THE CITY OF EDMONTON

PROJECT AGREEMENT
VALLEY LINE WEST LRT

Schedule 4
Design and Construction Protocols

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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 120 days after the Effective Date, or at an alternate date Accepted by the City in the Submittal Schedule and Register, Project Co shall prepare and submit an integrated Project management plan, which shall be administered by Project Co's Representative, (the "**Integrated Project Management Plan**"). The Integrated Project Management Plan shall describe:

(i) the methodology for implementing integrated project management for the Project;

(ii) how Project Co will be organized at the company level and personnel level to optimize empowerment and effectiveness of Key Individuals and all other key participants;

(iii) integrated controls and processes to ensure Integration between disciplines in both the Design and Construction and prevent any single discipline (Design or Construction) from working in isolation from any other discipline;

(iv) how the management plans required in this Agreement, including the Design Management Plan, Construction Management Plan, Quality Management Plan, Overall Communications Strategy, Annual Design and Construction Communications Plans and Commissioning Plan, are integrated to ensure cohesive delivery of the Design and Construction in compliance with the Project Requirements;

(v) how Project Co intends to maintain relationships with, and optimize contributions of, its Subcontractors;

(vi) outline approach to maintaining proactive and effective communication with the City and how on-going communications with the City will be managed, including how issue resolution protocols are aligned to organization of the City's teams;

(vii) how communications with Stakeholders will be managed and aligned with Schedule 12 *[Communications and Engagement]*;

(viii) how Project risks will be managed, including identification of specific Project risks that may materially affect Project Co's ability to comply with the Project Requirements and Project Co's strategy for mitigation of such risks; and

(ix) how Project Co will manage its work to minimize impacts to operations of Valley Line LRT Stage 1 and Valley Line LRT.

(b) Project Co shall segment the Design and Construction into discrete, logically organized work packages (each a "**Work Package**"). Subject to Section 6.6(c), each Work Package shall:

(i) match the structure identified in the "Work Breakdown Structure" as shown in Appendix 4D *[Work Breakdown Structure]* or as otherwise agreed by the City, provided however, that Project Co may submit proposed modifications to the Work Breakdown Structure to the City within 60 days of the Effective Date for the City's review. Such modifications shall be minor in nature and result in substantially equivalent breakdown of the work acceptable to City. Failure to achieve an Accepted endorsement within 90 days of the Effective Date will result in the Work Breakdown Structure located in Appendix 4D *[Work Breakdown Structure]* being the Accepted Work Breakdown Structure;

(ii) provide sufficient context to permit the City to understand and review the applicable Design scope in accordance with Schedule 2 *[Submittal Review Procedure]*;

(iii) be traceable to the applicable Project Requirements in accordance with the Requirements Management process;

(iv) be comprised of a sufficient scope of work, to the satisfaction of the City acting reasonably, to permit logical and efficient management, administration, reporting and review; and

(v) preserve its scope of work as delivery of the Work Package 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 aspects of the Design and Construction are assigned to Work Packages;

(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, where applicable, Commissioning Certificates for each Work Package in the form required by the NBCAE or in the form attached as Appendix 4A *[Certificate Forms]* to 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 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 Joint Committee**") consisting of the City's Representative, Project Co's Representative, Key Individuals as reasonably necessary or as required by the City, and such other members as the Parties may agree from time to time.

(b) The duties and obligations of the Construction Joint Committee shall end at the Final Completion Date.

(c) The purpose of the Construction Joint Committee is to provide a formal forum for the Parties to consult and cooperate in all matters relating to the Project. Any member appointed to the Construction 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) The Construction Manager, or a member of the Construction Joint Committee as approved by the City, shall attend Communications Working Group meetings in accordance with the requirements set out in Section 3.15 *[Communications and Engagement Working Group]* of Schedule 12 *[Communications and Engagement]*.

3.1.2 Authority

The Construction 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) shall adopt the terms of reference provided in Appendix 4E *[Construction Joint Committee Terms of Reference]* of this Schedule and any revisions agreed to by the City**;**

(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) Safety Sub-committee, comprised of:

(A) fire and life safety, as further described as the "Fire-Life Safety Committee (FLSC)" in the 'Handbook for Transit Safety and Security Certification' published by the U.S. Department of Transportation, Federal Transit Administration; and

(B) safety and security, as further described as the "Safety and Security Review Committee (SRC)" in the 'Handbook for Transit Safety and Security Certification' published by the U.S. Department of Transportation, Federal Transit Administration;

(ii) Commissioning Sub-committee, as further described in Section 9 *[Commissioning]* of this Schedule;

(iii) Interim Design Review Sub-committee, as further described in Section 6.8 *[Interim Design Reviews]* of this Schedule;

(iv) Integration Sub-committee, as further described in Section 5.7.4 *[Integration Sub-committee]* of this Schedule;

(v) Operational and Maintenance Readiness Sub-committee, as further described in Section 5.10 *[Operational and Maintenance Readiness Sub-committee],* closely aligned with the Integration Sub-committee, but focused upon operations and maintenance preparedness;

(d) 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 Joint Committee may determine are necessary from time to time and all such sub-committees shall report to the Construction Joint Committee; and

(e) 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 Joint Committee shall be convened by the chair on not less than five (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 by any member on such notice as may be reasonable in the circumstances.

(b) Construction Joint Committee shall be chaired by a representative of the City unless the City requires that a representative of Project Co chair the Construction Joint Committee.

(c) The Construction Joint Committee meetings shall be attended by all members.

(d) The Construction Joint Committee shall meet at least once each month at a location selected by the City, within the city of Edmonton (unless otherwise agreed by its members) and, at other times, as determined by the Construction Joint Committee.

(e) The Construction Joint Committee shall accommodate reasonable requests for additional meetings by any member of the Construction Joint Committee.

(f) The City shall keep minutes of all meetings and any recommendations of the Construction Joint Committee and shall circulate such minutes to Project Co within ten (10) Business Days of the holding of the meeting or the making of the recommendation. Any comments on the minutes shall be provided within five (5) Business Days of circulation.

(g) 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 five (5) Business Days prior to each monthly meeting of the Construction Joint Committee.

3.2 Construction Period Reporting

3.2.1 Monthly Progress Report

(a) No later than seven (7) days after the end of each month during the Construction Period, Project Co shall submit a Monthly Progress Report which shall describe 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 working level schedule, aligned to the Construction Schedule and the most recent Schedule Update, 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 and man-hours (broken down by Project Co work forces and Subcontractors) for the previous month, as reported pursuant to Section 9 *[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 Section 3.7 *[Monthly Quality Management Reports]* of Schedule 9 *[Quality Management]*;

(C) financial reporting of the previous month's invoicing against contract value, along with a table listing all the previously approved invoices and their respective values plus a similar table for all Change Order Confirmations to date;

(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 Register and any related issues, including identification of problems and issues that have arisen during the current reporting period, and are causing delay or may cause delay to the Design or Construction, outstanding problems and issues and summary of resolved problems and issues;

(G) interfaces and Integration progress for the previous month, including meetings held with the LRV Supplier, the Operator and TransEd;

(H) updates to the Hazard Logs;

(I) communication and engagement progress and issues for the previous month, including a summary of any events and inquiries;

(J) any other information or data which describes the previous month's progress or issues related to the Design and Construction;

(K) 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;

(L) progress photographs for each Site that support the assessment of progress;

(iv) to the extent not included in the foregoing, the reports required pursuant to Section 1.7(a) of this Agreement; and

(v) corrections to the most recent past monthly report where the City has identified errors or lack of clarity in reporting that have not been corrected in that past report. This shall include reference to the section and a statement of the corrected information.

4. PROJECT CO'S RESPONSIBILITIES

4.1 Design and Construction Responsibility

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 in the Project Requirements, as soon as practicable, but no later than 15 days, after becoming aware of such conflict or inconsistency in 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 Construction Completion Date:

(i) is complete, safe, secure and operational in accordance with and as described in the Project Requirements;

(ii) conforms to Section 1-2.1.2 [*Operational Design Parameters*] and Section 1-2.1.3 *[Operational Principles]* of Schedule 5 *[D & C Performance Requirements]*;

(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, to the extent that they are not in conflict, take precedence over those in the applicable Project Approvals;

(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 Final Completion Date, the Lands are clear of all Temporary Works, including construction site offices;

(e) maintain a complete, unfolded hard copy, full-sized (nominally A1), original set of:

(i) all signed and stamped Design Drawings; and

(ii) all shop or fabrication drawings required to be signed and stamped, together with all revisions thereto, on 24 lb. bond, until delivered to the City in accordance with this Agreement. 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

(f) comply with all Applicable Law and City Policies.

4.2 Standard of Performance for Design and Construction

Project Co shall, at all times during the Term 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 Not Used

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 Part 1 of Schedule 28 *[Project Approvals and Utility Matters]*.

4.5 LEED® Silver Certification

(a) Project Co shall obtain LEED® Silver Certification for:

(i) those portions of the Gerry Wright OMF Building B and the Lewis Farms Storage Facility Building specified in Section 8-2.6.1 *[Gerry Wright OMF Sustainability Requirements]* and Section 8-3.6.2 *[Lewis Farms Storage Facility Building Sustainability Requirements]* of Schedule 5 *[D&C Performance Requirements]* using LEED Building Design and Construction: New Construction and in accordance with the following:

(A) within 30 days after the Effective Date, or at an alternate date agreed by the City, Project Co shall register the relevant aspects of the Gerry Wright OMF Building B and Lewis Farms Storage Facility Building with the Canadian Green Building Council (CaGBC);

(B) except as otherwise contemplated or permitted by this Section 4.5(a) *[LEED® Silver Certification]* Project Co shall 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 the City to incur any liability, cost or expense;

(C) 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 Building B and Lewis Farms Storage Facility Building, Project Co shall forthwith notify the City of such change and such change shall be handled in accordance with Schedule 13 *[Changes]*;

(D) Project Co shall compile and submit all required documents for LEED® Silver Certification;

(E) If for any reason, Project Co fails to obtain LEED® Silver Certification for the Gerry Wright OMF Building B or for the Lewis Farms Storage Facility Building by 24 months following the Construction Completion Date,

Project Co shall, upon written demand from the City, promptly and in any event, within three (3) Business Days, pay to the City the amount of [redacted] as liquidated damages for each of such facilities for which Project Co fails to obtain LEED® Silver Certification; and

(F) Project Co and the City acknowledge and agree that such liquidated damages are not a penalty but a genuine pre-estimate of the damages suffered by the City as a result of Project Co failing to obtain LEED® Silver Certification for the Gerry Wright OMF Building B or for the Lewis Farms Storage Facility Building by 24 months following the Construction Completion Date and, 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 Building B and the Lewis Farms Storage Facility Building, as applicable. 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 Phase 1 Construction Completion Date for the relevant aspects of the Gerry Wright OMF Building B and no later than 30 days prior to the Construction Completion Date for the relevant aspects of the Lewis Farms Storage Facility Building:

(i) LEED® checklists, generally in accordance with CaGBC requirements, together with a written confirmation that, in Project Co's judgment, LEED® Silver Certification will be achieved as required by this Section 4.5 *[LEED Silver Certification]*;

(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.

(c) As security for Project Co's obligations pursuant to Section 4.5(a)(i)(E) *[LEED® Silver Certification]*, Project Co shall deliver, or cause to be delivered, to the City no later than Construction Completion, an irrevocable letter of credit (the "**LEED Letter of Credit**") substantially in the form of Schedule 30 *[Letter of Credit]* to the Agreement. The LEED Letter of Credit shall be in an amount equal to four million dollars ($4,000,000) (the "**LEED Amount**"). The LEED Letter of Credit shall be subject to the following:

(i) The LEED Letter of Credit must be issued by one or more Permitted Letter of Credit Providers;

(ii) In the event that the LEED Letter of Credit must be renewed at any time, Project Co agrees to provide to the City reasonable evidence of the renewal of such LEED Letter of Credit no later than ten (10) Business Days prior to the renewal date, if any, of such LEED Letter of Credit;

(iii) In the event that Project Co does not deliver the LEED Letter of Credit in accordance with Section 4.5(c) *[LEED® Silver Certification]*, the City may withhold from any amount otherwise due to Project Co by the City, including without limitation, any release of the Construction Completion Payment or the Construction Completion Deficiencies Holdback, an amount equal to the

LEED Amount (the "**LEED Letter of Credit Holdback**"), which holdback shall be held in an interest bearing account until such time as Project Co delivers the LEED Letter of Credit;

(iv) The City shall release the LEED Letter of Credit Holdback and together with all interest accrued thereon, no later than five (5) days following delivery of the LEED Letter of Credit to the City;

(v) The City shall be entitled to draw on the LEED Letter of Credit or the LEED Letter of Credit Holdback, as applicable, in an amount equal to any unpaid liquidated damages owing by Project Co pursuant to and as a result of Project Co's breach of its obligations under Section 4.5(a)(i)(E) *[LEED® Silver Certification]*;

(vi) Notwithstanding anything to the contrary in this Section 4.5(c) *[LEED® Silver Certification]*, the City shall be entitled to draw on the LEED Letter of Credit:

(A) upon the failure of Project Co to renew the LEED Letter of Credit pursuant to Section 4.5(c)(ii) *[LEED® Silver Certification]*;

(B) upon the downgrading of any of the banks or other financial institutions that issued the LEED Letter of Credit so that they no longer meet the requirements of a "Permitted Letter of Credit Provider" where the LEED Letter of Credit has not been replaced by Project Co with a replacement LEED Letter of Credit from a Permitted Letter of Credit Provider within 30 calendar days of such downgrading; or

(C) upon the bankruptcy or insolvency of any of the banks or other financial institutions that issued the LEED Letter of Credit,

provided that the City shall provide Project Co at least two Business Days prior written notice before drawing on the LEED Letter of Credit pursuant to this Section 4.5(c)(v) *[LEED® Silver Certification]*;

(vii) In the event that the LEED Letter of Credit is drawn down in accordance with Section 4.5(c)(v) *[LEED® Silver Certification]*, the City shall hold the cash proceeds thereof in an interest bearing account (provided that such account must be at a Permitted Letter of Credit Provider*)* and such cash proceeds shall thereupon stand in place of the LEED Letter of Credit until Project Co delivers (or causes the delivery of) a replacement LEED Letter of Credit to the City. All interest earned on such cash proceeds shall be for the benefit of Project Co. The City shall be entitled to withdraw such cash proceeds in the same manner that it is permitted to draw upon the LEED Letter of Credit pursuant to Section 4.5(c)(v) *[LEED® Silver Certification]*. Upon the replacement of the LEED Letter of Credit by Project Co, the City shall return all remaining cash proceeds and all accrued interest thereon from such segregated bank account to Project Co or as Project Co may direct within five (5) Business Days

(viii) The City may make multiple calls on the LEED Letter of Credit in accordance with this Section 4.5(c) *[LEED® Silver Certification]*; and

(ix) Unless the LEED Letter of Credit is fully drawn by the City in accordance with the provisions of this Agreement, the City shall, upon receipt of a written request from Project Co, release and deliver the LEED Letter of Credit to Project Co on

the next business day following the receipt of such request; provided that such request shall not be made prior to the earlier of (i) the date Project Co obtains LEED® Silver Certification for the Gerry Wright OMF Building B and Lewis Farms Storage Facility Building; and (ii) the date Project Co pays the liquidated damages pursuant to and in accordance with Section 4.5(a)(i)(E) [LEED® Silver Certification].

4.6 Community Employment Benefits Plan

(a) Project Co shall submit a completed Community Employment Benefits Plan within 90 Business Days of the Effective Date.

(b) Project Co shall implement the approved Community Employment Benefits Plan. The Community Employment Benefits Plan shall include:

(i) identification of the Project Co Person responsible for developing and implementing the Community Employment Benefits Plan and an overall team composition that will support the Community Employment Benefits Plan, including their roles and responsibilities. Individual(s) must have the necessary experience to undertake this initiative including a combination of the following: cultural competency training, diversity and inclusion training, experience with recruitment and maintaining employment of equity seeking groups, etc. Include an organizational chart demonstrating integration of the Community Employment Benefits Plan among Project Co and Project Co Persons.

(ii) planned initiatives to recruit, hire and train members of Targeted Groups, including identification and mitigation of barriers to employment of Targeted Groups;

(iii) planned initiatives to hire and/or procure services from small, medium, social or diversity-owned enterprises;

(iv) planned initiatives to ensure the Community Employment Benefits Plan is utilized by Sub-contractors;

(v) planned initiatives to communicate and engage potential Stakeholders about employment opportunities that are available to Targeted Groups;

(vi) a description of Project Co's approach to monitoring the Community Employment Benefits Plan and the submission of annual reports to the City;

(vii) a description of Project Co's diversity and inclusion training that will be made available to Project Co and Project Co Persons; and

(viii) any other considerations, tools and mechanisms that Project Co will employ to meet, advance and achieve the goals and objectives for the Community Employment Benefits Plan in alignment and compliance with the federal Community Employment Benefits Framework.

(c) The Table 4-4.6 below shall set the minimum standard target hours, contract value and employment opportunities to be met for each category of Targeted Groups:

Table 4-4.6: Minimum Standard Target Hours, Contract Value and Employment Opportunities for Categories of Target Groups

4-4.6			
Targeted Groups	**Definition**	**Target Ratio (% of total hours worked)**	**Employment Opportunities**
Apprentices	Individuals receiving skills training for designated occupations under the supervision of a certified journeyperson.	50 Apprentices	All available project trades will have apprenticeship opportunities.
Indigenous Peoples	Original peoples of North America and their descendants which include First Nations (Status and Non-Status), Inuit and Metis	10 %	Employment opportunities throughout the organization, including Project Management, Engineering and Construction will be made available.
Women	Individuals who reported identifying with the female gender	20 %	Employment opportunities throughout the organization, focusing in areas traditionally underrepresented by women such as Project Management, Engineering and Construction will be made available.
Youth	Individuals between the ages of 15 to 29	10%	Training and employment opportunities for entry-level positions and intermediate positions throughout the organization.
New Canadians	Permanent residents or new citizens of Canada arriving within the past 7 years who are eligible to work in Canada	10 %	Employment opportunities throughout the organization, including Project Management, Engineering and Construction will be made available.
Targeted Groups	**Definition**	**Contract Value ($)**	**Contract Opportunities**
Small enterprise	Businesses with less than 100 employees	$1,800,000.00	Providing contract opportunities for goods and services across the Project.
Medium enterprise	Business with between 100 and 499 employees	$4,800,000.00	Providing contract opportunities for goods

			and services across the Project.
Social enterprise	Businesses owned by non-profit organizations, that produce and/or sell goods and services for the blended purpose of generating income and achieving social, cultural, and/or environmental aims	$50,000.00	Providing contract opportunities for goods and services across the Project.
Diversity Ownership	Businesses owned by a visible minority, Indigenous peoples, women, persons with disabilities or any other underrepresented group	$500,000.00	Providing contract opportunities for goods and services across the Project.

(d) On each anniversary of Commercial Close until the Construction Completion Date (on which date the last submission under this Section 4.6 [Community Employment Benefits Plan] shall be made), Project Co shall provide an annual report to the City on the implementation of the Community Employment Benefits Plan which report shall include:

(i) an overall summary report including Project Co's overall experience in implementing the Community Employment Benefits Plan, finalized target ratios, lessons learned for application to future projects, as well as an executive summary for public release; and

(ii) detailed information setting out Project Co's progress toward achieving the objectives set out in the Community Employment Benefits Plan, including:

(A) identification of successes achieved by Project Co in meeting its objectives under the Community Employment Benefits Plan;

(B) an identification of any barriers that prevented Project Co from achieving its objectives and approaches to mitigate barriers;

(C) the number of hours worked by each class of Targeted Groups in the relevant annual period and cumulatively from the Effective Date; and

(D) the value of contracts provided to diversity ownership, small, medium and social enterprises;

(iii) if targets for each of the Targeted Groups as outlined in Table 4-4.6 are not met, a mitigation strategy and approach to achieving target ratios by the next annual report.

(e) The City may require Project Co to submit bi-annual and/or quarterly reports supporting going implementation of the Community Employment Benefits Plan, if in the City's opinion, acting reasonably, Project Co is failing to meet targets as outlined in Table 4-4.6 and mitigation strategies and results have failed to demonstrate continuous improvement to achieving target ratios.

(f) The City may require Project Co to amend its Community Employment Benefits Plan if in the City's opinion, acting reasonably, Project Co is failing to maximize employment

opportunities on the Project pursuant to the then current Community Employment Benefits Plan.

(g) Project Co's Community Employment Benefits Plan shall not be Confidential Information and the City may, in its sole discretion, release Project Co's Community Employment Benefits Plan to the public. The City shall consult and coordinate with Project Co in such release.

5. SYSTEM AND SAFETY ASSURANCE

5.1 General

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]*:

(a) independent verification and validation;

(b) the Safety and Security Certification Program;

(c) Requirements Management;

(d) the RAM Program;

(e) Integration Management;

(f) configuration management;

(g) Road Safety Audit;

(h) human factors;

(i) climatic extremes; and

(j) Design Service Life.

5.2 Program Management Plan

5.2.1 General

(a) Within 90 days after the Effective Date, or at an alternate date Accepted by the City in the Submittal Schedule and Register, Project Co shall prepare and submit a program management plan, (the "**Program Management Plan**") which shall include:

(i) an Integration Management Sub-Plan, described in Section 5.2.2.1 *[Integration Management Sub-Plan]* of this Schedule;

(ii) a Requirements Management Sub-Plan, described in Section 5.2.2.2 *[Requirements Management Sub-Plan]* of this Schedule;

(iii) a Configuration Management Sub-Plan, described in Section 5.2.2.3 *[Configuration Management Sub-Plan]* of this Schedule;

(b) The Program Management Plan shall be developed in conjunction with the Design Management Plan.

