand drawn or coloured).
- (b) Report drawings & figures, if requested, shall be either 8½" x 11" or 11" x 17" in sheet size, and shall be submitted:
- (i) in hard copy as part of a report; and

- (ii) electronically as part of the report, in the following formats:
 - (A) PDF;
 - (B) a format compatible with Autodesk 2014 or newer products.; and
 - (C) scanned to TIFF (if hand drawn).
- (c) Where sketches are required for clarification of any design, they shall be either 8½" x 11" or 11" x 17" in sheet size, and shall be submitted:
 - (i) in hard copy for distribution to Communications Stakeholders; and
 - (ii) submitted in the following electronic formats:
 - (A) PDF; and
 - (B) a format compatible with Autodesk 2014 or newer products.
- (d) Design Drawings for each Final Design shall:
 - (i) be issue no "0", dated and initialled in the "issue data" portion of the title block for Design Drawings that had no revisions or addenda changes;
 - (ii) have a note on the CAD files indicating when the original Design Drawings were signed and sealed, and by whom;
 - (iii) be submitted electronically in the following quantities and formats:
 - (A) two (2) sets of 11" x 17" Design Drawings, scaled half size, in PDF on CD, DVD, USB drive or portable HDD; and
 - (B) two (2) sets of the native Design Drawings in a format compatible with Autodesk 2014 or newer products on CD, DVD, USB drive or portable HDD;
 - (iv) be submitted in hard copy in the following quantity and format:
 - (A) two (2) sets of signed and sealed 11" x 17" sized sets of Design Drawings, scaled half size.
- (e) If required, revised Design Drawings for a Final Design shall:
 - (i) include the next sequential revision number as the revision number with a description of the revision in the revision block. The revision shall be clouded on the Design Drawing, and noted with the revision number shown adjacent to the cloud in a triangle;
 - (ii) include a note indicating when the original Design Drawing was signed and sealed, and by whom on the AutoCAD versions of the drawing; and
 - (iii) be submitted in the following electronic formats:
 - (A) PDF; and
 - (B) a format compatible with Autodesk 2014 or newer products.

- (f) All Record Drawings shall:
 - (i) include the note "Record" and initials in the "issue data" portion of the revision block;
 - (ii) be clean of revision notes and clouding from previous revisions;
 - (iii) have the revision number reset to 0;
 - (iv) include the typed name of the reviewer in the "reviewed by" title block;
 - (v) be submitted electronically in the following quantities and formats:
 - (A) two (2) sets of 11" x 17" Record Drawings, scaled half size, in PDF on CD, DVD, USB drive or portable HDD; and
 - (B) two (2) sets of the native Record Drawings in CAD format compatible with Autodesk 2014 or newer products on CD, DVD, USB drive or portable HDD;
 - (vi) be submitted in hard copy in the following quantity and format:
 - (A) two (2) sets of signed and sealed 11" x 17" sized set of Record Drawings on 24 lb bond paper, scaled half size;
 - (vii) include two cerlox bound sets of signed and sealed record shop drawings in 11" x 17" format on 24 lb paper; and
 - (viii) include all record shop drawings on CD, DVD, USB drive or portable HDD.

2.2.3 City of Edmonton CARDEX Naming Format

- (a) All Roadways, drainage and landscaping Final Design drawings shall include a secondary drawing numbering format that conforms to the standard City of Edmonton CARDEX system.
- (b) Project Co shall provide a drawing list for all Roadways, drainage and landscaping drawings in advance of the Final Design submission in order for the City to assign CARDEX numbers for the drawings. The City will need 10 Business Days to review the drawings lists and provide the requested numbers. Project Co shall accommodate this requirement in scheduling the submission of all applicable Final Designs.
- (c) For reference, "S085 131 A01", is the file name format for all Roadways, drainage and landscaping drawings.

2.2.4 Roadways Base Drawing Layer Format

- (a) Notwithstanding the electronic filing requirements of Section 2.2.2 *[Drawing Submissions]* of this Appendix 4C *[Project Drawing Standards]*, the Roadways base drawing file shall be submitted in Microstation format with the following levels:
 - (i) Curb Line:
 - (A) Level Name: RD_DETL_CURB, color=9, weight=3, linestyle=0;

- (ii) Lip Line:
 - (A) Level Name: RD_DETL_LIPG, color=8, weight=2, linestyle=0;
- (iii) Walk/Curb Ramps:
 - (A) Level Name: RD_DETL_WALK, color=13, weight=2, linestyle=0; and
- (iv) Shared Use Paths:
 - (A) Level Name: RD_DETL_WALK, color=8, weight=2, linestyle=0.