5.2.2 Program Management Sub-Plans

5.2.2.1 Integration Management Sub-Plan

The Integration Management Sub-Plan shall:

(a) describe the processes and procedures required to satisfy the requirements of Section 5.7 *[Integration Management]* of this Schedule and how the Integration milestones will be delivered successfully in time;

(b) describe the processes and technical Integration requirements required to satisfy the requirements of Part 7 *[LRV Integration Requirements]* of Schedule 5 *[D&C Performance Requirements]*;

(c) include details of the organization, roles and responsibilities for all Integration Management activities;

(d) describe the process to proactively identify, assign responsibility, co-ordinate, track, resolve and test interface and Integration issues;

(e) describe any software tools to be used for Integration Management;

(f) describe the process for incorporating relevant interface and Integration issues into the other system and safety assurance activities;

(g) be based on the preliminary Integration Management narrative included in the Proposal Extracts; and

(h) include an Integration Register.

5.2.2.2 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 their impacts, if any; and

(g) be based on the preliminary Requirements Management Sub-Plan included in the Proposal Extracts.

5.2.2.3 Configuration Management Sub-Plan

The Configuration Management Sub-Plan shall include:

(a) a detailed description of the overall configuration management strategy that will be implemented across all project phases;

(b) a demonstration of compliance with the configuration management processes detailed in IEEE 15288-2015 and IEEE 828-2012;

(c) the roles, responsibilities, accountabilities, and authorities with respect to configuration management;

(d) the integration of configuration management with the Design Management Plan;

(e) a list of configuration items, including the hierarchy and structure of all information;

(f) the full details of the numbering scheme for all documents, drawings and products including all configuration items, including system, subsystem, components, hardware, firmware and software components;

(g) the description of all tools being used in the configuration management process;

(h) a disposition of, access to, release of and control of changes to configuration items;

(i) the necessary baselines to be established;

(j) the locations and conditions of storage, storage media and its environment, in accordance with designated levels of integrity, security and safety;

(k) the criteria or events for commencing configuration control and maintaining baselines of evolving configurations;

(l) the audit strategy and the responsibilities for assessing continual integrity and security of the configuration definition information;

(m) change management, including any planned configuration control boards, regular and emergency change requests and procedures for change management;

(n) a description of how configuration management will be coordinated across of Project Co supplier and supply chain organizations;

(o) the archive and retrieval approach for configuration items, configuration management artifacts and data; and

(p) a description of how the configuration management process will be integrated with the configuration management used on the Valley Line LRT Stage 1, including document nomenclature and numbering scheme.

5.2.3 Updates to the Program Management Plan

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

5.2.4 Compliance with the Program Management Plan

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

5.3 Independent Verification & Validation

Project Co shall retain a qualified organization or team of individuals, independent of each of the Design Team, Project Co, Project Contractors and Subcontractors, to verify, validate and certify the safety and security of the Infrastructure (the "**IV&V Team**"). The IV&V Team shall:

(a) be appointed for the purpose of performing independent verification and validation of the safety and security of the Infrastructure;

(b) 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;

(c) verify and validate compliance with the Safety and Security Certification Program while upholding the City's SUI Principles, such that the least intrusive combination of means consistent with Good Industry Practice are applied to the mitigation of identified Hazards;

(d) be responsible to prepare and submit a Safety and Security Certification Verification Report in accordance with Section 5.4.1(o)(i) *[Safety and Security Certification Program]* of this Schedule;

(e) be responsible to prepare and submit a Project Safety and Security Certificate in accordance with Section 5.4.1(p)(ii) *[Safety and Security Certification Program]* of this Schedule; and

(f) not be or include any Person who is an Affiliate of Project Co or any Project Co Person.

5.4 Safety and Security Certification Program

5.4.1 General

(a) Safety shall be Project Co's primary design and performance requirement for the Project. The Infrastructure shall be Designed and Constructed, and LRV Commissioning undertaken, so that it demonstrates that the Valley Line Stage 2 will operate in a safe manner under all operating conditions. Safety components shall be Designed according to safety principles consistent with Good Industry Practice and shall incorporate high reliability parts, selective redundancy and warning and protective devices, as required, to contribute to the achievement of the specified safety requirements.

(b) Project Co shall use commercially reasonable efforts to ensure that all material Design and operating Hazards and security vulnerabilities are identified, evaluated, and properly controlled or mitigated, to a level as low as reasonably achievable, prior to the Construction Completion Date taking into consideration the role and obligations of the Operator.

(c) The safety of the Infrastructure shall, when operating under normal conditions, preclude inadvertent/incorrect actions and/or procedures used by operating personnel. In no case shall procedures be substituted to accomplish any safety functions provided by specific aspects, components, subsystems and equipment. Frequent and/or infrequent use shall not be a reason to justify unsafe design. At all other times (when carrying out maintenance and/or failure recovery), there shall be minimum dependence on correctness of actions and/or procedures used by operating and maintenance personnel.

(d) Project Co shall coordinate and chair Hazard and operability studies, reviews, inspections and technical discussions between the City, the LRV Supplier and the Operator, and all other relevant Persons (including the SRC) and incorporate the results, including any applicable SRC decision relating to the Safety and Security Certification Program, into the Design and Construction.

(e) 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) include details of the organization, roles and responsibilities for all safety and security activities;

(iii) implement the practices described in the 'Handbook for Transit Safety and Security Certification' published by the U.S. Department of Transportation, Federal Transit Administration;

(iv) apply CPTED principles for deterrence of criminal behaviour through natural access control (entry and exit points, fences), 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;

(v) identify how sub-committees of the Construction 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;

(vi) incorporate the Hazard analysis process stipulated by the 'Hazard Analysis Guidelines for Transit Projects' published by the U.S. Department of Transportation, Federal Transit Administration into the Design;

(vii) describe the approach, methodology and schedule for all of the Hazard Analyses which will be performed, including but not limited to the Preliminary Hazard Analysis (PHA), Failure Modes and Effects Analysis (FMEA), Operating Hazard Analysis (OHA), Threat and Vulnerability Analysis (TVA) and any additional system/subsystem Hazard or safety analysis required to demonstrate the safety of the Infrastructure;

(viii) identify the standards, consistent with Good Industry Practice, to be used to establish integrity levels and to be used in the development and validation of software for equipment, components, systems and sub-systems in which software is performing a safety function;

(ix) be co-ordinated with the other system and safety assurance activities described in this Section 5 *[System and Safety Assurance]*; and

(x) include an outline of the contents of the Safety and Security Certification Verification Report and Hazard Log.

(f) Within 120 days after the Effective Date, Project Co shall submit the Safety and Security Certification Program prepared by the IV&V Team.

(g) Project Co shall prepare and submit all Hazard Analyses which have been performed as part of the Safety and Security Certification Program including the mitigation measures proposed in accordance with the following:

(i) PHA – within 150 days after the Effective Date, or an alternate date agreed by the City;

(ii) TVA – at first Interim Design and updated and resubmitted at second Interim Design and Final Design;

(iii) OHA -at first Interim Design and updated and resubmitted at second Interim Design and Final Design; and

(iv) FMEA – at Final Design.

(h) Project Co shall prepare a comprehensive Hazard analysis of each Grade Crossing (each a "**Grade Crossing Hazard Analysis**") in accordance with the Safety and Security Certification Program and Good Industry Practice, which analysis shall identify:

(i) all Hazards to Persons and property, including the Infrastructure, other infrastructure, Passengers, pedestrians, motorists, cyclists and other members of the public; and

(ii) the Design, Construction and operational procedures available to mitigate the identified Hazards.

Grade Crossing Hazard Analyses shall take into account all applicable variables, including sightlines (for all pedestrians, road users and LRVs), Train speed, motor vehicle speeds, grades, pedestrian count, proximity of playground/school zones, and clearance distances. Project Co shall submit each Grade Crossing Hazard Analysis, together with the applicable Final Design, in accordance with Schedule 2 *[Submittal Review Procedure]*.

(i) Project Co shall prepare and submit additional Hazard Analyses at Final Design, including at minimum the following system elements:

(i) LRV integration and operation;

(ii) Train Control System;

(iii) Train Routing and Priority System;

(iv) communications;

(v) Special Trackwork;

(vi) fire protection, including ventilation;

(vii) electrical;

(viii) elevators/escalators;

(ix) Traction Power; and

(x) OCS.

(j) Techniques used for the additional Hazard Analyses shall include at minimum the following:

(i) system/sub-system Hazard Analysis;

(ii) software safety analysis;

(iii) failure mode, effects and criticality analysis; and

(iv) fault tree analysis.

(k) Project Co shall establish and maintain an overall project level log to record and track Hazards for resolution as addressed in all of the Hazard Analyses (the "**Hazard Log**"). The Hazard Log will also be the mechanism used to document the transfer of Hazards to the City and any other Person(s). No Hazard shall be exported or transferred to the City or any other Person without City consent. The Hazard Log shall follow the format of the hazard log depicted in the 'Hazard Analysis Guidelines for Transit Projects' published by the U.S. Department of Transportation. The Hazard Log shall:

(i) describe all identified Hazards;

(ii) describe all measures taken to resolve each Hazard (references citing document, revision, section number) and shall document all reviews, comments, Acceptances and consents by the City;

(iii) clearly identify the Party responsible for each mitigation of a Hazard;

(iv) track all Hazards through to resolution; and

(v) be included in the Safety and Security Certification Verification Report.

(l) Project Co shall submit the Hazard Log at the first and second Interim Design, and Final Design and throughout the Construction Period when requested by the City.

(m) The Hazard resolution process involves the analysis and actions taken to reduce, to the lowest level practical, the risk associated with an identified Hazard. The Hazard resolution process shall include, but not be limited to confirming the following:

(i) that the resolution of a Hazard in one system does not create a new Hazard in or to another system;

(ii) that Hazards involving interfaces between two or more systems have been analyzed and resolved;

(iii) that all Project Co suppliers and Subcontractors are providing required Hazard Analyses in a timely manner and identification of circumstances where delinquent receipt is delaying Hazard resolution; and

(iv) that appropriate resolutions are being implemented for identified Hazards that require a change in system Design or development of special procedures.

(n) All Hazard mitigations identified in the Hazard Log shall be incorporated into the Requirements Management program as outlined in Section 5.5 *[Requirements Management]*.

(o) Not less than twenty eight (28) Business Days prior to the Phase 1 Construction Completion Date, Project Co shall cause the IV&V Team to submit:

(i) a safety and security certification verification report (the "**Phase 1 Safety and Security Certification Verification Report**") that summarizes the readiness of Gerry Wright OMF Stage 2 for Phase 1 Construction Completion 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 Gerry Wright OMF Stage 2;

(D) a list of any operating restrictions;

(E) actions required to mitigate or minimize the consequences of any remaining operating restrictions; and

(F) a schedule for eliminating all remaining Phase 1 Construction Completion Deficiencies by the applicable Deficiency Deadline(s); and

(ii) a safety and security certificate, authenticated by an Appropriate Person, in the form attached hereto as Appendix 4A *[Certificate Forms] [2-Project Safety & Security Certificate]* of this Schedule, (the "**Phase 1 Project Safety and Security Certificate**").

(p) Not less than twenty (20) Business Days prior to the Construction Completion 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 Construction Completion 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 any operating restrictions;

(E) actions required to mitigate or minimize the consequences of any remaining operating restrictions; and

(F) a schedule for eliminating all remaining Construction Completion Deficiencies by the applicable Deficiency Deadline(s); and

(ii) a safety and security certificate, authenticated by an Appropriate Person, in the form attached hereto as Appendix 4A *[Certificate Forms] [2-Project Safety & Security Certificate]* of this Schedule, (the "**Project Safety and Security Certificate**").

(q) Project Co shall submit an addendum to the Project Safety and Security Certificate within five (5) days of the Accepted rectification of any Major Deficiency related to the safe operation of the Infrastructure during the Warranty Period and Infrastructure Performance Demonstration Period.

(r) All safety analysis shall use the risk assessment and risk acceptance criteria defined in the FTA for accepting a Hazard risk level and shall be in accordance with 'Hazard Analysis Guidelines for Transit Projects' published by the U.S. Department of Transportation.

5.4.2 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]*.

5.4.3 Compliance with the Safety and Security Certification Program

Throughout the Term, 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.

5.5 Requirements Management

5.5.1 General

(a) Project Co shall be responsible for establishing a formal protocol for requirements management that identifies, captures, documents, traces, manages, verifies and validates compliance with the Project Requirements (the "**Requirements Management**") prior to the Acceptance of the Program Management Plan and shall comply with such Requirements Management protocol throughout the Construction Period.

(b) The Requirements Management protocol shall include a commercially available requirements management database software 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) Commissioning requirements;

(iv) operational requirements;

(v) safety requirements;

(vi) security requirements;

(vii) environmental requirements;

(viii) RAM requirements;

(ix) functional requirements;

(x) performance requirements;

(xi) interface requirements;

(xii) Integration requirements;

(xiii) expandability requirements;

(xiv) SUI requirements;

(xv) quality requirements;

(xvi) Communications requirements;

(xvii) Community Employment Benefit requirements;

(xviii) requirements in accordance with the Human Factors Report; and

(xix) all other derived requirements.

(c) Project Co shall maintain and keep current all Requirements Management data.

(d) The Final Design(s) for each Work Package shall include clear and complete evidence of traceability between the content of the Final Design and all applicable Project Requirements.

(e) Project Co shall submit the Requirements Management data in the native format of the Requirements Management database software tool at the first and second Interim Design, and Final Design and throughout the Construction Period when requested by the City. Project Co shall provide full read-only access to the Requirements Management data, with access to all content, attributes and links, ensuring that the chosen methodology for access allows the user to create views showing attributes of his or her choosing and provides the ability to seamlessly follow traceable links.

(f) With the Requirements Management Sub-Plan, Project Co shall provide the Requirements Management database software tool along with two (2) read-only licenses to the City, which licenses shall be maintained throughout the Term. Project Co shall transfer the administrative rights to the Requirements Management database software tool and all data base files associated with the Requirements Management database to the City following the achievement of Construction Completion and shall provide the City with one (1) administrator license and one (1) read/write access license, which license shall be maintained for a period of two (2) years following achievement of Construction Completion.

(g) Requirements Management shall follow the Requirements Management Sub-Plan as defined in Section 5.2.2.2 *[Requirements Management Sub-Plan]* of this Schedule.

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 Construction Period, 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

The Infrastructure must meet the requirements outlined in the reliability, availability, maintainability program (the **"RAM Program"**). Project Co shall be responsible for modifying the Design and implementing any required changes to enable the Infrastructure to meet the requirements outlined in the RAM Program.

5.6.2 RAM Program

Within 60 days after the Effective Date, Project Co shall prepare and submit a RAM Program in compliance with EN 50126-1, *Railway Applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*. The RAM Program shall:

(a) describe the processes and procedures to satisfy the requirements outlined in the RAM Program;

(b) include details of the organization, roles and responsibilities for all RAM Program activities;

(c) identify the individual responsible for leading the RAM Program;

(d) establish quantified and measurable RAM Program targets for all equipment, components, systems and sub-systems to assure Infrastructure reliability, availability and maintainability levels sufficient to satisfy all the requirements outlined in the RAM Program;

(e) define the RAM Program tasks, deliverables, milestones and the methodology for establishing, assigning and adjusting RAM Program targets;

(f) describe the RAM Program analyses and testing, feedback and reporting to be used to demonstrate compliance with the RAM Program targets;

(g) guide and co-ordinate the RAM Program design, analysis, test documentation and certification activities through all Project stages and phases;

(h) employ a consistent approach to RAM Program analysis across all equipment, components, systems and sub-systems that influence the RAM targets;

(i) account for the appropriate RAM Program allocations in the applicable Design(s);

(j) identify the software tools which will be used as part of the RAM Program to model the system and conduct the analysis; and

(k) be co-ordinated with the other activities described in Section 5 *[System and Safety Assurance]* and Section 9 *[Commissioning]* of this Schedule, and Schedule 7 *[Performance Demonstration Requirements]*.

5.6.3 RAM Analysis Report

Prepare and submit a RAM analysis report at the first and second Interim Design and Final Design that:

(a) provides a narrative description and an overall analytical model for the Infrastructure demonstrating that the RAM Program requirements have been achieved by the Design;

(b) lists the RAM Program targets for the Infrastructure as a whole and for the equipment, components, systems and sub-systems that make up the Infrastructure;

(c) includes narrative analyses, together with charts, diagrams, modelling or simulations demonstrating the statistical basis and sensitivity of the RAM Program target contributions from major equipment, components, systems and sub-systems to the RAM Program target(s) for the Infrastructure as a whole;

(d) provides a reliability prediction performed in accordance with MIL-HDBK-217F, parts stress method, supplemented by Non-Electronic Parts Reliability Data (NPRD-2016 - Quanterion);

(e) identifies the Design, operating and maintenance solutions to control any identified failures and conditions which impact RAM targets; and

(f) is prepared, signed and stamped by a Professional Engineer,

(collectively, the "**Final RAM Analysis Report**").

5.6.4 RAM Requirements

(a) The Infrastructure shall have an overall Availability of 98%.

(b) Availability percentage shall be determined on the basis of the equation MTBF/{MTBF+MTTR} × 100.

(c) The Infrastructure, excluding the LRV and on-board equipment, shall have an overall MTBSAF of 1,200 hours.

(d) RAM Failure Category

(i) Significant Failure: A failure that prevents Train movement or causes a delay to service greater than five (5) minutes.

(ii) Major Failure: A failure that must be rectified for the Train to achieve its specified performance and does not cause a delay to service more than the headway specified in Section 1-2.1 *[General Design Parameters]* of Schedule 5 *[D&C Requirements]*

(iii) Minor Failure: Any failure of Equipment that does not meet the criteria of Major Failure or Significant Failure.

(e) The Infrastructure shall have an MTTR of no more than one (1) hour unless otherwise specified in Table 4-5.6.4 [*RAM Requirements*] of this Schedule.

(f) MTTR shall be calculated for equipment elements defined as either line replaceable units or lowest level replaceable units. All elements defined with the same part number or piece of equipment performing the same function within the failed unit shall be used for the calculation. Note the MTTR shall be calculated for all in-service corrective maintenance and out-of-service corrective maintenance. It shall include any time required to perform fault isolation, troubleshooting and repair following failure of an element. It shall not include travel time to site.

(g) Specific RAM requirements are set out in Table 4-5.6.4 *[RAM Requirements]* of this Schedule.

Table 4-5.6.4: RAM Requirements

System/Subsystem	Requirement:
SCADA	Availability > 99.99% SCADA outstations shall have an MTBF of 20,000 hours, MTBSAF of 50,000 hours and an MTTR of < 2 hours.

Fibre Optic backbone	Availability > 99.995% Fibre Optic Nodes shall have an MTBF of 20,000 hours, MTBSAF of 50,000 hours and an MTTR of < 1 hours.
Radio System	Availability > 99.99% Individual radios shall have an MTBF of 20,000 hours, MTBSAF of 50,000 hours and an MTTR of < 2 hours.
TPSS	Switchgear shall have an MTBF of 20,000 hours, MTBSAF of 50,000 hours and an MTTR of < 4 hours. Transformer/Rectifier Unit MTBF of 20,000 hours, MTBSAF of more than 250,000 hours and an MTTR of < 4 hours.
OCS	The Overhead Catenary System (inclusive of poles, mounts, messenger and contact wire, tensioners, mounts etc.) shall have an MTBF of 6,000 hours for the system. MTTR < 4 hours.
Train Routing and Priority System and Train Control Systems (Wayside only)	Availability > 99.99% Train Routing and Priority System and Train Control Systems shall have an MTBF of 20,000 hours, MTBSAF of 50,000 hours and an MTTR of < 2 hours.
Elevators	Availability > 97% i. Availability is calculated as total operational time (in hours) divided by the total number of downtime (in hours), which includes scheduled preventative maintenance and failures, plus total operational time (in hours). ii. A% = total operational time / (total operational time + total downtime). iii. MTTR < 4 hours.
Escalators	Availability > 97% i. Availability is calculated as total operational time (in hours) divided by the total number of downtime (in hours), which includes scheduled preventative maintenance and failures, plus total operational time (in hours). ii. A% = total operational time / (total operational time + total downtime). iii. MTTR < 4 hours.

UPS	Availability > 99.999% Each UPS shall have an MTBF of 30,000 hours, MTBSAF of 100,000 hours and an MTTR of < 0.25 hours
Network Management System	MTBF of 500,000 hours. MTTR < 0.5 hours
Telephones:	Each outdoor phone shall have a minimum MTBF of 50,000 hours, and MTTR of < 2 hours Each indoor phone shall have a minimum MTBF of 130,000 hours and MTTR of < 2 hours.
Public Address (PA)/variable message signs	Each PA loudspeaker shall have a minimum MTBF of 120,000 hours. Each variable message sign shall have a minimum MTBF of 50,000 hours. MTTR < 0.5 hours.
CCTV	Overall CCTV system availability shall be 99.99% Each camera shall have a minimum MTBF of 90,000 hours with an MTTR < 0.5 hours. NVR shall have a minimum MTBF of 50,000 hours with an MTTR < 0.5 hours.

5.6.5 Not Used

5.6.6 Spare Parts

(a) at Final Design, Project Co shall prepare and submit a list of Spare Parts (the "**Spare Parts List**") in accordance with Schedule 2 *[Submittal Review Procedure]* which shall include, at a minimum, all of the items listed in Section 1-9 *[Spare Parts]* of Schedule 5 *[D&C Performance Requirements]* as well as any other spare parts and replacement components which have been identified through the RAM Program as being necessary to maintain the Availability requirements of Section 5.6.4 *[RAM Requirements]* of this Schedule. The list of Spare Parts shall show which Spare Parts will be provided at the Phase 1 Construction Completion Date and which Spare Parts will be provided at the Construction Completion Date.

(b) The Spare Parts List shall identify, for each Spare Part in an electronically editable format suitable for importing into the Asset Management System:

(i) name and description of part;

(ii) recommended quantity to be supplied as part of the Project Work, which shall be:

(A) a sufficient quantity to allow the City to support all operations and maintenance (including all preventative and corrective) for a period of 3 (three) years following the Service Readiness Date; and

(B) at a minimum, the quantity set out for that Spare Part in Section 1-9 *[Spare Parts]* of Schedule 5 *[D&C Performance Requirements]*;

(iii) calculations in support of the recommended quantity based on the Final RAM Analysis Report;

(iv) type of assembly;

(v) design drawing reference number;

(vi) sub-assembly or larger assembly in which part is used. Identify if used in different assemblies;

(vii) suggested Spare Part strategy - replace components or larger assembly;

(viii) recommendation for the minimum number of Spare Parts, at which point the Spare Parts should be reordered;

(ix) recommended re-order quantity;

(x) procurement lead time;

(xi) commercial supplier of Spare Part, including name and address, and appropriate contact information. Identify if manufacturer, distributor, agent or other. Local and Canadian distributors are preferred by the City for logistical reasons;

(xii) Project Co's part number, if applicable;

(xiii) supplier's and/or manufacturer's part number(s);

(xiv) the dimensions and mass of the spare parts individually and the sum of those listed in (ii) above; and

(xv) Unit price, price break quantities and prices.

(c) The Spare Parts described in this Section 5.6.6 *[Spare Parts]* of this Schedule shall exclude those spare parts required for Commissioning Work and Warranty Work.

(d) Spare parts required for Commissioning Work and Warranty Work shall be segregated from the Spare Parts defined in the Spare Parts List and stored off Site.

5.6.7 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]*.

5.6.8 Compliance with the RAM Program

Throughout the Construction Period, 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 Integration Management

5.7.1 General

(a) Project Co shall be responsible for establishing a formal Integration management process ("**Integration Management**") prior to the Acceptance of the Program Management Plan, designed to ensure:

(i) all Integration between Stage 1 LRVs, Stage 2 LRVs, and other On-track Vehicles, fixed infrastructure, operations systems, and Valley LRT Stage 1 is achieved 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;

(iii) all interface and Integration issues are proactively identified and recorded in an integration register (the **"Integration Register"**), with assigned responsibilities for tracking, resolution and testing of each identified issue; and

(iv) the Integration Manager has direct oversight of Integration Management,

and Project Co shall comply with such Integration Management process throughout the Construction Period.

(b) The Integration Register shall:

(i) be submitted as part of the Integration Management Sub-Plan, described in Section 5.2.2.1 *[Integration Management Sub-Plan]* of this Schedule;

(ii) include all interface and Integration issues identified through the Requirements Management and Requirements Management Sub-Plan activities;

(iii) include all of the data and tracking fields identified in the Integration Management Sub-Plan;

(iv) be co-ordinated with the other system and safety assurance activities described in Section 5 *[System and Safety Assurance]* of this Schedule;

(v) be updated to reflect resolution of existing interfaces and addition of new interface and Integration issues as they arise; and

(vi) be maintained and updated in accordance with the Integration Management Sub-Plan.

(c) Project Co shall develop and populate the Integration Register with all interface and Integration issues and how they have been satisfactorily addressed in Design and Construction and Commissioning, including the following:

(i) LRV wheel to Track interface;

(ii) LRV pantograph to Overhead Catenary System interface;

(iii) LRV door threshold to Platform gap (horizontal and vertical) interface;

(iv) SCADA to end device interfaces;

(v) Public Address intelligibility;

(vi) Station and Stop surface finish interfaces;

(vii) 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, Passenger information displays, and landscaping;

(viii) noise and vibration from the Infrastructure;

(ix) grounding and bonding interfaces;

(x) Electromagnetic Compatibility;

(xi) Stray Current and corrosion control;

(xii) duct bank and Access Vault drainage requirements;

(xiii) cable and duct routing;

(xiv) Roadway to rail elevations;

(xv) Utilities to Infrastructure;

(xvi) Valley Line LRT Stage 1 to Valley Line LRT Stage 2 interface; and

(xvii) any other interfaces that need to be addressed to ensure the Design and Construction are functional and Integrated with operations and maintenance of the Valley Line West LRT.

(d) Integration Management shall follow the Integration Management Sub-Plan as defined in Section 5.2.2.1 *[Integration Management Sub-Plan]* of this Schedule.

5.7.2 Updates to Integration Management

Prior to implementation of any amendments or updates to the Integration 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 Integration Management

Throughout the Construction Period, Project Co shall implement and comply, and ensure that all Project Co Persons comply, with the Integration Management process, including any amendments or updates which have been Accepted by the City, to ensure all Project interfaces are tracked and managed to eliminate the likelihood of design errors.

5.7.4 Integration Sub-committee

(a) The Integration Sub-committee shall be convened no less than 60 days following the Effective Date and maintained throughout the Construction Period. The Integration Sub-committee shall be comprised of representatives from TransEd Partners, the City and Project Co. Project Co shall require the Integration Manager and any other relevant Project Co Persons to attend meetings of the Integration Sub-committee at the request of the City.

(b) The Integration Sub-committee shall provide a formal forum for escalation and resolution of integration issues between Project Co and TransEd Partners that have not been satisfactorily resolved at a working level by Project Co and to oversee the consultation and cooperation in all matters relating to the interface between, and the Integration of the Valley Line LRT Stage 2 and Valley Line LRT Stage 1.

(c) Project Co shall provide agendas identifying the issues for discussion and relevant background two (2) Business Days before each meeting, Project Co shall keep an action register updated and minutes of all decisions, recommendations, action items and meetings of the Integration Sub-Committee and shall circulate such minutes to the City and the other members of the Integration Sub-Committee within five (5) Business Days of the holding of the meeting, the making of the recommendation or the identification of the action item. Meeting minutes shall clearly identify all agreed upon items.

5.8 Road Safety Audits

5.8.1 General

(a) No later than 120 days after the Effective Date, Project Co shall engage a road safety auditor, independent of the Design Team and acceptable to Project Co and the City, acting reasonably, (the "**Independent Road Safety Auditor**"). The Independent Road Safety Auditor shall have the following minimum qualifications:

(i) recognized expert in the field of road safety engineering;

(ii) minimum of 15 years of road safety engineering experience on projects with similar scope and complexity as the Project; and

(iii) having completed a minimum of five (5) road safety audits on projects involving integration of roads with light rail in an urban environment using the procedures set out in *The Canadian Road Safety Audit Guide*.

(b) Where, for any reason during the Construction Period, the Independent Road Safety Auditor is, or becomes, unable or unwilling to continue to perform the Independent Road Safety Auditor's services as set out herein Project Co shall promptly engage a replacement Independent Road Safety Auditor, acceptable to Project Co and the City, acting reasonably.

(c) Project Co shall carry out all of its obligations set out in this Section 5.8 *[Road Safety Audits*];

(d) Project Co shall cause the Independent Road Safety Auditor to:

(i) carry to out all of its obligations in accordance with the *Canadian Road Safety Audit Guide;*

(ii) carry out a road safety audit on the Second Interim Design for each Roadway Work Package (each, a "**Detailed Design Road Safety Audit**");

(iii) prepare a report setting out the findings of such each Detailed Design Road Safety Audit (each, a "**Detailed Design Road Safety Audit Report**"); and

(iv) promptly after completion, provide a copy of each Detailed Design Road Safety Audit Report concurrently to Project Co and the City.

(e) As soon as practicable following receipt of each Detailed Design Road Safety Audit Report, Project Co shall prepare a response to the Detailed Design Road Safety Report (each, a "**Detailed Design Road Safety Response Report**") and submit it to the City.

(f) Project Co shall implement all measures contained in the Accepted Detailed Design Road Safety Audit Response Report, unless otherwise directed by the City, after which Project Co shall cause the Independent Road Safety Auditor to issue a certificate to this effect, in the form of Appendix 4A *[Certificate Forms] [1-Road Safety Audit Certificate]* to this Schedule, which Project Co shall submit to the City with the associated Final Design of the applicable Roadway Work Package, in accordance with Section 6.10 *[Final Designs]* of this Schedule.

5.8.2 In-Service Road Safety Audit

(a) Not later than 60 Business Days prior to the Target Construction Completion Date, Project Co shall cause the Independent Road Safety Auditor to:

(i) complete a comprehensive Project wide "In-Service" road safety audit, (the "**In-Service Road Safety Audit**").

(ii) prepare a report setting out the findings of the In-Service Road Safety Audit (the "**In-Service Road Safety Audit Report**"); and

(iii) promptly following completion, provide a copy of the In-Service Road Safety Audit Report concurrently to Project Co and the City.

(b) As soon as practicable following receipt of the In-Service Road Safety Audit Report, but prior to Construction Completion, Project Co shall prepare an In-Service Road Safety Response Report (the "**In-Service Road Safety Response Report**") and submit it to the City.

(c) Project Co shall implement all measures contained in the Accepted In-Service Road Safety Response Report prior to Construction Completion, unless otherwise directed by the City, after which Project Co shall cause the Independent Road Safety Auditor to issue a certificate to this effect, in the form of Appendix 4A-1 [*Road Safety Audit Certificate*] to this Schedule (the "**In-Service Road Safety Audit Certificate**").

5.9 Human Factors Specialist

Project Co shall provide a Human Factors Specialist, with work experience of comparable complexity and scope, to perform the following services:

(a) advise the designers of the Infrastructure of all Design considerations as the Human Factors Specialist considers appropriate including how this is relates to interactions and interfaces with other equipment and infrastructure e.g. LRVs, other rail vehicles; and

(b) prepare and submit at the second Interim Design and Final Design, a Human Factors Report (the "**Human Factors Report**") in accordance with Schedule 2 *[Submittal Review Procedure]*, showing compliance of the Infrastructure with all of the requirements identified as 'shall' in the *FAA Human Factors Design Standard document HF-STD-001B*, as well as any of the recommendations identified as 'should' which are appropriate for this application.

5.10 Operational and Maintenance Readiness Sub-committee

(a) The Operational and Maintenance Readiness Sub-committee shall be convened no less than six (6) months prior to the commencement of any testing and Commissioning activities and maintained until Construction Completion. The Operational and Maintenance Readiness Sub-committee shall be comprised of representatives from the City, the LRV Supplier, the Operator, and Project Co. Project Co shall require the O&M Lead and any other relevant Project Co Persons to attend meetings of the Operational and Maintenance Readiness Sub-committee at the request of the City.

(b) The Operational and Maintenance Readiness Sub-committee shall provide a formal forum to consult and cooperate in all matters relating to the operational and maintenance readiness of the Valley Line LRT.

(c) Project Co shall provide agendas identifying the issues for discussion and relevant background two (2) Business Days before each meeting, Project Co shall keep an action register updated and shall keep minutes of all decisions, recommendations, action items and meetings of the Operational and Maintenance Readiness Sub-Committee and circulate such minutes to the City and the other members of the Integration Sub-Committee within five (5) Business Days of the holding of the meeting, the making of the recommendation or the identification of the action item. Meeting minutes shall clearly identify all agreed upon items.

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;

(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;

(ii) includes architects who are registered or licensed to practice as architects under the *Architects Act* (Alberta);

(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; and

(iv) includes core Design personnel whose primary place of business during the Design Development Phase, is within a joint project office located in the greater Edmonton area and is comprised of, at a minimum, the Design Manager, Integration Manager, SUI Leader, O&M Leader, Utilities Manager and representatives from each Design discipline including all Engineers of Record (the "**Core Design Team**").

(c) Project Co shall prepare and submit a final Stage 2 LRV OMF B design criteria document that contains a list of all the Stage 2 LRV design information required from the LRV Supplier to design the Gerry Wright OMF Part B no later than 90 days after the Effective Date, (the "**Stage 2 LRV OMF-B Design Criteria**"). At minimum, the list must contain the Stage 2 LRV items as defined in Section 7-1.3 *[City Integration Obligations]* of Schedule 5 *[D&C Performance Requirements].* The City will use commercially reasonable efforts to provide Project Co with Stage 2 LRV OMF-B Design Criteria as soon as reasonably practicable, and in any case will provide Project Co with:

(i) all LRV information relating to weight, physical dimensions and power requirements within 12 months after the Effective Date; and

(ii) all information defined in the Stage 2 LRV OMF-B Design Criteria on or before the date that is 18 months following the Effective Date.

6.2 Design and Certification Procedure

(a) Throughout the Construction Period, 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,

(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 Construction Period, including any further Design development or changes to a Design submitted and 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, including the members of the Design Team and any independent team, 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 him 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 in 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 Law, professional standards or practices.

6.4 Design Management Plan

6.4.1 General

Within 60 days after the Effective Date, or at an alternate date Accepted by the City in the Submittal Schedule and Register, 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, including;

(A) the proposed timing for inter-disciplinary review meetings based on the Submittal Schedule for Design Submittals; and

(B) how actions recorded during inter-disciplinary review meetings will be documented and tracked by the Designer for each discipline during the Design Development Phase;

(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) Vibration Control Sub-Plan; and

(ii) 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 Integration and interface issues;

(ii) mitigation of risks and vulnerabilities identified through the Safety and Security Certification Program;

(iii) elimination of Deficiencies and other Nonconformities and mitigation of risks including those identified through the RAM Program; and

(iv) 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) include a Building Information Modelling (BIM) Execution Plan that shall:

(i) provide details of the chosen BIM program;

(ii) provide a narrative describing Project Co's approach to BIM to promote an integrated design approach;

(iii) describe Project Co's approach to BIM collaboration among its team members, including the specific methods and software platforms in which model data shall be shared;

(iv) describe Project Co's approach to BIM meetings and collaboration sessions that shall be held throughout the project phases, including their frequency;

(v) define the level of development that shall be used at each phase of the Project for BIM elements;

(vi) describe the procedure for compartmentalizing the system elements of each model, where applicable;

(vii) describe how Quality Assurance and Quality Control shall be incorporated into the BIM strategy and execution, including the QA and QC tasks and responsibilities of each team member involved;

(viii) describe the process for updating and maintaining the Design BIM data during Construction; and

(ix) list the BIM deliverables, including their file format and model structure hierarchy, including their relationships with other related BIM deliverables;

(i) the contents and format of Interim Designs, if applicable, and Final Design submissions for each Work Package;

(j) 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) 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;

(k) details of the organization and hierarchy of all Design Data;

(l) details of the plans for implementing, and verifying the implementation of, the Design of the Infrastructure throughout the Construction;

(m) the procedures to be used to ensure consideration of Construction constraints including, but not limited to, those in Section 1-3 *[General Construction Requirements]* of Schedule 5 *[D&C Performance Requirements]*;

(n) the procedures to be used to ensure compliance with the Operability and Maintainability Parameters of Appendix 5-D *[Operability and Maintainability Parameters]*;

(o) the procedures to be used to ensure compliance with the quality assurance and quality control requirements of Schedule 9 *[Quality Management]*;

(p) details of the plans and procedures for the identification of all Project Intellectual Property pursuant to Schedule 8 *[Intellectual Property]*;

(q) appropriate metrics to measure the progress of the Design activities for each discipline;

(r) a Submittal schedule (including detailed Design Submittals) and tracker (the "**Submittal Schedule and Register**") which shall:

(i) provide for a progressive and orderly flow of Design Data and other Submittals from Project Co to the City appropriately staged 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 required by the City to consider such Submittals;

(ii) be in a table format with columns that identify the following for each Submittal:

(A) unique Submittal tracking number;

(B) Submittal revision;

(C) name of Project Co Person responsible for preparation of the Submittal;

(D) Work Package identifier(s) (if applicable);

(E) Requirements Management reference(s) to applicable Project Requirement(s);

(F) submission status (e.g. not started, in progress, submitted, endorsed, revise and resubmit);

(G) target submission date;

(H) actual date of submission;

(I) target date of City endorsement; and

(J) endorsement status under Section 4 *[Review Procedure]* of Schedule 2 *[Submittal Review Procedure]*;

(iii) allow adequate time prior to performance of the 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, and for Project Co to make changes to the Submittals as may be required to account for any comments received from the City; and

(iv) as an appendix to the Submittal Schedule and Register, provide a detailed description of the Design Data that will be included in each Submittal.

(s) be developed in conjunction with the Program Management Plan;

(t) the procedures to be used to ensure consideration of the Human Factors Specialist's requirements and recommendations in accordance with Section 5.9 [*Human Factors Specialist*] of this Schedule.

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 on a quarterly basis in accordance with Schedule 2 *[Submittal Review Procedure]*.

6.4.3 Compliance with the Design Management Plan

Throughout the Construction Period, 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 and Register Updates

(a) On or before the last day of each month, up to and including the Construction Completion Date, Project Co shall submit an updated Submittal Schedule and Register to the City. Each updated version of the Submittal Schedule and Register shall:

(i) comply with the requirements of Section 6.4.1(r) *[General]* of this Schedule; and

(ii) include a design register showing all known, submitted and proposed Design Drawings and other documents, including the 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 endorsed "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 Not Used

6.4.5.2 Not Used

6.4.5.3 Not Used

6.4.5.4 Not Used

6.4.5.5 Vibration Control Sub-Plan

The Vibration Control Sub-Plan shall:

(a) describe the processes and procedures required to satisfy the requirements of Section 1-2.1.7 *[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 1-2.1.7 *[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; and

(e) consider the noise and vibration impact report based on the Preliminary Reference Design which has been prepared by the City and is included in the Disclosed Data.

6.4.5.6 Noise Control Sub-Plan

The Noise Control Sub-Plan shall:

(a) describe the processes and procedures required to satisfy the requirements of Section 1-2.1.5 *[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 1-2.1.5 *[Noise Control]* of Schedule 5 *[D&C Performance Requirements]*;

(d) describe the approach(es) to be applied along the LRT Corridor to mitigate noise from the Infrastructure; and

(e) consider the noise and vibration impact report based on the Preliminary Reference Design which has been prepared by the City and is included in the Disclosed Data.

6.5 Design Certification

6.5.1 Design Certificates

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

(b) Project Co shall issue the applicable Design Certificate(s) in accordance with Section 6.5.3 *[Submission of Design Certificates]* of this Schedule for each Work Package, together with the applicable Final Design(s).

(c) For elements of the Infrastructure that are governed by the NBCAE, the Design Certificates shall be in addition to the forms required by the NBCAE. For all other elements of the Infrastructure, the Design Certificates shall be in the form attached hereto as Appendix 4A *[Certificate Forms] [3-Certification for Design and Commitment for Field Review]* of this Schedule and shall be signed and stamped by the Designer.

6.5.2 Design Coordination Certificate

(a) The Final Design which constitutes the conclusion of the Design Development Phase shall be submitted with the Design Coordination Certificate.

(b) Project Co shall issue Design Coordination Certificates in accordance with Section 6.5.3 *[Submission of Design Certificates*] of this Schedule.

(c) The Design Coordination Certificates shall be in the form attached hereto as Appendix 4A *[Certificate Forms] [7-Assurance of Design Coordination]* of this Schedule and shall be signed and stamped by the Design Manager.

6.5.3 Submission of Design Certificates

All Design Certificates and the Design Coordination Certificate, together with the supporting documentation, shall be submitted to the City in accordance with Schedule 2 *[Submittal Review Procedure]* with original signatures, stamps and registration numbers and in such form as to allow the City to perform its review in respect of such Design Certificate or the Design Coordination 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.

(c) Project Co may propose separating out from a Work Package and submitting independently from and prior to the rest of the Work Package**,** Design Submittals that require early submission in order to facilitate achievement of the Construction Schedule, subject to acceptance by the City. These early-submitted Design Submittals would not be subject to the full requirements of Appendix 4B [*Project Specific Submission Requirements*], subject to acceptance by the City.

(d) Project Co may separate out from the relevant Work Package and submit independently from and prior to the rest of the Work Package**,** Design Submittals for the Gerry Wright OMF Building B Design so as to facilitate receipt of the Stage 2 LRV design information described in Section 6.1(c) *[General Design Considerations]* of this Schedule and achievement of the Construction Schedule.

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 6-4.5 *[Transit Signal Priority]* 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;

(ii) Traction Power modeling in accordance with Section 6-2.3 *[Design Requirements]* 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 Surveillance Study, with the Final Design of 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.

6.8 Interim Design Reviews

(a) Project Co shall submit, at a minimum, two (2) Interim Designs for each Work Package, unless otherwise stated in Schedule 5 *[D&C Performance Requirements]*

(b) Notwithstanding Section 6.8(a) *[Interim Design Reviews]*, Project Co may submit, at a minimum, one (1) Interim Design for each of the following Work Packages:

(i) Alex Decoteau Stop;

(ii) NorQuest Stop;

(iii) Glenora Stop;

(iv) Grovenor/142 Street Stop;

(v) Jasper Place Stop;

(vi) Aldergrove/Belmead Stop;

(vii) Lewis Farms Stop;

(viii) 107 Street/104 Avenue Utility Complex;

(ix) Oliver Square Utility Complex;

(x) 124 Street/Stony Plain Road Utility Complex;

(xi) Stony Plain Road/132 Street Utility Complex;

(xii) 89 Avenue/Meadowlark Road Utility Complex;

(xiii) 87 Avenue/165 Street Utility Complex;

(xiv) retaining walls; and

(xv) OCS Foundations.

(c) Notwithstanding Section 6.8(a) *[Interim Design Reviews]*, Project Co need not submit any Interim Designs for each of the following Work Packages:

(i) all Stops not listed in Section 6.8(b) *[Interim Design Reviews]*;

(ii) all Utility Complexes not listed in Section 6.8(b) *[Interim Design Reviews];* and

(iii) Public Art.

(d) Interim Design submissions shall be informal and shall not be subject to review under the provisions of Schedule 2 *[Submittal Review Procedure]*; instead, 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.

(e) The minimum content of each Interim Design submission is described in Appendix 4B *[Project Specific Submission Requirements]* of this Schedule. 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 Schedule 5 *[D&C Performance Requirements]* and shall highlight any key integration points with other disciplines.

(f) Each Interim Design submission shall include a summary of commitments included in Proposal Extracts to confirm that the Design incorporates these commitments.

(g) An Interim Design Review Sub-committee shall be convened no less than 60 days following the Effective Date and meet at a minimum monthly through the Design period. The Interim Design Review Sub-committee shall be comprised of the Design Manager, Integration Manager, SUI Leader, O&M Leader, City representatives and other individuals who Project Co or the City deem appropriate. The Interim Design Review Sub-committee shall:

(i) confirm the Design Data to be submitted for review in each Interim Design submission;

(ii) confirm the schedule of each Interim Design submission in the context of the Submittal Schedule and Register;

(iii) confirm the review timelines of each Interim Design submission; and

(iv) schedule any interim Design review meetings as required.

(h) Project Co shall organize Interim Design and other review meetings with the City's Representative in accordance with the Design Management Plan, for the purpose of reviewing the applicable Interim Designs and other Design Data. Unless otherwise agreed, the meetings shall be convened in the city of Edmonton. Project Co shall provide not less than 2 days' notice of any such meeting, along with proposed agenda topics and proposed attendees.

(i) Project Co shall prepare minutes of all review meetings, including recording the City's comments, and shall circulate copies of the minutes to the City within five (5) Business Days following the review meeting, Project Co shall promptly address the City's comments to the reasonable satisfaction of the City.

(j) 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.

(k) 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 who shall 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 and Design Data;

(ii) report directly to Project Co;

(iii) be from an organization(s) which is not an Affiliate of Project Co or any Project Co Person;

(iv) consist of individuals who are registered or qualified to be registered as professional engineers in their North American home jurisdiction;

(v) have demonstrable expertise in all design disciplines involved in the Design, including the following disciplines:

(A) geotechnical;

(B) structural;

(C) systems; and

(D) track; and

(vi) in the case of the IV&V Team, meet the requirements of Section 5.3 *[Independent Verification & Validation]* of this Schedule.

(b) Project Co shall ensure that the Checking Team remains independent from the Design Team, Project Co and Project Contractors 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 Project 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 and other Nonconformities in the Design and analyses, and notifying Project Co and the City of unresolved 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 and structural design of the Anthony Henday Drive LRT Bridge;

(ii) geotechnical and structural design of the 87 Avenue Elevated Guideway Structure; and

(iii) derailment protection measures on Transportation Structures.

(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 team shall also be responsible for their own interpretation.

(f) For each applicable Final Design, Project Co shall cause the relevant Checking Team member(s) to provide a signed and stamped 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

(a) Unless otherwise stated in Schedule 5 *[D&C Performance Requirements]*, 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:

(i) include Design Certificates and all pertinent Design Data, including Design Drawings and copies of all Project Approvals and Design reports, and inspection and testing requirements sufficient to demonstrate conformance with the Project Requirements, along with such other supporting Design Data as requested by the City, acting reasonably;

(ii) include all information as listed in Appendix 4B *[Project Specific Submission Requirements]* of this Schedule, to the extent applicable to the Work Package;

(iii) include all applicable Design Data, signed and stamped in accordance with Applicable Law, and the policies and requirements of applicable Governmental Authorities and regulatory agencies, including APEGA, ASET, AAA, and AALA;

(iv) be comprised of designs that are Integrated appropriately, without conflicts, and presented in a consistent format;

(v) include Design Drawings that are complete, searchable, 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;

(vi) include all pertinent data from the system and safety assurance activities, the pertinent information recorded pursuant to the Requirements Management protocol and an Integration Register extract, for the applicable Final Design that demonstrates that the Final Design conforms to the Project Requirements and is Integrated with the other project disciplines;

(vii) include all applicable Road Safety Audit Certificates, in the form attached hereto as Appendix 4A *[Certificate Forms]* of this Schedule, signed and stamped by the Independent Road Safety Auditor and the Designer;

(viii) include all models, mock-ups and studies applicable to the relevant Final Design or otherwise required to demonstrate compliance with the applicable Project Requirements;

(ix) include all plans and procedures applicable to implementation of the relevant Final Design;

(x) demonstrate, through comprehensive geotechnical and structural analyses and designs, that the Project Requirements and tolerances of the relevant Infrastructure and each component thereof shall be met over the applicable Design Service Life;

(xi) detail how the Operability and Maintainability Parameters and any other operations and maintenance requirements in this Agreement have been incorporated into the applicable Final Design;

(xii) detail how SUI treatments and considerations have been incorporated into the applicable Final Design;

(xiii) detail how any comments of the City, and issues identified in the course of, 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;

(xiv) 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;

(xv) contain all pertinent correspondence, arranged by subject matter in chronological order; and

(xvi) 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.

(b) Except as otherwise provided in the Agreement, specific content identified in the Final Designs that have been prepared and submitted to the City which have been accepted by the City in accordance with Schedule 2 *[Submittal Review Procedure]* subsequent to the submission of the Proposal Extracts shall replace the corresponding specific content contained in the Proposal Extracts, provided that:

(i) Final Designs that contain information that is intended to replace information contained in the Proposal Extracts are clearly marked up with a note which reads "REPLACES PROPOSAL EXTRACT" for each individual deviation from the Proposal Extracts; and

(ii) Final Designs in no circumstances result in lower levels of safety, reliability, durability, performance, quality and service than those described in the Proposal Extracts.

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

Project Co shall not depart from Final Designs, including all Design Data, that have been the subject of a Design Certificate that has been submitted to the City in accordance with the Design and Certification Procedure 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 urgent 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.

6.13 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, examine the Construction and satisfy 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.

6.14 Temporary Works

(a) At 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 within the boundaries of Bylaw 7188 and within Groat Ravine defined by below the break in slope.

(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 Appropriate Person.

(d) In performing a check referred to in Section 6.14(c) *[Temporary Work]* 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, as well as 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.

6.15 No Construction

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

(i) satisfied all applicable conditions precedent, as set out in this Agreement, including Schedule 10 *[Environmental Performance Requirements]*;

(ii) submitted all applicable Final Designs, including all Design Data and relevant Design Certificates required in respect of the relevant Work Package, in accordance with Schedule 2 *[Submittal Review Procedure]* and such Final Designs have been suitably endorsed by the City; and

(iii) obtained all necessary Project Approvals and fulfilled any other applicable requirements in respect of the relevant Work Package; and

(b) Notwithstanding Section 6.12(a) *[Adherence to Final Design]* of this Schedule, the City may grant certain exceptions for Temporary Works on a case by case basis, subject to the requirements of Section 6.14 *[Temporary Works]* of this Schedule being fulfilled in a manner deemed to be equivalent by the City, in its discretion.

7. CONSTRUCTION

7.1 Construction Management Plan

7.1.1 General

Within 90 days after the Effective Date, or at an alternate date Accepted by the City in the Submittal Schedule and Register, 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;

(c) include the documented processes, methods and procedures which will be employed in Construction work for critical subsystems, including the Traction Power System, Traffic Signals, Train Control System, Fibre Optic Backbone and all supporting infrastructure including Wayside Equipment and Wayside Equipment Enclosures, Systems Duct Banks, and wire and cable. The processes, method and procedures employed on

critical subsystems shall be based on Good Industry Practice and minimising impact on Valley Line LRT Stage 1 operations.

(d) include procedures for ensuring coordination of all Construction performed by Subcontractors, including manufacturers of materials, plant or equipment;

(e) include procedures for ensuring coordination of all Other Works performed by Other Contractors;

(f) include a soil management plan describing how Project Co will manage all soil excavation, handling, storage and reuse of soils within the Project. The soil management plan shall also include descriptions on how Project Co will manage all backfill that is required. Project Co shall ensure the soil management plan complies with the requirements in Schedule 10 *[Environmental Performance Requirements]*.

(g) include procedures to regularly inform the Communications Manager to ensure that the requirements and activities of the communications plans and the engagement plans can be executed;

(h) describe the quality control and quality assurance 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 Monitors;

(i) describe the procedures for accurately redlining on-site issued-for-construction Design Drawings and how revisions to the issued-for-construction Design Drawings will be managed;

(j) include a log of lessons learned from similar projects and plan for implementing mitigation measures to address similar issues;

(k) include procedures for identifying and correcting Deficiencies and other Nonconformities;

(l) 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;

(m) describe the approach to managing the construction constraints described in Section 1-3.1 *[Construction Constraints]* of Schedule 5 *[D&C Performance Requirements]*; and

(n) be consistent with the preliminary Construction Management Plan included in the Proposal Extracts, unless otherwise appropriately endorsed by the City.

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 1-3.3 *[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 and/or noise-sensitive times of day and in the vicinity of festivals/events;

(f) identify areas of Construction noise concerns that may require additional communications and engagement attention; and

(g) be consistent with the preliminary Construction Noise Control Sub-Plan included in the Proposal Extracts unless otherwise agreed to by the City.

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 1-3.4 *[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 vibration-sensitive areas, and in the vicinity of festivals/events;

(e) identify minimum separation distances between operating vibration-generating equipment and buildings;

(f) identify areas of Construction vibration concerns that may require additional communications and engagement attention; and

(g) be consistent with the preliminary Construction Vibration Control Sub-Plan included in the Proposal Extracts.

7.2.3 Construction Maintenance Program

(a) Not less than 30 days before commencing any Construction activities within the Lands, Project Co shall prepare and submit to the City a comprehensive Construction Maintenance program for the Construction Period (the "**Construction Maintenance Program**"), which shall list the specific Construction Maintenance procedures in accordance with Section 1-3.5 *[Maintenance During Construction]* of Schedule 5 *[D&C Performance Requirements].*

(b) Project Co shall review and amend the Construction Maintenance Program, not less than annually on the anniversary of the Effective Date throughout the Construction Period, and more often as necessary, to ensure that the Construction Maintenance Program at all times:

(i) reflects the nature of the Project Work being performed at the applicable Sites; and

(ii) complies with the requirements set out in Section 1-3.5C *[Maintenance During Construction]* of Schedule 5 *[D&C Performance Requirements].*

(c) Any amendments to the Construction Maintenance Program shall be submitted to the City pursuant to Schedule 2 *[Submittal Review Procedure].*

(d) The Construction Maintenance Program shall terminate on the Construction Completion Date**.**

7.3 Construction Requirements

7.3.1 Skilled Workers

Project Co shall employ or cause any entity performing Construction on the Project to employ a sufficient number of appropriately qualified and skilled workers to perform the Construction in compliance with this Agreement.

7.3.2 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.

7.3.3 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 Construction 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.

7.3.4 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 to advise the City of any potential crisis on any site including, without limitation, a terrorist attack, infrastructure failing fatality or major injury. 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 Project Co shall post the phone number in prominent locations at each Site) for notification of Construction related emergencies;

(d) support the City's lead role in addressing all Crisis Communications in accordance with Section 3.8 *[Crisis Communications]* of Schedule 12 *[Communications and Engagement]*;

(e) maintain and provide access 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]*.

7.3.5 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 representatives, 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 Construction Contractor's reasonable site rules, have access to:

(i) attend the Lands and view and observe the Construction at any time;

(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 8.2 *[City Audits]* of Schedule 9 *[Quality Management]*;

(v) take photographs or video or install a device for taking photographs or video over a period of time for project monitoring, progress capture and communications purposes; and

(vi) 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 representatives shall have the right to attend all monthly progress meetings and site meetings, including meetings between Project Co and the Project Contractors 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 in a way that does not unreasonably interfere with the progress of the Construction and in compliance with Section 3.6 *[Special Events]* of Schedule 12 *[Communicating and Engagement]*.

7.3.6 Inspection

(a) Prior to the Final Completion Date, Project Co shall, upon request by the City, which request shall include detailed reasons for the request, open up for inspection by the City or its representatives any part of the Infrastructure which the City, acting reasonably, believes is defective;

(b) If the Parties agree, or if it is determined in accordance with the Dispute Resolution Procedure, that there are no Deficiencies in the relevant part of the Infrastructure, and Project Co complied with the requirements of Section 7.3.5 *[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 11 *[Relief Events and Limited Relief Events]* of the Agreement;

(c) 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:

(i) Project Co shall rectify and correct such Deficiencies;

(ii) any consequence of such rectification or correcting Deficiencies 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 Target Completion Date in relation to such rectification and Making Good of such Deficiencies; and

(d) If the Parties are unable to reach agreement in accordance with Sections 7.3.6(a) *[Inspection]* or 7.3.6(b) [*Inspection*] above, 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, if Project Co proceeds in accordance with the City's position and the Dispute is finally determined in favour of Project Co, Project Co shall be entitled to claim a Relief Event subject to and in accordance with Section 11 *[Relief Events and Limited Relief Events]* of this Agreement.

7.3.7 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.

7.4 Transportation Management Plan

7.4.1 Transportation Management Plan (TMP)

Within 90 days following the Effective Date Project Co shall prepare and submit to the City a Transportation Management plan, (the "**Transportation Management Plan**"), which shall be divided into the following chapters:

(a) Transportation Accommodation, in accordance with Section 7.4.2 *[Transportation Accommodation]* of this Schedule;

(b) public notification, in accordance with Section 7.4.3 *[Public Notification]* of this Schedule; and

(c) incident management, in accordance with Section 7.4.4 *[Incident Management]* of this Schedule.

7.4.2 Transportation Accommodation

The Transportation Accommodation chapter of the TMP shall include:

(a) an overall strategy for provision of safe and continuous access to and passage for all impacted transportation modes, including pedestrians, bicycles and vehicles, through or around all Sites;

(b) an overall strategy for maintaining continuous, safe and efficient access to all impacted properties;

(c) a description of all safety Hazards associated with the Transportation Closures and the available mitigation measures;

(d) a description and drawings of the proposed Construction staging identifying:

(i) the location, anticipated duration and nature of each Transportation Closure; and

(ii) the traffic movements, pedestrian and bicycle routes including alternate routes where applicable;

(e) identification of all transit routes impacted by Transportation Closures;

(f) the approach to co-ordination of Transportation Accommodation with City Works, Other Works, other construction projects, festivals and events on or adjacent to the Lands

and all of the Construction constraints described under Section 1-3.1 *[Construction Constraints]* of Schedule 5 *[D&C Performance Requirements]*;

7.4.3 Public Notification

The public notification chapter of the TMP shall address the approach to compliance with the applicable requirements of Schedule 12 *[Communications and Engagement],* including but not limited to Section 3.2 *[Design and Construction Communications Services]* of Schedule 12 *[Communications and Engagement],* addressing all activities impacting all transportation modes throughout the Construction Period.

7.4.4 Incident Management

The incident management chapter of the TMP shall address:

(a) procedures to deal with traffic incidents and emergencies within or adjacent to the Site;

(b) the approach to involving Emergency Services when developing the traffic incident management requirements of each TAR, TAP and TAS;

(c) identification of circumstances under which PCMSs will be used to provide incident information to the public; and

(d) a process for assessment, reaction, communication and staff training related to traffic incident reporting procedures.

7.4.5 Review and Amendment of the Transportation Management Plan

(a) Project Co shall review and amend the Transportation Management Plan, at a minimum on every anniversary of the Effective Date throughout the Construction Period, based on monitoring of the Transportation Accommodation, as necessary to ensure that the Transportation Management Plan at all times:

(i) reflects the nature of the Project Work being performed, including any changes in the Sites, work methods, Construction staging or Construction Schedule;

(ii) complies with the requirements of Section 1-4 *[Transportation Management]* of Schedule 5 *[D&C Performance Requirements].*

(b) Any Transportation Management Plan amendments shall be submitted to the City for review pursuant to Schedule 2 *[Submittal Review Procedure]*.

8. ASSET TAGGING AND REGISTER

8.1 Asset Tagging

(a) Project Co shall, in consultation with the City and the Operator, supply and affix asset radio frequency identification tags to all Equipment, including all components thereof, to the level of line replaceable units, including:

(i) On-track Vehicles, except LRVs and their on-board equipment;

(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) communication and wayside cabinets;

(xii) CCTV cameras;

(xiii) PA speakers;

(xiv) Road Traffic Signal poles, cantilevers and luminaires;

(xv) LRT Traffic Signal fixtures;

(xvi) Block Signals;

(xvii) Traffic Controller cabinets;

(xviii) Utility Complexes;

(xix) TPSSs; and

(xx) Data Centres.

(b) Each asset identification tag shall include a unique numerical identifier.

8.2 Asset Register

Within 150 days after the Effective Date, Project Co shall create, maintain, update and provide to the City, an asset register in electronic format ready for uploading to the Asset Management System, of all items required to be tagged with an asset identification tag pursuant to Section 8.1 *[Asset Tagging]* of this Schedule (the **"Asset Register"**). The Asset Register shall be consistent with the City's Asset Classification and Numbering System. 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) critically based on the RAMs assessment;

(d) asset tag number;

(e) serial number, where applicable;

(f) executive software name, version, date installed, and checksum, where applicable;

(g) application software name, version, date installed, and checksum, where applicable;

(h) purchase order or equipment purchase contract identifier;

(i) equipment supplier and contact information for the equipment supplier;

(j) installed location;

(k) date installed;

(l) any maintenance carried out before handover;

(m) anticipated replacement date or timeframe;

(n) warranty tracking, including manufacturer warranty start date and expiry date, where applicable;

(o) required Utility or other connections;

(p) applicable drawings;

(q) operation and maintenance manual(s), work instructions and Training Manuals, where applicable;

(r) complete quantitative and baseline performance data, including applicable Commissioning data; and

(s) any other information that may be agreed upon by the City and Project Co or as may be otherwise required pursuant to, or by, the Project Requirements.

8.3 Asset Management System

The City will use commercially reasonable efforts to provide Project Co with information regarding the Asset Management System sufficient to enable Project Co to perform its obligations hereunder as soon as reasonably practicable, and in any case, on or before the date that is 90 days following the Effective Date.

9. COMMISSIONING

9.1 Commissioning Manager

(a) Project Co shall retain a qualified Commissioning manager (the "**Commissioning Manager**") at least 12 months prior to the first Commissioning activity who:

(i) shall have a minimum of ten (10) years of demonstrable experience in commissioning light rail transit systems;

(ii) shall be registered, or be qualified to be registered, as a Professional Engineer;

(iii) is acceptable to the City, acting reasonably; and

(iv) shall 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 and in accordance with, 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 Infrastructure comply with the Project Requirements;

(B) establish a baseline record of Equipment, components, systems and sub-systems in electronic format suitable for storing in an Asset Management System for comparing performance and determining deterioration over the applicable Design Service Life;

(C) demonstrate that the Gerry Wright OMF Stage 2 is ready for, and has met all of the conditions precedent for, Phase 1 Construction Completion;

(D) demonstrate that the Infrastructure is ready for, and has met all of the conditions precedent for, Construction Completion;

(E) validate the technical performance of individual Equipment, components, systems and sub-systems;

(F) demonstrate Integration of the individual Equipment, components, systems and sub-systems into the Infrastructure;

(G) demonstrate that all Commissioning test equipment has been properly calibrated and that such calibration is documented and traceable to the applicable standards;

(H) validate the safety and security of the Infrastructure in accordance with the Safety and Security Certification Program;

(I) confirm the Infrastructure meets the RAM targets set out in the RAM Program and this Agreement;

(J) demonstrate that the Infrastructure is electromagnetically compatible with its environment and achieves emission and susceptibility targets set out in the EMC Program described in Section 1-2.3 *[Electromagnetic Compatibility]* of Schedule 5 *[D&C Performance Requirements];*

(K) demonstrate that the Stray Current emissions from the Infrastructure and corrosion control activities are compliant with the levels set out in the

Stray Current Program described in Section 1-2.4 *[Stray Current and Corrosion Control Program]* of Schedule 5 *[D&C Performance Requirements];*

(L) demonstrate that noise levels do not exceed the levels set out in the Noise Control Sub-Plan;

(M) demonstrate that vibration levels do not exceed the levels set out in the Vibration Control Sub-Plan;

(N) demonstrate that wheel/rail profiles and associated wear levels do not exceed the levels set out in the Integration Management Plan;

(O) demonstrate that the OCS/pantograph contact forces and associated wear levels do not exceed the levels set out in the Integration Management Plan;

(P) demonstrate that the LRV platform gaps are consistent with those detailed in the Integration Management Plan; and

(Q) demonstrate that the LRV and the Gerry Wright OMF Stage 2 interfaces are consistent with those set out in the Integration Management Plan.

9.2 Commissioning Sub-Committee

(a) Not less than nine (9) months prior to the first scheduled activity of the Commissioning Work, the City and Project Co shall establish and maintain, until the Construction Completion Date, a joint liaison committee (the "**Commissioning Sub-Committee**") consisting of the Commissioning Manager, Project Co's Representative, the City's Representative, a member from IV&V Team and such other members as the Parties may agree from time to time. The City shall be entitled to have a representative **of** the Operator attend meetings of the Commissioning Sub-Committee.

(b) The Commissioning Sub-Committee shall be a sub-committee of the Construction 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 four (4) weeks and more frequently 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 two (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 by any member 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 five (5) Business Days of the holding of the meeting, the making of the recommendation or

the identification of the action item. Meeting minutes shall clearly identify all agreed upon items.

9.3 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 Infrastructure, or portion thereof, with the applicable Project Requirements.

(b) Project Co shall provide all required resources and work processes to plan, schedule, coordinate and execute the overall Commissioning for the Project.

(c) Project Co shall be solely responsible for all checking and verification activities relating to individual components, sub systems, equipment and facilities associated with the Infrastructure that are required prior to Commissioning and that are necessary to demonstrate the fully integrated operation and successful Commissioning of the Infrastructure, to the satisfaction of the Independent Certifier.

(d) 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 in accordance with Schedule 9 *[Quality Management]* until they meet the applicable Project Requirements;

(iv) where a Nonconformity is discovered during Commissioning, the applicable Nonconformity is investigated, and the source or cause of the Nonconformity is determined and rectified prior to proceeding with further Commissioning of the affected Equipment, components, systems or sub-systems;

(v) 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 any Subcontractor's reasonable Site rules, the City's Representative, designated City Persons and the Independent Certifier, and their respective representatives, have access to all Infrastructure throughout the Commissioning;

(vi) the Independent Certifier, the City's Representative, designated City Persons and their respective representatives receive reasonable advance notice of, and have full access to attend, all testing, inspection and Commissioning of all parts of the Infrastructure, including individual pieces of Equipment, components, systems and sub-systems;

(vii) 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

(viii) 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.

(ix) 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;

(e) Project Co's Commissioning Work shall include:

(i) pre-delivery tests, including:

(A) Qualification Testing on Equipment that is newly designed and developed and, where prior qualification cannot be demonstrated in a similar and representative environment. Such testing shall demonstrate compliance with the standards required by the Agreement;

(B) Type Testing on Equipment subjected to previous Qualification Testing to demonstrate compliance with the standards required by the Agreement; and

(C) Factory Acceptance Tests (FAT) on Equipment, Infrastructure and Systems specified in Schedule 5 *[D&C Performance Requirements]* and as per Good Industry Practice;

(ii) Post Installation Checkout (PICO) tests, audits and inspections after a component, subsystem or system has been installed; and

(iii) Site Acceptance Tests (SAT) following the successful completion of PICO tests, audits and inspections.

(A) Where power, including Traction Power, is applied during SAT, site safety procedures shall be implemented to reflect this new Hazard on the testing and commissioning site.

(f) Project Co's Commissioning shall include Site Integration Testing (SIT) of all Systems described in Schedule 5 *[D&C Performance Requirements]* including, but not limited to, the following:

(i) Traction Power System;

(ii) Overhead Catenary System;

(iii) Train Control System;

(iv) Train Routing and Priority System;

(v) Traffic Signal system;

(vi) communications and controls, including, at a minimum, the following:

(A) Communication Transmission System;

(B) City Fibre;

(C) Fibre Optic Backbone;

(D) Building Administration Network;

(E) CCTV system;

(F) radio systems;

(G) telephone systems;

(H) Building SCADA system;

(I) security and alarm system;

(J) Network Management System;

(K) public address and variable messaging system;

(L) intrusion detection;

(M) UPS; and

(N) Master Clock system;

(vii) Electromagnetic interference and electromagnetic compatibility;

(viii) Track;

(ix) LRVs to the Infrastructure;

(x) Maintenance and Storage Facilities and Mainline Track Integration, including Platform interface; and

(xi) corrosion control systems.

(g) Project Co's Commissioning Work shall include testing and inspection of all Building Structure and Elevated Guideway systems, including, at a minimum, the following:

(i) maintenance equipment systems;

(ii) site development;

(iii) building envelope;

(iv) elevators and escalators;

(v) fire detection, protection, and alarm systems;

(vi) plumbing systems;

(vii) HVAC systems;

(viii) electrical systems;

(ix) security and safety systems;

(x) interfaces with Stops and Stations;

(xi) drainage systems; and

(xii) emergency power generators.

(h) Project Co's Commissioning Work shall include testing and inspection of the civil engineering elements of the Structures for purposes of establishing readiness for intended use, including, at a minimum, the following:

(i) Structures;

(ii) Roadways and Roadway related infrastructure;

(iii) landscaping and SUI elements;

(iv) OCS support structures and foundations, and related infrastructure components; and

(v) wayfinding, signage and visual displays.

(i) Project Co shall use Stage 1 LRVs for Integration and Commissioning of the Phase 1 Infrastructure. The City will be responsible to make available two (2) Stage 1 LRVs in accordance with Section 7-1.3 [*City Integration Obligations*] of Schedule 5 [*D&C Performance Requirements*]. Failure by the City to make at least two (2) Stage 1 LRVs available to Project Co as required by Project Co for Integration and Commissioning of the Phase 1 Infrastructure shall entitle Project Co to claim a Relief Event subject to and in accordance with Section 11 *[Relief Events and Limited Relief Events]* of this Agreement.

(j) Project Co shall use both Stage 1 LRVs and Stage 2 LRVs for Integration and Commissioning of the Infrastructure (other than the Phase 1 Infrastructure). The City will be responsible to make available to Project Co not less than two (2) Stage 1 LRVs and two (2) Stage 2 LRVs for purposes of Commissioning. In the event that the Stage 2 LRVs are not available 12 months prior to Construction Completion, the City shall cause no fewer than four (4) Stage 1 LRVs to be available for purposes of Commissioning. Failure by the City to make at least four (4) LRVs available to Project Co as required by Project Co for Commissioning shall entitle Project Co to claim a Relief Event subject to and in accordance with Section 11 *[Relief Events and Limited Relief Events]* of this Agreement.

9.3.1 System Migration

(a) Project Co shall migrate all applicable Systems in accordance with the Migration Plan described in Section 9.4.3 *[Migration Plan]* of this Schedule.

(b) Project Co shall coordinate with the Operator or TransEd Partners throughout the migration process.

(c) Prior to Phase 1 Construction Completion, Project Co shall be responsible for all maintenance activities on all infrastructure on the Gerry Wright OMF Stage 1 that has been replaced due to the Project Work.

(d) Prior to Construction Completion, Project Co shall be responsible for all maintenance activities on all infrastructure on the Valley Line LRT Stage 1 that has been replaced due to the Project Work.

(e) At no point shall the migration of Systems cause a degradation of revenue service on the Valley Line LRT Stage 1, except as explicitly noted in Part 1 *[General]* of Schedule 5 *[D&C Performance Requirements].*

9.4 Commissioning Plans

9.4.1 Phase 1 Commissioning Plan

Not less than six (6) months prior to the Anticipated Phase 1 Construction Completion 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 Gerry Wright OMF Stage 2 and to satisfy the requirements of Section 9 *[Commissioning]* of this Schedule (the "**Phase 1 Commissioning Plan**"). The Phase 1 Commissioning Plan shall:

(a) be prepared by, or under the direction of, the Commissioning Manager;

(b) include an initial Phase 1 Commissioning Register to be used for monitoring the Phase 1 Commissioning Work;

(c) describe the Phase 1 Commissioning Work to be performed to Commission the Gerry Wright OMF Stage 2;

(d) describe the approach and methodology to Commission the Gerry Wright OMF Stage 2 without the use of a Stage 2 LRV, with reference to Section 7-1.3 *[City Integration Obligations]* of Schedule 5 *[D&C Performance Requirements]* for Stage 1 LRV availability;

(e) include details of the Integrated LRV Commissioning process related to the Gerry Wright OMF Stage 2;

(f) include details of the organization, roles and responsibilities for the above Phase 1 Commissioning Work;

(g) include a list of the Commissioning deliverables required for Commissioning the Gerry Wright OMF Stage 2;

(h) identify the specific requirements for the City, the Operator, the LRV Supplier or other third-party interfaces;

(i) include a list of all Equipment, components, systems, sub-systems and processes to be subjected to Qualification Testing, Type Testing, FAT, PICO, SAT and SIT to be Commissioned under the Phase 1 Commissioning Plan;

(j) include a description and diagram illustrating the structure and sequence of the Phase 1 Commissioning Work;

(k) include a list of the Test Procedures for conducting the relevant Phase 1 Commissioning Work;

(l) include a draft of each Test Procedure listed in the Phase 1 Commissioning Plan as an appendix;

(m) describe the process for demonstrating compliance with the RAM Program, the Safety and Security Certification Program and the other Project Requirements;

(n) provide a description of the procedures and Phase 1 Commissioning rules to be implemented to manage Hazards during Phase 1 Commissioning arising from Train movements, energized Traction Power and active Track switches, adjacent and crossing vehicular traffic, other On-track Vehicles, and pedestrians. These procedures shall include safe operating restriction for the City and Operator whom will be participating in each Phase 1 Commissioning event;

(o) include the organization and responsibilities of each member of the Commissioning team, including the involvement of the Appropriate Person(s) and the IV&V Team; and

(p) include an initial high-level schedule for performance of the Phase 1 Commissioning Work. The high-level schedule shall identify:

(i) the timing and location of all Phase 1 Commissioning Work, including all testing, inspection and training activities; and

(ii) for each of the Condition Precedents for Phase 1 Construction Completion, the date upon which Project Co anticipates completing the relevant Phase 1 Commissioning Work.

9.4.2 Commissioning Plan

Not less than 18 months prior to the Target Construction Completion 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 Infrastructure and to satisfy the requirements of Section 9 *[Commissioning]* of this Schedule (the "**Commissioning Plan**"). The Commissioning Plan shall:

(a) be prepared by, or under the direction of, the Commissioning Manager;

(b) include an initial Commissioning Register to be used for monitoring the Commissioning Work;

(c) include the following Commissioning sub-plans, each further described in Section 9.4.4 *[Commissioning Sub-Plans]* of this Schedule:

(i) Traction Power Commissioning Sub-Plan;

(ii) Signalling Commissioning Sub-Plan;

(iii) Communication Commissioning Sub-Plan;

(iv) Integration Commissioning Sub-Plan; and

(v) Civil Commissioning Sub-Plan;

(d) 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;

(e) include a list of all Equipment, components, systems, sub-systems and processes to be subjected to Qualification Testing, Type Testing, FAT, PICO, SAT and SIT;

(f) include a detailed list of the Commissioning deliverables to be submitted, and cross-reference to the appropriate Commissioning sub-plan when applicable;

(g) include a description and diagram illustrating the structure and sequence of the Commissioning Work;

(h) describe the process for demonstrating compliance with the RAM Program, the Safety and Security Certification Program and the other Project Requirements;

(i) include the organization and responsibilities of each member of the Commissioning team, including the involvement of the Appropriate Person(s) and the IV&V Team;

(j) identify specific requirements for the City, the Operator or other third-party interfaces;

(i) where an interface is defined in a specific sub-plan listed in 9.4.2(d) *[General]* of this Schedule, include a cross-reference in the Commissioning Plan and the associated sub-plan(s).

(k) 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. These procedures shall include safe operating restrictions for the City and Operator whom will participating in each Commissioning event;

(l) 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 9.3 *[Minimum Commissioning Requirements]* of this Schedule will be satisfied;

(m) include an initial high-level schedule for performance of the Commissioning Work, which schedule shall be consistent with the Key Dates and the then-current Construction Schedule. The high-level schedule shall identify:

(i) the timing and location of all Commissioning Work, including all testing, inspection and training activities;

(ii) 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

(iii) for each of the Condition Precedents for Construction Completion, the date upon which Project Co anticipates completing the relevant Commissioning Work; and

(n) include a list of the Test Procedures for conducting the Commissioning Work.

9.4.3 Migration Plan

(a) Not less than 60 days prior to Phase 1 Construction Completion, Project Co shall prepare and submit a migration plan for the upgrade or replacement of the Systems of the Valley Line LRT Stage 1 to a complete and operationally contiguous Valley Line LRT system (the "**Migration Plan**").

(b) The Migration Plan shall:

(i) identify each specific System that shall be migrated from the Valley Line LRT Stage 1 infrastructure, and shall include, at minimum, the following systems:

(A) TRPS;

(B) CTS;

(C) YCS at the Gerry Wright OMF;

(D) Voice Radio System;

(E) WiFi O&M Data Radio System;

(F) transfer trip between the Churchill TPSS and the 107 St TPSS; and

(G) OCS;

(ii) identify and develop the process for informing the Operator or TransEd Partners, as applicable, of any and all safe operating restrictions or operating restrictions resulting from migration activities;

(iii) describe the timeline and coordination requirements for any additional training required for the Operator or TransEd Partners; and

(iv) describe how Project Co will coordinate migration activities with the Operator or TransEd Partners.

9.4.4 Updates to the Commissioning Plans

Prior to implementation of any amendments or updates to the Phase 1 Commissioning Plan and the Commissioning Plan, Project Co shall submit the proposed amendments or updates to the City in accordance with Schedule 2 *[Submittal Review Procedure]*.

9.4.5 Compliance with the Commissioning Plans

Project Co shall implement and ensure that all Project Co Persons engaged in the Commissioning Work comply with the Accepted Phase 1 Commissioning Plan and Commissioning Plan and any subsequent amendments or updates to the Phase 1 Commissioning Plan and the Commissioning Plan which have been appropriately endorsed by the City.

9.4.6 Commissioning Sub-Plans

9.4.6.1 Traction Power Commissioning Sub-Plan

The Traction Power Commissioning Sub-Plan shall:

(a) describe the Commissioning Work to be performed to Commission the following systems:

(i) the Traction Power System; and

(ii) the Overhead Catenary System;

(b) include details of the organization, roles and responsibilities for the above Commissioning Work, cross-referencing the Commissioning Plan;

(c) include a list of the Commissioning deliverables required for Commissioning the systems listed in Section 9.4.6.1(a) *[Traction Power Commissioning Sub-Plan]* of this Schedule;

(d) identify the specific requirements for the City, the Operator, the LRV Supplier or other third-party interfaces;

(e) include a list of all Equipment, components, systems, sub-systems and processes to be subjected to Qualification Testing, Type Testing, FAT, PICO, SAT and SIT to be Commissioned under the Traction Power Commissioning Sub-Plan;

(f) include a list of the Test Procedures for conducting the relevant Commissioning Work; and

(g) include a draft of each Test Procedure listed in the Traction Power Commissioning Sub-Plan as an appendix.

9.4.6.2 Signalling Commissioning Sub-Plan

The Signalling Commissioning Sub-Plan shall:

(a) describe the Commissioning Work to be performed to Commission the following:

(i) the Train Control System;

(ii) the Train Routing and Priority System; and

(iii) the Traffic Signal system;

(b) include details of the organization, roles and responsibilities for the above Commissioning Work, cross-referencing the Commissioning Plan;

(c) include a list of the Commissioning deliverables required for Commissioning the systems listed in Section 9.4.6.2(a) *[Signalling Commissioning Sub-Plan]* of this Schedule;

(d) identify the specific requirements for the City, the Operator, the LRV Supplier or other third-party interfaces;

(e) include a list of all Equipment, components, systems, sub-systems and processes to be subjected to Qualification Testing, Type Testing, FAT, PICO and SAT to be Commissioned under the Signalling Commissioning Sub-Plan;

(f) include a list of the Test Procedures for conducting the relevant Commissioning Work; and

(g) include a draft of each Test Procedure listed in the Signalling Commissioning Sub-Plan as an appendix.

9.4.6.3 Communication Commissioning Sub-Plan

The Communication Commissioning Sub-Plan shall:

(a) describe the Commissioning Work to be performed to Commission, at minimum, the following:

(i) the Communication Transmission System;

(ii) City Fibre;

(iii) Fibre Optic Backbone;

(iv) CCTV system;

(v) Building SCADA system;

(vi) Network Management Systems;

(vii) Voice Radio System;

(viii) O&M Wi-Fi Data Radio System; and

(ix) public address and variable messaging system;

(b) include details of the organization, roles and responsibilities for the above Commissioning Work, cross-referencing the Commissioning Plan;

(c) include a list of the Commissioning deliverables required for Commissioning the systems listed in Section 9.4.6.3(a) *[Communication Commissioning Sub-Plan]* of this Schedule;

(d) identify the specific requirements for the City, the Operator, the LRV Supplier or other third-party interfaces;

(e) include a list of all Equipment, components, systems, sub-systems and processes to be subjected to Qualification Testing, Type Testing, FAT, PICO and SAT to be Commissioned under the Communication Commissioning Sub-Plan;

(f) include a list of the Test Procedures for conducting the relevant Commissioning Work; and

(g) include a draft of each Test Procedure listed in the Communication Commissioning Sub-Plan as an appendix.

9.4.6.4 Integration Commissioning Sub-Plan

The Integration Commissioning Sub-Plan shall:

(a) describe the Commissioning Work to be performed to Commission the interfaces included on the Integration Register;

(b) include details of the Integrated LRV Commissioning process;

(c) include details of the organization, roles and responsibilities for the above Commissioning Work, cross-referencing the Commissioning Plan;

(d) include a list of the Commissioning deliverables required for Commissioning the systems listed in Section 9.4.6.4(a) *[Integration Commissioning Sub-Plan]* of this Schedule;

(e) identify the specific requirements for the City, the Operator, the LRV Supplier or other third-party interfaces;

(f) include a list of the Test Procedures for conducting the relevant Commissioning Work; and

(g) include a draft of each Test Procedure listed in the Integration Commissioning Sub-Plan as an appendix.

9.4.6.5 Civil Commissioning Sub-Plan

The Civil Commissioning Sub-Plan shall:

(a) describe the Commissioning Work to be performed to Commission, at minimum, the following:

(i) Building Structures and Building Structure systems;

(ii) Elevated Guideways and Elevated Guideway systems;

(iii) OCS support structures and foundations, and related infrastructure components;

(iv) Roadways; and

(v) wayfinding, signage and visual displays;

(b) include details of the organization, roles and responsibilities for the above Commissioning Work, cross-referencing the Commissioning Plan;

(c) include a list of the Commissioning deliverables required for Commissioning the systems listed in Section 9.4.6.5(a) *[Civil Commissioning Sub-Plan]* of this Schedule;

(d) identify the specific requirements for the City, the Operator, the LRV Supplier or other third-party interfaces;

(e) include a list of all Equipment, components, systems, sub-systems and processes to be subjected to Qualification Testing, Type Testing, FAT, PICO, SAT, SIT and other relevant tests to be Commissioned under the Civil Commissioning Sub-Plan;

(f) include a list of the Test Procedures for conducting the relevant Commissioning Work; and

(g) include a draft of each Test Procedure listed in the Civil Commissioning Sub-Plan as an appendix.

9.5 Commissioning Schedules

9.5.1 Phase 1 Commissioning Schedule

(a) At least twenty (20) Business Days prior to the commencement of Phase 1 Commissioning Work, Project Co shall prepare and submit a detailed schedule for the applicable Phase 1 Commissioning Work, (each, a "**Phase 1 Commissioning Schedule**"). Each Phase 1 Commissioning Schedule shall:

(i) update the high-level schedule included in the Phase 1 Commissioning Plan to provide details of the applicable Phase 1 Commissioning Work to be performed and the timing of all applicable Phase 1 Commissioning Work, including all testing, inspection and training activities;

(ii) be consistent with the Key Dates 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 Phase 1 Commissioning Work and shall perform all Phase 1 Commissioning Work in accordance with the applicable appropriately endorsed Phase 1 Commissioning Schedule.

9.5.2 Commissioning Schedule

(a) At least twenty (20) 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 Key Dates 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 appropriately endorsed Commissioning Schedule.

9.6 Commissioning Constraints

(a) All Phase 1 Commissioning Work and Commissioning Work activities that:

(i) are not intended to test and demonstrate operation during the peak hours as shown under the heading 'LRT Network General Hours of Operation' in the Operability and Maintainability Parameters; and

(ii) have the potential to disrupt adjacent or crossing vehicular traffic,

shall be performed during off peak periods.

(b) All Phase 1 Commissioning Work and Commissioning Work activities shall comply with the Operating Rule Book and Standard Operating Procedures.

(c) Project Co shall coordinate all Phase 1 Commissioning Work and Commissioning Work activities with the City's commissioning activities described in Section 9.7 *[City Works Commissioning]* of this Schedule.

9.7 City Works Commissioning

The City shall provide at least twenty (20) days written notice to Project Co in advance of performing any Commissioning Work activities related to the City Works identified in Section 1-1.3 *[City Works]* of Schedule 5 *[D&C Performance Requirements]*.

9.8 Commissioning Documents

9.8.1 Phase 1 Commissioning Register

Not less than 30 days before the first scheduled activity of the Phase 1 Commissioning Work, Project Co shall prepare and submit a register identifying and listing all activities to be performed as part of the Phase 1 Commissioning Work, (the "**Phase 1 Commissioning Register**"). The Phase 1 Commissioning Register shall include data fields to:

(a) record the Test Procedure document number and version to be used to perform each activity;

(b) record the Commissioning Test Report document number to be used to record each activity;

(c) record the actual date(s) of each activity;

(d) record the pass/fail status of each activity;

(e) specify the sample rate or test frequency for each activity;

(f) identify the Project Co Person responsible for performing each activity;

(g) identify the Project Co Person responsible for witnessing each activity; and

(h) identify the reference or document number of the standard, inspection checklist or procedure that shall be used to conduct each activity.

9.8.2 Commissioning Register

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:

(a) record the Test Procedure document number and version to be used to perform each activity;

(b) record the Commissioning Test Report document number to be used to record each activity;

(c) record the actual date(s) of each activity;

(d) record the pass/fail status of each activity;

(e) specify the sample rate or test frequency for each activity;

(f) identify the Project Co Person responsible for performing each activity;

(g) identify the Project Co Person responsible for witnessing each activity; and

(h) identify the reference or document number of the standard, inspection checklist or procedure that shall be used to conduct each activity.

9.8.3 Test Procedures

(a) Not less than 60 days before the scheduled date of the associated Phase 1 Commissioning Work or Commissioning Work activity, as applicable, Project Co shall prepare and submit final inspection, validation and test procedures for the relevant Phase 1 Commissioning Work or Commissioning Work activity, as applicable, (in each case, 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 Phase 1 Commissioning Register or 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) identify staffing requirements, including requirements from the City or other third parties;

(vii) identify required instrumentation, Equipment, facilities and supporting systems;

(viii) identify the test location;

(ix) provide Requirements Management traceability of the Project Requirements applicable to the inspection or test; and

(x) include detailed procedures and Commissioning rules to manage Hazards during Commissioning as further described in Section 9.4.2 *[Commissioning Plan]* of this Schedule.

(b) Without limiting Section 9.8.2(a) *[Commissioning Documents]* of this Schedule:

(i) 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;

(ii) 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

(iii) Test Procedures for Traffic Signal 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; and

(B) checklist items contained in the *Traffic Signal Commissioning Test Report*, a copy of which is included in the Disclosed Data.

9.8.4 Test Reports

(a) Project Co shall prepare and submit a test report for each activity listed in the Phase 1 Commissioning Register and Commissioning Register (each, a "**Commissioning Test Report**"), no more than 28 days after the associated activity has been performed. Each Commissioning Test Report shall:

(i) document the results for the applicable activity listed in the Phase 1 Commissioning Register or Commissioning Register;

(ii) be assigned a unique document number that matches the reference or document number identified for the corresponding activity in the Phase 1 Commissioning Register or Commissioning Register;

(iii) contain a reference to the corresponding Test Procedure;

(iv) record the date of the inspection or test;

(v) document version control;

(vi) record the equipment used in the inspection or test and applicable calibration results;

(vii) contain legible results, as recorded during the test or inspection;

(viii) include sample calculations demonstrating how the results were obtained from measured data;

(ix) include, where appropriate, photographs and other documentation;

(x) include a summary and conclusion of the test or inspection; and

(xi) identify any Deficiencies and Nonconformities.

(b) Not less than 30 days prior to the first scheduled Phase 1 Commissioning Work or 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. The City shall be provided with secure access to the recording system. All inspection and test results shall be provided to the City upon request.

9.9 Commissioning Certifications

9.9.1 Phase 1 Commissioning Certification

(a) Project Co shall issue a separate Phase 1 Commissioning Certificate for each applicable Phase 1 Commissioning Work activity described in the Phase 1 Commissioning Register, and a final Phase 1 Commissioning Certificate for the whole of the Gerry Wright OMF. The Phase 1 Commissioning Certificates shall be in the form attached hereto as Appendix 4A *[Certificate Forms] [6-Commissioning Certificate]* of this Schedule.

(b) All Phase 1 Commissioning Certificates, together with the applicable Commissioning 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, stamps and registration numbers and in such form as to allow the City to perform its review in respect of such Phase 1 Commissioning Certificates without delay.

(c) The Commissioning Manager shall sign and stamp all Phase 1 Commissioning Certificates.

9.9.2 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 Infrastructure, other than any Infrastructure Commissioned pursuant to Section 9.9.1 *[Phase 1 Commissioning Certification]* of this Schedule. The Commissioning Certificates shall be in the form attached hereto as Appendix 4A *[Certificate Forms] [6-Commissioning Certificate]* of this Schedule.

(b) All Commissioning Certificates, together with the applicable Commissioning 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, stamps 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 stamp all Commissioning Certificates.

9.10 Commissioning Program Reports

9.10.1 Phase 1 Commissioning Program Report

Within 30 days following the Phase 1 Construction Completion Date, Project Co shall cause the Commissioning Manager to compile, prepare and submit a comprehensive Commissioning program report to the City (the "**Phase 1 Commissioning Program Report**"). The Phase 1 Commissioning Program Report shall include:

(a) a description of all Phase 1 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 Commissioning 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 Maintenance Concept;

and each section of the Phase 1 Commissioning Program Report shall be:

(h) formally reviewed by the Designer to confirm conformance of the Infrastructure to the Project Requirements and the applicable Design; and

(i) signed and stamped by the Appropriate Person(s), where required to be so signed and stamped, and signed by the Commissioning Manager.

9.10.2 Commissioning Program Report

Within 30 days following the Construction Completion Date, Project Co shall cause the Commissioning Manager to compile, prepare and submit a comprehensive Commissioning program report to the City (the "**Commissioning Program Report**"). The Commissioning Program 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 Commissioning 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 Maintenance Concept;

and each section of the Commissioning Program Report shall be:

(h) formally reviewed by the Designer to confirm conformance of the Infrastructure to the Project Requirements and the applicable Design; and

(i) signed and stamped by the Appropriate Person(s), where required to be so signed and stamped, and signed by the Commissioning Manager.

10. TRAINING AND OPERATING AND MAINTENANCE MANUALS

10.1 Training and Assessment Program

(a) Project Co shall, in consultation with the Operator, develop a comprehensive Training and Assessment Program, which shall provide a description of the Phase 1 Training and Assessment Plan, Infrastructure Training and Assessment Plan, and training program/process, including certification and re-certification, for each sub-system and associated training materials.

(b) Project Co shall provide hands-on training to the Operator to ensure the Operator's competence in operating and maintaining the Infrastructure, the Equipment and systems.

(c) Project Co shall ensure that qualified and skilled training and assessor personnel are available to adequately provide the Operator with the required quantity and quality of training in Edmonton unless otherwise Accepted by the City.

(d) Project Co shall submit the CVs of the trainer and assessor six (6) months prior to the start of each course for approval. Each trainer and assessor should have at least ten (10) years' experience delivering training and assessment programmes. They should have a recognised training and assessment qualification and have experience of delivering adult based learning programmes, ideally within an O&M rail environment.

(e) Training shall commence in two stages:

(i) two (2) months prior to Phase 1 Construction Completion and conclude prior to the Phase 1 Construction Completion Date; and

(ii) at the ICS Integration Ready Date and conclude prior to the Construction Completion Date.

(f) Project Co shall develop the Phase 1 Training and Assessment Plan, Infrastructure Training and Assessment Plan, and all training courses, including curriculum and materials, referenced in this Section 10 *[Training and Operating and Maintenance Manuals]* and shall submit such training courses and materials in accordance with Schedule 2 *[Submittal Review Procedure]* at the following times:

(i) six (6) months prior to Phase 1 Construction Completion for all training courses listed in the Phase 1 Training and Assessment Plan. Changes to the training courses arising from review by the City shall be incorporated prior to commencement of training; and

(ii) six (6) months prior to the ICS Integration Ready Date for all training courses listed in the Infrastructure Training and Assessment Plan. Changes to the training courses arising from review by the City shall be incorporated prior to commencement of training.

(g) Project Co shall submit final training schedules not less than:

(i) three (3) months prior to Phase 1 Construction Completion for training activities described in the Phase 1 Training and Assessment Plan; and

(ii) three (3) months prior to the ICS Integration Ready Date for training activities described in the Infrastructure Training and Assessment Plan.

(h) Project Co shall provide training sessions for the City and Operator personnel, in accordance with the Phase 1 Training and Assessment Plan, the Infrastructure Training and Assessment Plan, and the final training schedules and shall ensure that all City and Operator personnel have the opportunity to receive training prior to the Phase 1 Construction Completion Date and the Construction Completion Date respectively. The City and the Operator will be responsible for attendance of City and Operator personnel at the applicable training sessions held in accordance with the final Phase 1 Training and Assessment Plan, Infrastructure Training and Assessment Plan and training schedules.

(i) The Phase 1 Training and Assessment Plan and Infrastructure Training and Assessment Plan shall use a 'train the trainer' format, so that the Operator, who will be trained by Project Co, will be enabled to deliver subsequent training to its staff. In the first session, a City Person and an Operator trainer will be members of the session. In the second training session, the City Person and an Operator trainer will assist the

instructor. In the third and any subsequent training sessions, the City representative and an Operator trainer will deliver the training, assisted by the Project Co instructor.

(j) Sufficient time shall be provided between training sessions to allow the City Person and Operator trainer to study the reference material in preparation for the next training session.

(k) At least one full training session, presented by Project Co's instructors, of each course shall be completely recorded on video in 1080p. All video recordings will be provided to the City and the Operator in a format agreed by the City.

(l) Each training course shall include a testing component pursuant to which each student will be granted a pass or fail status according to his or her demonstration of competence. The assessment methodology and pass/fail criteria shall be developed by Project Co and agreed with the appropriate Operator management personnel.

(m) Training and assessment materials and course content shall be of high quality and follow Good Industry Practice for adult learning. Training and assessment materials, including instructor support documents, shall be of sufficient quality and content to be used in continued in-house training by the Operator. Principal documents used for training shall be tailored to reflect the specific course content and the target audience. At a minimum, Project Co shall deliver:

(i) one (1) complete set of student materials for each participant enrolled in any training led by Project Co;

(ii) one (1) complete set of training materials for the Operator in a high-quality digital format so further copies can be made with no noticeable decrease in copy quality; and

(iii) one (1) complete set of assessment materials for the Operator in a high-quality digital format so further copies can be made with no noticeable decrease in copy quality. The assessment documentation must include clear description of how to conduct practical assessment / simulated assessments as well as written assessments. Assessment materials should include model answer sheets and clearly outline the pass/fail criteria.

(n) Training schedules shall reasonably account for trainee availability (notice period normal work shifts, days of rest and holidays) and shall be conducted in a manner that does not impact the on-going operation and maintenance of the Infrastructure.

(o) Training courses shall be provided for the following personnel:

(i) OCC staff;

(ii) security staff, including ETS personnel;

(iii) Operator training staff and assessment supervisors, inspectors and managers;

(iv) Operator maintenance staff for all Infrastructure.

(v) Track and wayside Equipment maintainers;

(vi) Traction Power System; and

(vii) IT and technical maintenance staff responsible for maintaining the Infrastructure, systems, networks, Data Centres and other communications systems.

10.2 Training and Assessment Plan

10.2.1 Phase 1 Training and Assessment Plan

(a) Project Co shall develop and submit a draft training plan (the "**Phase 1 Training and Assessment Plan**") one (1) year prior to the Target Phase 1 Construction Completion Date that describes the procedures and courses that shall be used to instruct the City and the Operator on the recommended operation and maintenance practices for the Gerry Wright OMF Stage 2 and that shall include:

(i) the organizational structure and corresponding staff qualifications required to maintain the Gerry Wright OMF Stage 2, including the categorization of roles and the number of staff within each category, broken down as follows:

(A) supervisory staff;

(B) maintenance staff, divided into specialist areas (e.g. Track maintainers, Traction Power System maintainers);

(ii) a minimum list of courses which shall be provided by Project Co and, as guidance, the number of sessions required;

(iii) proposed course structure;

(iv) overview of course material;

(v) overview of course content;

(vi) a list of any prerequisites;

(vii) duration of each course;

(viii) instructional technique to be used;

(ix) instructional aids which will be used;

(x) instructional materials which will be used;

(xi) assessment approach (practical, simulated and/or written) to be used;

(xii) the proposed pilot course and final course presentation schedules;

(xiii) training facilities and equipment to be used;

(xiv) instructor qualifications, including the following information:

(A) position in Project Co's organization, or in product supplier's organization;

(B) length of time employed in Project Co's organization, or in product supplier's organization;

(C) relevant training experience;

(D) education and reasons for Project Co selection of instructor; and

(E) demonstrated knowledge of the Equipment in respect of which training is provided; and

(xv) any special requirements beyond training facilities detailed in this Section.

(b) In delivering the Phase 1 Training and Assessment Plan, Project Co shall or shall be responsible to:

(i) provide all labour, equipment, tools, aids, products, services and supervision required to carry out the training as defined in the Accepted Phase 1 Training and Assessment Plan;

(ii) provide formal training for personnel identified by the Operator and the City in the proper understanding, operation and maintenance of the Equipment;

(iii) assume the target trainees for technical equipment possess as a minimum the knowledge of an electrical journeyman, licensed in the Province of Alberta;

(iv) assume the target trainees for the Operators possess Operating Rule Book training;

(v) provide training materials sufficient to support continued training by the City and the Operator;

(vi) provide updated training and training materials when, changes or modifications are made that affect the operation or maintenance;

(vii) provide the necessary qualified instructors, instructional material, reference information and equipment to carry out the Phase 1 Training and Assessment Plan;

(viii) provide sufficient classroom and on-the-job training and testing for City and Operator personnel to ensure their competence in understanding, operating and maintaining the Gerry Wright OMF Stage 2 in accordance with the Maintenance Concept, and up to the standards required by the City and by any and all regulatory Governmental Authorities;

(ix) provide instructors who are competent and completely familiar with the subject(s) being taught and with the special tooling, test equipment, manuals and procedures to be employed by the City or the Operator;

(x) make optimum use of the supplemental materials in the delivery of all training courses, such that formal instruction is augmented by effective hands-on experience; and

(xi) provide the training in Edmonton.

(c) The City or Operator may use, reproduce and modify any instructional materials (such as manuals, lesson plans, and audio-visual aids) as the City or Operator deems necessary for further instruction of City or Operator personnel.

10.2.2 Infrastructure Training and Assessment Plan

(a) Project Co shall develop and submit a draft training plan (the "**Infrastructure Training and Assessment Plan**") two (2) years prior to the Target Construction Completion Date that describes the procedures and courses that shall be used to instruct the City and the Operator on the recommended operation and maintenance practices for the Infrastructure, excluding the Gerry Wright OMF Stage 2, and that shall include:

(i) the organizational structure and corresponding staff qualifications required to maintain the Infrastructure, excluding the Gerry Wright OMF Stage 2, and including the categorization of roles and the number of staff within each category, broken down as follows:

(A) supervisory staff;

(B) maintenance staff, divided into specialist areas (e.g. Track maintainers, Traction Power System maintainers);

(ii) a minimum list of courses which shall be provided by Project Co and, as guidance, the number of sessions required;

(iii) proposed course structure;

(iv) overview of course material;

(v) overview of course content;

(vi) a list of any prerequisites;

(vii) duration of each course;

(viii) instructional technique to be used;

(ix) instructional aids which will be used;

(x) instructional materials which will be used;

(xi) assessment approach (practical, simulated and written) to be used;

(xii) the proposed pilot course and final course presentation schedules;

(xiii) training facilities and equipment to be used;

(xiv) instructor qualifications, including the following information:

(A) position in Project Co's organization, or in product supplier's organization;

(B) length of time employed in Project Co's organization, or in product supplier's organization;

(C) relevant training experience;

(D) education and reasons for Project Co selection of instructor; and

(E) demonstrated knowledge of the Equipment in respect of which training is provided; and

(xv) any special requirements beyond training facilities detailed in this Section.

(b) In delivering the Infrastructure Training and Assessment Plan, Project Co shall or shall be responsible to:

(i) provide all labour, equipment, tools, aids, products, services and supervision required to carry out the training as defined in the Accepted Infrastructure Training and Assessment Plan;

(ii) provide formal training for personnel identified by the Operator and the City in the proper understanding, operation and maintenance of the Equipment;

(iii) assume the target trainees for technical equipment possess as a minimum the knowledge of an electrical journeyman, licensed in the Province of Alberta;

(iv) assume the target trainees for the Operators possess Operating Rule Book training;

(v) provide training materials sufficient to support continued training by the City and the Operator;

(vi) provide updated training and training materials when, changes or modifications are made that affect the operation or maintenance;

(vii) provide the necessary qualified instructors, instructional material, reference information and equipment to carry out the Infrastructure Training and Assessment Plan;

(viii) provide sufficient classroom and on-the-job training and testing for City and Operator personnel to ensure their competence in understanding, operating and maintaining the Infrastructure, excluding the Gerry Wright OMF Stage 2, in accordance with the Maintenance Concept, and up to the standards required by the City and by any and all regulatory Governmental Authorities;

(ix) provide instructors who are competent and completely familiar with the subjects being taught and with the special tooling, test equipment, manuals and procedures to be employed by the City or the Operator;

(x) make optimum use of the supplemental materials in the delivery of all training courses, such that formal instruction is augmented by effective hands-on experience; and

(xi) provide the training in Edmonton.

(c) The City or Operator may use, reproduce and modify any instructional materials (such as manuals, lesson plans, and audio-visual aids) as the City or Operator deems necessary for further instruction of City or Operator personnel.

10.3 Training Documentation

(a) Project Co shall develop and submit an "Instructor's Guide" for each training course, which shall contain, at a minimum:

(i) a system overview;

(ii) a statement of overall program goals;

(iii) lesson plans, a session by session outline containing the following:

(A) student learning objectives, stated in measurable terms;

(B) an overview of each lesson;

(C) the suggested instructional methods and learning activities;

(D) the required equipment and resources; and

(E) safety procedures and instructions, as appropriate; and

(iv) the assessment methods consisting of written and practical tests designed to measure the extent to which the student has met all learning objectives, with a model answer key for each of the tests developed.

(b) Project Co shall develop and submit a "Student Manual" for each training course, which shall contain, but not be limited to:

(i) a system overview and introduction;

(ii) a statement of overall program goals;

(iii) the student's learning objectives, stated in measurable terms that describe the desired behaviours or knowledge that will be taught;

(iv) a fully developed narrative, not outline format, of content presentation, developed in the same modular format as the instructor's guide;

(v) illustrations, tables, charts, or graphics, as needed to enhance content presentation;

(vi) problems and questions related to lesson content, as appropriate; and

(vii) safety procedures and instructions, as appropriate.

(c) Project Co shall provide one (1) copy of any Operating and Maintenance Manuals for each student in the session and incorporate them into the course instruction, provided that incorporation into, or reference to, Operating and Maintenance Manuals in the instructor's guide and the student manual shall not compromise the ability of each manual to stand alone and function independently. The provided Operating and Maintenance Manuals may be recovered at the end of each session and re-used in subsequent sessions.

(d) Final training and Operating and Maintenance Manuals shall reflect the "As Built" Infrastructure. If errors or omissions in the Operating and Maintenance Manuals are found at any stage of training, all affected documentation contained in the instructor's guide, student manual, and Operating and Maintenance Manuals shall be updated. Following correction and update, all corrected and updated training documentation shall be distributed immediately to all participants who have completed the course. Similarly, any updated Operating and Maintenance Manuals shall be resubmitted to the City in accordance with Section 10.6 *[Operating and Maintenance Manual]* of this Schedule.

(e) Project Co shall deliver a complete set of instructors' guides, presentation materials, assessment guides and materials, and training aids to each training course session and a set of complete student materials for each participant enrolled in each training class.

10.4 Instructional Aids

Project Co shall provide appropriate instructional aids to support the formal instruction carried out at each training session. The suitability of these aids will be assessed and agreed by the City following their use at a designated pilot course. The following instructional aids shall be provided to support formal instruction:

(a) audio-visual aids such as handouts, transparencies, slides, videos, simulators;

(b) supplemental materials, which provide a functional mock-up or a functional representation. This will be required of any Equipment which requires theoretical discussion. This may be in the form of an animated schematic, a model of the equipment, an interactive video training device or the like. Any such mock-ups that are not actual items of supplied equipment will become the property of the City upon Construction Completion; and

(c) working Equipment. For the duration of the training period and until Final Completion, Project Co shall provide, for the purposes of supporting formal instruction, a facility that contains a fully functional mock-up of the Equipment for which training is being provided.

10.5 Training Courses

(a) Project Co shall ensure that the training courses meet the following requirements:

(i) Training courses shall provide instruction in the theory, operation and Maintenance of the Infrastructure and related subsystems. This shall include all of the hardware and software supplied as part of the Infrastructure. Separate training courses shall be provided for both operations and Maintenance, although each course shall include relevant overviews.

(ii) Project Co shall provide separate training sessions, to enable the City and Operator personnel who work in shifts to participate in the courses. Project Co will be required to coordinate with the City and Operator in order to agree upon the exact number of each session.

(iii) Each training session shall not train more than eight (8) persons and the duration of each course "day" shall not exceed eight (8) hours.

(iv) Allowance shall be made for sessions in each of the shift periods worked by City and Operator personnel.

(v) Each operations training course shall include detailed reviews of product operating manuals and shall include product operating demonstrations, all in sufficient detail to enable the City and Operator to operate the Infrastructure to its full potential.

(vi) Each Maintenance training course shall include detailed reviews of product maintenance manuals and accompanying documentation and shall cover materials in enough detail so that the City and the Operator's Maintenance personnel can fully maintain the Infrastructure in all respects.

(vii) Maintenance training shall provide City and the Operator personnel with a full understanding of the function and operation, as well as maintenance requirements, of all components. It will include a review of the drawings and electrical schematics, cover all scheduled inspection and lubrication requirements, adjustments and/or calibrations, detailed troubleshooting and diagnostic tools, component removal and installation.

(viii) Maintenance training shall provide practical knowledge and shall facilitate competence in the type of product being trained upon.

(ix) All training courses provided shall use a combination of classroom and hands-on instruction. The Instructors shall tailor the course for the attending audience.

(x) All training courses shall employ the use of actual assets or mock ups in order to facilitate hands-on instruction thereby ensuring that course participants further appreciate and build upon key concepts presented by formal instruction.

(xi) All Maintenance courses shall cover Equipment installation, operation, interfaces and cabling/piping between Equipment, preventive Maintenance, diagnostics procedures, corrective maintenance and expansion procedures. Course participants shall operate actual Equipment, run all applicable diagnostic software and, perform hands-on diagnosis and repair of simulated failures on actual Equipment.

(xii) The communications network training shall enable the City and the Operator's operation and maintenance groups to be familiar with the communication network and have an in- depth working knowledge of all associated external interfaces, devices and alarms. Instruction will also include procedures to take in the event of a radio frequency interference, fibre cable cut, Equipment failure, alarm, or the like.

(b) Project Co shall provide one (1) pilot course for each training course which shall meet the following requirements:

(i) The pilot course shall be presented at least ten (10) Business Days prior to the first scheduled training course in that area of instruction.

(ii) The pilot course shall be presented by the course instructor who will be teaching the actual course using full course materials and aids.

(iii) The pilot course will be attended by a small number of City and Operator personnel who will evaluate the course and recommend changes to be incorporated prior to providing further training.

(c) All training courses shall include both written and practical tests, as appropriate, as a measuring device to determine adequate transfer of knowledge. Specifically:

(i) Tests shall be appropriate for the intended audience and shall have been validated in the corresponding pilot course or by some other means agreed to by the City and the Operator.

(ii) Whenever possible, a practical hands-on test shall be developed to demonstrate the successful transfer of operational and mechanical skills. Where appropriate, practical assignments may be employed for the purpose of testing that design concepts have been learned.

(iii) Records of test results shall be kept and submitted to the City and the Operator after each training session. These records shall identify individual students and measure their success in meeting the training objectives for each course.

10.6 Operating and Maintenance Manuals

10.6.1 General

(a) Project Co shall develop and submit, in accordance with Schedule 2 *[Submittal Review Procedure]*, a comprehensive, and specific for the Valley Line LRT Infrastructure, installation, operation and maintenance manual (the "**Operating and Maintenance Manual**") for the Infrastructure, including each sub-system. The Operating and Maintenance Manual shall cover all Equipment supplied as part of the Project Work and, with the agreement of the City, may be split into manageable sized, logical multiple volumes where appropriate.

(b) The Operating and Maintenance Manual shall be entirely in Canadian English using the Crystal Mark Accreditation standard, shall give comprehensive descriptions and illustrations of each and every system's operating layouts and shall include, without limitation, such items as operation, overhaul, adjustments, maintenance, recommended maintenance schedule, component removal and replacement, part numbers, operating voltage and other pertinent information.

(c) The Operating and Maintenance Manual shall have sufficient detail in order that the City and Operator can fully maintain the Infrastructure, including all Equipment, in proper working order without the assistance of Project Co or any other external parties. The manual shall include all pertinent software and hardware documentation.

(d) Project Co shall submit a draft of the Operating and Maintenance Manual no later than:

(i) four (4) months prior to Phase 1 Construction Completion for all Operating and Maintenance Manual sections related to the operation and maintenance of the Gerry Wright OMF Stage 2; and

(ii) 60 days prior to the ICS Integration Ready Date for all other Operating and Maintenance Manual sections.

(e) Project Co shall incorporate revisions from training sessions into final copies of the Operating and Maintenance Manual already in the possession of the City and Operator. These revisions shall be in the form of the requisite number of replacement pages and shall be transmitted to the City.

10.6.2 Format

(a) Project Co shall provide, along with the final copies of the Operating and Maintenance Manual, a full copy of the manuals in searchable PDF format on CD, DVD, USB drive or portable HDD suitable for the reprinting of any manual without loss of resolution or quality and uploading into an Asset Management System in whole or in part.

(b) Five (5) hard copies of the final Operating and Maintenance Manual shall be provided by Project Co to the City.

(c) The Operating and Maintenance Manual shall fulfil the following format requirements:

(i) Organize text, data, illustrations and drawings in the form of an instructional manual.

(ii) Use commercial quality, hard cover, three (3) ring binders, 219 mm x 279 mm (8½" x 11") maximum size.

(iii) When multiple binders are used, group data by binder into related consistent groupings.

(iv) Identify each binder with typed or printed title "O&M Manual"; add the City contract number and title of contract; identify subject matter of contents.

(v) Arrange content by systems or process flow, under section numbers in the same sequence as the Table of Contents.

(vi) Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts.

(vii) Present manufacturer's printed data, or typewritten data on 20-pound paper with non-water soluble inks.

(viii) If water soluble coloured inks, dyes or pigments are used in illustrations they must be laminated. Where coloured inks, dyes or pigments of any type are used, use those with the greatest resistance to fading.

(ix) FORMAT AND CONTENT

(A) TABLE OF CONTENTS: List the City contract number and title of contract, and schedule of products and systems, indexed to match the content of the volume(s).

(B) REFERENCES: For each product or system list names, addresses and telephone numbers of suppliers, including local source of supplies and replacement parts and warranties. List names, addresses, and telephone numbers of Project Co and Subcontractors with names of responsible persons.

(C) OVERVIEW: Discuss concept, details of design, construction and fabrication features, component function and maintenance requirements, with enough detail to permit effective start- up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the Infrastructure.

(D) TECHNICAL DATA: Provide technical data and product data supplemented by bulletins, component illustrations, detailed views, technical descriptions and parts lists. If standard literature is incorporated into the Operating and Maintenance Manual, only information directly relevant to the installed equipment shall be included and highlighted and any extraneous or irrelevant information shall be deleted, where practicable.

(E) SCHEMATICS: Include schematic and point to point wiring diagrams showing the value of each component, wiring interconnection lists and diagrams fully cross referenced and coordinated. Provide cross referenced components lists and sequence of operations. Suitable diagrams of pneumatic and hydraulic systems shall be provided, including component values and settings; interconnections, valves and sensors.

(F) FAULT CORRECTION: Provide a trouble shooting and fault location guide along with sequential instructions on the quick return of malfunctioning Equipment to normal operation.

(G) SERVICE AND MAINTENANCE: Lay out a routine servicing and preventative maintenance schedule for products. Include estimate of hours required for routine servicing and preventative maintenance tasks.

(H) SPARE PARTS: Include a list of recommended spare parts and the recommended quantity of each to be stocked. List should be based on the Spare Parts List produced in accordance with Section 5.6.6 *[Spare Parts]* of this Schedule.

(I) PERFORMANCE CURVES: Include performance curves for products, equipment and components.

(J) TYPED TEXT: Use typed text as required to, without limitation, supplement product data. Provide a logical sequence of instructions for each procedure, incorporating the manufacturer's instructions.

(x) DRAWINGS

(A) DRAWINGS: Provide with reinforced punched binder tab. Bind in with text; fold to size of text pages.

(B) DRAWINGS: Use drawings, as required, to supplement product data to illustrate the relationship of component parts of equipment and systems and to show control and flow diagrams.

(C) SHOP DRAWINGS: Include a complete set of Accepted shop drawings.

(xi) EQUIPMENT LOG - Include a maintainable Equipment log in each Operating and Maintenance Manual. Without limitation, the log should include the following information:

(A) all Equipment that requires either regular, irregular or infrequent Maintenance by the City;

(B) all Equipment that requires either regular, irregular or infrequent maintenance by the manufacturer or a third-party specialist;

(C) criticality of the equipment to the safety and reliability of the system;

(D) the location, part numbers and serial numbers of Equipment;

(E) supplier's name, contact person(s), telephone numbers, e-mail addresses and postal addresses for the products;

(F) supplier and/or Equipment web page address if such exists;

(G) the maintainable elements of the Equipment;

(H) the type of Maintenance required;

(I) initial recommended frequency of maintenance and the reasons therefor, so that as the asset ages the frequency can be adjusted through appropriate engineering change control;

(J) the manufacturer's recommended products, tools and equipment required to carry out the Maintenance;

(K) any formal qualifications required by personnel carrying out the Maintenance;

(L) details of any re-certification or recalibration required after Maintenance is carried out; and

(M) details of any re-certification or recalibration required on any installed Equipment even if maintenance is not required.

(d) Project Co shall develop and submit a Maintenance plan (the "**Maintenance Concept**") as part of the Operating and Maintenance Manual taking the following into consideration:

(i) It is assumed that troubleshooting and repair shall be performed by an individual who possesses as a minimum the knowledge of a journeyman from the relevant discipline (e.g. electrical), licensed in the Province of Alberta.

(ii) Spare Parts recommended by Project Co as per the Spare Parts List defined in Section 5.6.5 *[Spare Parts]* of this Schedule will be available.

(iii) Maintenance will be performed at three discrete levels: on-line, off-line, and bench.

(A) on-line Maintenance is performed on an in-place and operational Equipment element. Test points or built-in indicators shall facilitate identification of interfaces with other system elements. On-line maintenance shall not disrupt service;

(B) off-line Maintenance is performed on in-place but out-of-service Equipment elements; and

(C) bench maintenance is performed on out-of-place and service Equipment elements. This Maintenance is to be performed in a shop area where standard test equipment and fixtures are available. Test equipment and procedures shall allow maintenance to the lowest line replaceable unit part level.

(iv) The Maintenance Concept shall define the repair, corrective, and preventive Maintenance program plans, policies, and support requirements for all Equipment supplied under this Project. It shall:

(A) minimize each level of Maintenance consistent with the specification requirements and system RAM requirements defined in Section 5 *[System and Safety Assurance]* of this Schedule;

(B) include by design simple access arrangements to carry out maintenance safely without affecting service or causing inconvenience to passengers;

(C) recommend policies and practices which include a schedule of planned preventative maintenance inspections to determine the condition of any asset, carry out any adjustments required and replacement of any worn parts before failure. Where possible, maintenance practices must include recording of wear and/or cycles of use to assess the performance of line replaceable units against the specification requirements and system RAM requirements defined in Section 5 [*System and Safety Assurance*] of this Schedule 4 *[Design and Construction Protocols]* and predict the actual life to allow for any changes in reliability arising as asset ages and due to differences in usage and environmental conditions; and

(D) recommend policies and practices which ensure that, at the time of a failure, qualified maintenance personnel will be promptly notified and will have the necessary documentation, tools, test equipment, and Spare Parts to affect the repair in a minimum of time and carry out diagnostics to determine how to avoid any future significant failures.

(v) The Maintenance Concept shall develop recommendations for:

(A) depth and frequency of maintenance requirements at each level;

(B) facilities required;

(C) support Equipment and tools required;

(D) skill levels and numbers of personnel required;

(E) subsystem, component, and piece part repair policy; and

(F) detailed fault isolation and troubleshooting procedures, diagnostic equipment, and special test equipment.

10.6.3 Standard Operating Procedures and Operating Rule Book

Project Co acknowledges that Valley Line West LRT will adopt the Valley Line LRT Stage 1 Standard Operating Procedures and Operating Rule Book. Project Co shall identify and communicate any proposed revisions to the Standard Operating Procedures or Operating Rule Book that are required due to LRT technology to the City 180 days prior to the ICS Integration Ready Date.

11. RECORD DOCUMENTATION AND FINAL REPORTING

11.1 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; or

(ii) Construction Completion, in accordance with Section 14 *[Construction Completion]* of this Schedule.

Construction Certificates for Temporary Works and for decommissioning or removal of Existing Infrastructure only need to be submitted prior to making an application for Construction Completion, in accordance with Section 14 *[Construction Completion]* of this Schedule.

(b) Each Construction Certificate 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 NBCAE, the Construction Certificates shall be in the forms required by the NBCAE. 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 stamped by the Designer.

11.2 Final Design and Construction Report

Prior to the Construction Completion 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 check notes;

(d) Construction team information;

(e) the As Built Construction Schedule, compared against the Baseline Construction Schedule;

(f) Quality Management 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 be titled "Reports of Conformity to Trackwork Tolerances" and shall have all information separated by Track and shall 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.

(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 6-4.3.7 *[Traffic Controller and Cabinet]* 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.

11.3 Phase 1 Record Drawings

At least 60 days prior to the Phase 1 Construction Completion Date, Project Co shall prepare and submit to the City all Record Drawings for Gerry Wright OMF Stage 2. The Record Drawings for the Gerry Wright OMF shall:

(a) incorporate all As Built information contained on the final, redlined, issued for construction Design Drawings;

(b) 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

(c) be signed and stamped 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.

11.4 Record Drawings

At least 90 days prior to the Construction Completion Date, Project Co shall prepare and submit to the City all Record Drawings for the Infrastructure. The Record Drawings for the Infrastructure shall:

(a) incorporate all As Built information contained on the final, redlined, issued for construction Design Drawings;

(b) 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

(c) be signed and stamped 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.

11.5 Phase 1 Design and Construction Report

Prior to the Phase 1 Construction Completion Date, Project Co shall prepare and submit to the City a report on the Design and Construction of the Gerry Wright OMF Stage 2 (the "**Phase 1 Design and Construction Report**"). The Phase 1 Design and Construction Report shall show the details and progression of the Design and Construction for the Phase 1 Project Work and will include, as a minimum:

(a) an executive summary of Phase 1 Project Work scope;

(b) Gerry Wright OMF Stage 2 Design Team information;

(c) Design notes and check notes;

(d) Gerry Wright OMF Stage 2 Construction team information;

(e) the As Built Construction Schedule for the Phase 1 Project Work, compared against the Baseline Construction Schedule;

(f) Quality Management 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, as applicable:

(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 be titled “Reports of Conformity to Trackwork Tolerances for Gerry Wright OMF Stage 2” and shall have all information separated by Track and shall include, as applicable:

(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; and

(j) a summary and notes of all public communications and engagement activities undertaken during the completion of the Phase 1 Project Work.

12. CONSTRUCTION COMPLETION OF PHASE 1

12.1 Initial Phase 1 Countdown Notice

(a) Not less than 180 days prior to the Target Phase 1 Construction Completion Date and not less than 180 days prior to the Anticipated Phase 1 Construction Completion Date, Project Co shall submit a notice (the "**Initial Phase 1 Countdown Notice**") to the City confirming:

(i) the anticipated Phase 1 Construction Completion Date (the "**Anticipated Phase 1 Construction Completion Date**"); and

(ii) details of any events or circumstances that have the capacity to impact Project Co's ability to achieve Phase 1 Construction Completion on or before the Anticipated Phase 1 Construction Completion Date;

(b) If Project Co has at any time reason to believe that Phase 1 Construction Completion will be delayed by more than five (5) Business Days from the Anticipated Phase 1 Construction Completion Date, Project Co shall:

(i) submit a notice informing the City of the revised date on which Phase 1 Construction Completion is anticipated to occur (the "**Revised Anticipated Phase 1 Construction Completion Date**"); and

(ii) an explanation of the reason for the delay

(the "**Subsequent Phase 1 Countdown Notice**").

12.2 Delays in Achieving Phase 1 Construction Completion

In the event that Project Co fails to achieve Phase 1 Construction Completion by the Target Phase 1 Construction Completion Date, Project Co shall pay to the City as liquidated damages in respect of damages suffered and costs incurred by the City related to Project Co's failure to achieve Phase 1 Construction Completion by the Target Phase 1 Construction Completion Date the sum of $40,000 for each day following the Target Phase 1 Construction Completion Date until the date Phase 1 Construction Completion is achieved, subject to a maximum amount payable pursuant to this Section 12.2 *[Delays in Achieving Phase 1 Construction Completion]* of $24,960,000.00. Project Co and the City acknowledge and agree that such liquidated damages are not a penalty but a genuine pre-estimate of the damages

suffered by the City as a result of Project Co failing to achieve Phase 1 Construction Completion by the Target Phase 1 Construction Completion Date.

12.3 Advance Notice of Phase 1 Construction Completion

(a) Project Co acknowledges that the Project Work in respect of the Gerry Wright OMF Stage 2 is required to be completed by the Target Phase 1 Construction Completion Date.

(b) The Independent Certifier will be responsible to certify Phase 1 Construction Completion. Project Co acknowledges that the Independent Certifier will require sufficient time to complete any inspections, consult with the City and Project Co and review the list of Deficiencies. Accordingly, Project Co shall:

(i) at least 30 days (but no more than 45 days) before the Anticipated Phase 1 Construction Completion Date, 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 in respect of the Gerry Wright OMF Stage 2 prior to Phase 1 Construction Completion; and

(B) a list of all Deficiencies and incomplete Design and Construction in respect of the Gerry Wright OMF Stage 2 that Project Co is aware of at the time of the notice; and

(ii) assist the Independent Certifier in making any advance inspections requested by the Independent Certifier.

12.4 Phase 1 Construction Completion Deficiency List

(a) Prior to, and as a condition of, issuance of the Certificate of Phase 1 Construction Completion, Project Co shall, in co-operation with the City and the Independent Certifier, prepare a complete list of Phase 1 Construction Completion Deficiencies and deliver to the City and the Independent Certifier the list of Phase 1 Construction Completion Deficiencies, together with the Independent Certifier's reasonable estimate of the cost to correct each such Phase 1 Construction Completion Deficiency.

(b) Subject to the right of the parties to refer matters related to the accuracy or completeness of the list of Phase 1 Construction Completion Deficiencies to the Dispute Resolution Procedure, the list of Phase 1 Construction Completion Deficiencies shall include all items required by the City to be included on such list.

12.5 Conditions Precedent to Phase 1 Construction Completion

Phase 1 Construction Completion shall only be achieved if, at the time of certification, the following conditions precedent have been satisfied in respect of the Gerry Wright OMF Stage 2:

(a) all Design and Construction of the Gerry Wright OMF Stage 2 has been completed in accordance with the Project Requirements, save for Phase 1 Construction Completion Deficiencies for which the estimated total cost of correction, as determined by the Independent Certifier, does not exceed $2,000,000 or an amount as otherwise agreed by the City in writing;

(b) all Major Deficiencies have been rectified;

(c) the Gerry Wright OMF Part B Systems are Commissioned and ready for use in accordance with the applicable Project Requirements and is safe and permits uninterrupted and unobstructed use;

(d) the assurance of coordination form in the form of Appendix 4A *[Certificate Forms] [7-Assurance of Design Coordination Certificate]* of this Schedule shall have been completed and delivered;

(e) the list of Phase 1 Construction Completion Deficiencies has been submitted;

(f) all Final Design, Design Certificates, Construction Certificates and Commissioning Certificates related to the Gerry Wright OMF Stage 2 have been submitted to, and Accepted by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*;

(g) the Building Occupancy Permit has been obtained for the Gerry Wright OMF Building B;

(h) at least 180 days has elapsed from the latest submission date of either the Initial Phase 1 Countdown Notice or any Subsequent Phase 1 Countdown Notice(s) to the City;

(i) all training has been delivered in accordance with the appropriately endorsed Phase 1 Training and Assessment Plan and schedule;

(j) a Phase 1 Safety and Security Verification Report and Phase 1 Safety and Security Certificate has been issued by the IV&V Team and submitted to the City;

(k) LEED project checklists and written opinion related to the Gerry Wright OMF Building B have been delivered to the City in accordance with Section 4.5(b) *[LEED Silver Certification]* of this Schedule;

(l) all Spare Parts relevant to the Gerry Wright OMF Stage 2 as set out in the Spare Parts List, pursuant to Section 5.6.5 *[Spare Parts]* of this Schedule, have been delivered to the City;

(m) a copy of all redlined, Final Design Drawings related to the Gerry Wright OMF Stage 2 have been submitted to the City in accordance with Section 6.10 *[Final Designs]* of this Schedule;

(n) final cleaning related to the Gerry Wright OMF Stage 2 has been completed in accordance with applicable requirements of Section 1-8.4.3 *[Final Cleaning]* of Schedule 5 *[D&C Performance Requirements]*;

(o) all Gerry Wright OMF Stage 2 Record Drawings have been submitted and Accepted by the City;

(p) all Warranty Certificates associated with the Gerry Wright OMF Stage 2 that are required to be transferred to the City under this Agreement have been so transferred in accordance with Section 7.1(g) of the Agreement; and

(q) the final Phase 1 Design and Construction Report has been submitted to the City.

12.6 Application for Certificate of Phase 1 Construction Completion

If Project Co considers that it has achieved the requirements for Phase 1 Construction Completion to Section 12.5 *[Conditions Precedent to Phase 1 Construction Completion]* of this Schedule and has complied with Section 12.3 *[Advance Notice of Application for Phase 1 Construction Completion]* of this Schedule, Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for the Certificate of Phase 1 Construction Completion.

12.7 Inspection for Phase 1 Construction Completion

No later than ten (10) Business Days after Project Co delivers:

(a) an application for a Certificate of Phase 1 Construction Completion pursuant to Section 12.6 *[Application for Certificate of Phase 1 Construction Completion]* 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 12.5 *[Conditions Precedent to Phase 1 Construction Completion]* of this Schedule have been satisfied, to the City's Representative and the Independent Certifier, the Parties shall require the Independent Certifier in co-operation with Project Co's Representative and the City's Representative to;

(i) review and verify the accuracy of the Phase 1 Construction Completion Deficiencies;

(ii) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent as described in Section 12.5 *[Conditions Precedent Phase 1 Construction Completion]* of this Schedule have been satisfied; and

(iii) perform and complete an inspection of the Gerry Wright OMF Stage 2 to determine whether Phase 1 Construction Completion has been achieved.

12.8 Certification of Phase 1 Construction Completion

No longer than ten (10) Business Days after the completion of the inspection required under Section 12.7 *[Inspection for Phase 1 Construction Completion]* of this Schedule, the City and Project Co shall cause the Independent Certifier to either:

(a) issue the Certificate of Phase 1 Construction Completion stating the 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 Phase 1 Construction Completion and state the reasons in detail for such decision, including any further work that is required to achieve Phase 1 Construction Completion.

12.9 Refusal to Certify Phase 1 Construction Completion

The Independent Certifier may refuse to issue the Certificate of Phase 1 Construction Completion only if the Gerry Wright OMF Stage 2 does not meet the conditions precedent specified in Section 12.5 *[Conditions Precedent to Phase 1 Construction Completion]* of this Schedule.

12.10 Completion of Further Work for Phase 1 Construction Completion

In the event the Independent Certifier delivers a notice under Section 12.12 *[Submissions by the City's Representative]* of this Schedule, Project Co shall issue a notice to the Independent Certifier and the City not less than five (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 Phase 1 Construction Completion. 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 five (5) Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 12.5 *[Conditions Precedent to Phase 1 Construction Completion]* of this Schedule through to Section 12.12 *[Submissions by the City's Representative]*, inclusive, shall thereafter apply to such inspection mutatis mutandis.

12.11 Correction of Phase 1 Construction Completion Deficiencies

Upon issuance of the Certificate of Phase 1 Construction Completion, Project Co shall proceed expeditiously to correct each Phase 1 Construction Completion Deficiency listed in the list of Phase 1 Construction Completion Deficiencies by the date that is 60 days after the Phase 1 Construction Completion Date, or such later date as may be reasonably required to provide sufficient time to correct the Phase 1 Construction Completion Deficiencies and that is agreed to by the City, acting reasonably. Each Phase 1 Construction Completion Deficiency listed in the list of Construction Completion Deficiencies shall have its own deadline for completion (each, a "**Phase 1 Construction Completion Deficiency Deadline**"). Nothing in this Section 12 *[Construction Completion of Phase 1]* limits Project Co's responsibilities for correction of Deficiencies that are identified after the preparation of the list of Phase 1 Construction Completion Deficiencies.

12.12 Submissions by the City's Representative

The City may, at any time, following receipt of notice given by Project Co pursuant to Section 12.3 *[Advance Notice of Application for Phase 1 Construction Completion]* or Section 12.10 *[Completion of Further Work for Phase 1 Construction Completion]* of this Schedule, and prior to the Independent Certifier issuing the Certificate of Phase 1 Construction Completion, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the Certificate of Phase 1 Construction Completion have been satisfied and, if applicable, the reasons as to why the City considers that the Certificate of Phase 1 Construction Completion should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the Certificate of Phase 1 Construction Completion.

12.13 No Limitation

The issuance of a Certificate of Phase 1 Construction Completion 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.

12.14 Disputed Certificate

A Certificate of Phase 1 Construction Completion issued by the Independent Certifier will be final and not referable to the Dispute Resolution Procedure, provided, however, that Project Co shall be entitled to refer to the Dispute Resolution Procedure a refusal of the Independent Certifier to issue a Certificate of Phase 1 Construction Completion.

12.15 Phase 1 Construction Completion Deficiencies Holdback

(a) The City may withhold from the Phase 1 Construction Completion (OMF-B) Payment a holdback amount that is 200% of the amount estimated by the Independent Certifier for the City to complete and rectify all Phase 1 Construction Completion Deficiencies (the "**Phase 1 Construction Completion Deficiencies Holdback**"), which holdback shall be held in an interest-bearing account;

(b) If Project Co fails to complete and rectify any Phase 1 Construction Completion Deficiency within the time for its completion and rectification specified in Section 12.11 *[Correction of Phase 1 Construction Completion Deficiencies]*, the City may engage others to perform the work necessary to complete and rectify such Phase 1 Construction Completion Deficiency at the risk and cost of Project Co, and may deduct such cost from the Phase 1 Construction Completion Deficiencies Holdback and interest accrued thereon;

(c) Notwithstanding Section 12.15 *[Phase 1 Construction Completion Deficiencies Holdback]* of this Schedule, the City shall be entitled to set-off against the Phase 1 Construction Completion Deficiencies Holdback any other amounts permitted to be set-off against amounts owing to Project Co pursuant to and in accordance with Section 8.6 *[Set-off]* of the Agreement;

(d) Upon City acceptance that all Phase 1 Construction Completion Deficiencies have been completed, Project Co shall submit an invoice to the City for the balance of the Phase 1 Construction Completion Deficiencies Holdback together with all supporting documentation demonstrating completion of all Phase 1 Construction Completion Deficiencies. Within 11 Business Days of such invoice, the City shall release to Project Co the balance of Phase 1 Construction Completion Deficiencies Holdback, together with all interest accrued thereon and applicable GST. Where the City exercises its rights pursuant to Section 12.15 *[Phase 1 Construction Completion Deficiencies Holdback]* of this Schedule, and the cost of such completion and rectification or other set-off exceeds the amount of the Phase 1 Construction Completion Deficiencies Holdback and interest, Project Co shall reimburse the City for all such excess costs within 11 Business Days. Should additional amounts beyond the Phase 1 Construction Completion Deficiencies Holdback be required to rectify Phase 1 Construction Deficiencies in a timely manner, the City may, in its discretion, also draw upon any available Performance Security required by this Agreement.

12.16 Phase 1 Construction Completion Deficiencies Letter of Credit

As security for Project Co's obligations pursuant to Section 12.11 *[Correction of Phase 1 Construction Completion Deficiencies]*, Project Co may deliver, or cause to be delivered, to the City no later than Phase 1 Construction Completion, an irrevocable letter of credit (the "**Phase 1 Construction Completion Deficiencies Letter of Credit**") substantially in the form of Schedule 30 *[Letter of Credit]* to the Agreement. The Phase 1 Construction Completion Deficiencies Letter of Credit shall be in an amount equal to and in lieu of the Phase 1 Construction Completion Deficiencies Holdback pursuant to Section 12.15 *[Phase 1 Construction Completion Deficiencies Holdback]*. The Phase 1 Construction Completion Deficiencies Letter of Credit shall be subject to the following:

(a) The Phase 1 Construction Completion Deficiencies Letter of Credit must be issued by one or more Permitted Letter of Credit Providers;

(b) In the event that the Phase 1 Construction Completion Deficiencies Letter of Credit must be renewed at any time, Project Co agrees to provide to the City reasonable

evidence of the renewal of such Phase 1 Construction Completion Deficiencies Letter of Credit no later than ten (10) Business Days prior to the renewal date, if any, of such Phase 1 Construction Completion Deficiencies Letter of Credit;

(c) In the event that the City has withheld the Phase 1 Construction Completion Deficiencies Holdback pursuant to Section 12.15 *[Phase 1 Construction Completion Deficiencies Holdback]* and Project Co subsequently delivers a Phase 1 Construction Completion Deficiencies Letter of Credit pursuant to this Section 12.16 *[Phase 1 Construction Completion Deficiencies Letter of Credit]*, the City shall release the Phase 1 Construction Completion Deficiencies Holdback and together with all interest accrued thereon, no later than five (5) days following delivery of the Phase 1 Construction Completion Deficiencies Letter of Credit to the City;

(d) If Project Co fails to complete and rectify any Phase 1 Construction Completion Deficiency within the time for its completion and rectification specified in Section 12.11 *[Phase 1 Correction of Construction Completion Deficiencies]*, the City may engage others to perform the work necessary to complete and rectify such Phase 1 Construction Completion Deficiency at the risk and cost of Project Co, and may draw on the Phase 1 Construction Completion Deficiencies Letter of Credit to the extent of costs incurred by the City;

(e) Notwithstanding anything to the contrary in this Section 12.16 *[Phase 1 Construction Completion Deficiencies Letter of Credit]*, the City shall be entitled to draw on the Phase 1 Construction Completion Deficiencies Letter of Credit:

(i) upon the failure of Project Co to renew the Phase 1 Construction Completion Deficiencies Letter of Credit pursuant to Section 12.16(b) *[Phase 1 Construction Completion Deficiencies Letter of Credit]*.

(ii) upon the downgrading of any of the banks or other financial institutions that issued the Phase 1 Construction Completion Deficiencies Letter of Credit so that they no longer meet the requirements of a "Permitted Letter of Credit Provider" where the Phase 1 Construction Completion Deficiencies Letter of Credit has not been replaced by Project Co with a replacement Phase 1 Construction Completion Deficiencies Letter of Credit from a Permitted Letter of Credit Provider within 30 calendar days of such downgrading; or

(iii) upon the bankruptcy or insolvency of any of the banks or other financial institutions that issued the Phase 1 Construction Completion Deficiencies Letter of Credit,

provided that the City shall provide Project Co at least two Business Days prior written notice before drawing on the Phase 1 Construction Completion Deficiencies Letter of Credit pursuant to this Section 12.16 *[Phase 1 Construction Completion Deficiencies Letter of Credit]*;

(f) In the event that the Phase 1 Construction Completion Deficiencies Letter of Credit is drawn down in accordance with Section 12.16(d) *[Phase 1 Construction Completion Deficiencies Letter of Credit]*, the City shall hold the cash proceeds thereof in an interest bearing account (provided that such account must be at a Permitted Letter of Credit Provider) and such cash proceeds shall thereupon stand in place of the Phase 1 Construction Completion Deficiencies Letter of Credit until Project Co delivers (or causes the delivery of) a replacement Phase 1 Construction Completion Deficiencies Letter of Credit to the City. All interest earned on such cash proceeds shall be for the

benefit of Project Co. The City shall be entitled to withdraw such cash proceeds in the same manner that it is permitted to draw upon the Phase 1 Construction Completion Deficiencies Letter of Credit pursuant to 12.16(d)14.16(d) Phase 1 *[Construction Completion Deficiencies Letter of Credit]*. Upon the replacement of the Phase 1 Construction Completion Deficiencies Letter of Credit by Project Co, the City shall return all remaining cash proceeds and all accrued interest thereon from such segregated bank account to Project Co or as Project Co may direct within five (5) Business Days.

(g) The City may make multiple calls on the Phase 1 Construction Completion Deficiencies Letter of Credit in accordance with this Section 12.16 *[Phase 1 Construction Completion Deficiencies Letter of Credit]*; and

(h) Unless the Phase 1 Construction Completion Deficiencies Letter of Credit is fully drawn by the City in accordance with the provisions of this Agreement, upon City acceptance that all Phase 1 Construction Completion Deficiencies have been completed, the City shall release to Project Co the Phase 1 Construction Completion Deficiencies Letter of Credit. Where the City exercises its rights pursuant to Section 12.15(b) *[Phase 1 Construction Completion Deficiencies Holdback]* and the cost of such completion and rectification exceeds the amount of the Phase 1 Construction Completion Deficiencies Letter of Credit and interest, Project Co shall reimburse the City for all such excess cost within 11 Business Days. Should additional amounts beyond the Phase 1 Construction Completion Deficiencies Letter of Credit be required to rectify Phase 1 Construction Completion Deficiencies in a timely manner, the City may, in its discretion, also draw upon any available other Performance Security required by this Agreement.

13. INTEGRATED CONTROL SYSTEM (ICS) INTEGRATION READY

13.1 Advance Notice of ICS Integration Ready Date

(a) Project Co acknowledges that the Operator will be installing an integrated control system (ICS) to be used for Valley Line West LRT operations and shall require access to the relevant Infrastructure and support from Project Co prior to Construction Completion in order to begin integration so that the Operator will complete the ICS installation within 180 days after Construction Completion. The date at which this access and support is to be provided by Project Co is the "**ICS Integration Ready Date**".

(b) The Independent Certifier will be responsible to certify the ICS Integration Ready Date. Project Co acknowledges that the Independent Certifier will require sufficient time to complete any inspections, consult with the City and Project Co and review the list of Deficiencies. Accordingly, Project Co shall:

(i) at least 30 days (but no more than 45 days) before the anticipated ICS Integration Ready Date, 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 ICS Integration Ready Date; and

(B) a list of all Deficiencies and incomplete Design and Construction that Project Co is aware of at the time of the notice; and

(ii) assist the Independent Certifier in making any advance inspections requested by the Independent Certifier.

13.2 Delays in Achieving ICS Integration Ready Date

In the event that Project Co fails to achieve the ICS Integration Ready Date by the Target ICS Integration Ready Date, then Project Co shall pay to the City as liquidated damages in respect of damages suffered and costs incurred by the City related to Project Co's failure to achieve the ICS Integration Ready Date by the Target ICS Integration Ready Date the sum of $15,000 for each day following the Target ICS Integration Ready Date until the Target Construction Completion Date, subject to a maximum amount payable pursuant to this Section 13.2 *[Delays in Achieving ICS Integration Ready Date]* of $2,700,000.00. Project Co and the City acknowledge and agree that such liquidated damages are not a penalty but a genuine pre-estimate of the damages suffered by the City as a result of Project Co failing to achieve the ICS Integration Ready Date by the Target ICS Integration Ready Date.

13.3 Conditions Precedent to ICS Integration Ready Date

The ICS Integration Ready Date shall only be achieved if, at the time of certification, the following conditions precedent have been satisfied:

(a) all Infrastructure sub-systems with which the ICS must integrate, at minimum those sub-systems identified in Part 6 [*Systems*] of Schedule 5 [*D&C Performance Requirements*], shall have been successfully Commissioned with all related Commissioning Certificates submitted, certified as safe to operate, and are functioning correctly;

(b) Project Co has demonstrated that from the ICS Integration Ready Date to Construction Completion, it will provide sufficient physical access and resource support to the Operator to enable it to commence Integration of the ICS with the Project Co installed systems;

(c) all Operating and Maintenance Manuals have been submitted and Accepted by the City; and

(d) the Accepted Infrastructure Training and Assessment Plan is, in the discretion of the Independent Certifier, sufficiently ready such that training of the City and its representatives shall be completed prior to Construction Completion.

13.4 Application for ICS Integration Ready Date Certificate

If Project Co considers that it has achieved the requirements for ICS Integration Ready Date pursuant to Section 13.3 *[Conditions Precedent to ICS Integration Ready Date]* and has complied with Section 13.1 *[Advance Notice of Application for ICS Integration Ready Date]* of this Schedule, Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for the ICS Integration Ready Date Certificate.

13.5 Inspection for ICS Integration Ready Date

No later than ten (10) Business Days after Project Co delivers:

(a) an application for an ICS Integration Ready Date Certificate pursuant to Section 13.3(a) *[Application for ICS Integration Ready Date Certificate]* 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 *[Conditions Precedent to ICS Integration Ready Date]* of this Schedule have been satisfied, to the City's Representative and the Independent Certifier, the Parties shall require the Independent Certifier in co-operation with Project Co's Representative and the City's Representative to;

(i) review and verify the accuracy of the listed Deficiencies and incomplete Design or Construction;

(ii) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent as described in Section 13.3 *[Conditions Precedent to ICS Integration Ready Date]* of this Schedule have been satisfied; and

(iii) perform an inspection of the Infrastructure to determine whether ICS Integration Ready Date has been achieved.

13.6 Certification of ICS Integration Ready Date

No longer than 10 Business Days after the completion of the inspection required under Section 13.5 *[Inspection for ICS Integration Ready Date]* of this Schedule, the City and Project Co shall cause the Independent Certifier to either:

(a) issue the ICS Integration Ready Date Certificate, (the "**ICS Integration Ready Date Certificate**"), stating the date, to the City and Project Co; or

(b) notify Project Co and the City's Representative of its decision not to issue the ICS Integration Ready Date Certificate and state the reasons in detail for such decision, including any further work that is required to achieve the ICS Integration Ready Date.

13.7 Refusal to Certify ICS Integration Ready Date

The Independent Certifier may refuse to issue the ICS Integration Ready Date Certificate only if the Infrastructure does not meet the conditions precedent specified in Section 13.3 *[Conditions Precedent to ICS Integration Ready Date]* of this Schedule.

13.8 Completion of Further Work for ICS Integration Ready Date

In the event the Independent Certifier delivers a notice under Section 13.7 *[Refusal to Certify ICS Integration Ready Date]* of this Schedule, Project Co shall issue a notice to the Independent Certifier and the City not less than five (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 ICS Integration Ready Date 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 five (5) Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 13.3 *[Conditions Precedent to ICS Integration Ready Date]* of this Schedule through to this Section 13.9 *[Submissions by the City's Representative]*, inclusive, shall thereafter apply to such inspection *mutatis mutandis*.

13.9 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 *[Advance Notice of Application for ICS Integration Ready Date]* or 13.8 *[Completion of Further Work for ICS Integration Ready Date]* of this Schedule, and prior to the Independent Certifier issuing the ICS Integration Ready Date Certificate, provide to the Independent Certifier and Project Co the City's submissions as to whether the conditions for issuance of the ICS Integration Ready Date Certificate have been satisfied and, if applicable, any reasons as to why the City considers that the ICS Integration Ready Date Certificate should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the ICS Integration Ready Date Certificate.

13.10 No Limitation

The issuance of the ICS Integration Ready Date 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. CONSTRUCTION COMPLETION

14.1 Initial Countdown Notice

(a) Not less than 180 days prior to the Target Construction Completion Date and not less than 180 days prior to the Anticipated Construction Completion Date, Project Co shall submit a notice (the "**Initial Countdown Notice**") to the City confirming:

(i) the anticipated Construction Completion Date (the "**Anticipated Construction Completion Date**"); and

(ii) details of any events or circumstances that have the capacity to impact Project Co's ability to achieve Construction Completion on or before the Anticipated Construction Completion Date;

(b) If Project Co has at any time reason to believe that Construction Completion will be delayed by more than five (5) Business Days from the Anticipated Construction Completion Date, Project Co shall:

(i) submit a notice informing the City of the revised date on which Construction Completion is anticipated to occur (the "**Revised Anticipated Construction Completion Date**"); and

(ii) an explanation of the reason for the delay; and

(iii) a remediation plan.

(the "**Subsequent Countdown Notice**").

14.2 Delays in achieving Construction Completion

In the event that Project Co fails to achieve Construction Completion by the Target Construction Completion Date, then Project Co shall pay to the City as liquidated damages in respect of damages suffered and costs incurred by the City related to Project Co's failure to achieve Construction Completion by the Target Construction Completion Date the sum of $61,000 for each day following the Target Construction Completion Date until the date Construction Completion is achieved, subject to a maximum aggregate amount payable pursuant to Section 13.2 *[Delays in Achieving ICS Integration Ready Date]* and this Section 14.2 *[Delays in Achieving Construction Completion]* of $22,265,000.00. Project Co and

the City acknowledge and agree that such liquidated damages are not a penalty but a genuine pre-estimate of the damages suffered by the City as a result of Project Co failing to achieve to achieve Construction Completion by the Target Construction Completion Date.

14.3 Advance Notice of Application for Construction Completion

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. Accordingly, Project Co shall:

(a) at least 30 days (but no more than 45 days) before the Anticipated Construction Completion Date, 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 Construction Completion; and

(ii) a list of all Deficiencies, Nonconformities 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.

14.4 Deficiency List

(a) Prior to, and as a condition of, issuance of the Certificate of Construction Completion, Project Co shall, in co-operation with the City and the Independent Certifier, prepare a complete list of Construction Completion Deficiencies and deliver to the City and the Independent Certifier the list of Construction Completion Deficiencies, together with the Independent Certifier's reasonable estimate of the cost to correct each such Construction Completion Deficiency.

(b) Subject to the right of the parties to refer matters related to the accuracy or completeness of the list of Construction Completion Deficiencies to the Dispute Resolution Procedure, the list of Construction Completion Deficiencies shall include all items required by the City to be included on such list.

14.5 Conditions Precedent to Construction Completion

Construction Completion shall only be achieved if, at the time of certification by the Independent Certifier, the following conditions precedent have been satisfied:

(a) all Design and Construction has been completed in accordance with the Project Requirements, save for Construction Completion Deficiencies for which the estimated total cost of correction, as determined by the Independent Certifier, does not exceed 1.0% of the Total Capital Cost Amount or an amount as otherwise agreed by the City in writing;

(b) all Major Deficiencies have been rectified;

(c) the Infrastructure is ready for use when tasked to perform, provide and deliver all of its intended functions in accordance with the applicable Project Requirements, is safe and permits uninterrupted and unobstructed public use;

(d) "substantial performance" of the Infrastructure, as defined in the Builder's Lien Act (Alberta) has been achieved;

(e) The assurance of coordination form in the form of Appendix 4A *[Assurance of Design Coordination Certificate*] of this Schedule shall have been completed and delivered;

(f) the list of Construction Completion Deficiencies has been submitted;

(g) all Design Certificates, Construction Certificates and Commissioning Certificates and the Design Coordination Certificate have been submitted to, and endorsed "Accepted" by, the City in accordance with Schedule 2 *[Submittal Review Procedure]*;

(h) the Certificate of Phase 1 Construction Completion and the ICS Integration Ready Date Certificate have been issued by the Independent Certifier;

(i) Building Occupancy Permits have been obtained for all Building Structures to which the NBCAE applies;

(j) 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;

(k) at least 180 days has elapsed from the latest submission date of either the Initial Countdown Notice or any Subsequent Countdown Notice(s) to the City;

(l) 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;

(m) an In-Service Road Safety Audit Certificate has been issued by the Independent Road Safety Auditor and submitted to the City;

(n) LEED project checklists and written opinion have been delivered to the City in accordance with Section 4.5(b) *[LEED Silver Certification]* of this Schedule;

(o) all training has been delivered in accordance with the appropriately endorsed Infrastructure Training and Assessment Plan and schedule;

(p) a copy of all redlined, Final Design Drawings have been submitted to the City 60 days prior to the Target Construction Completion Date in accordance with Section 6.10 *[Final Designs]* of this Schedule;

(q) all Project Work specified in Schedule 10 *[Environmental Performance Requirements]* in respect of each Native Forest Reclamation Area and each Naturalization Area is complete in accordance with the requirements specified in Schedule 10 *[Environmental Performance Requirements]*;

(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) all Record Drawings have been submitted and Accepted by the City;

(u) all necessary Spare Parts as set out in the Spare Parts List, pursuant to Section 5.6.5 *[Spare Parts]* of this Schedule, have been delivered to the City; and

(v) the Final Design and Construction Report has been submitted to the City.

14.6 Application for Construction Completion

If Project Co is of the opinion that it has achieved the requirements for Construction Completion and has complied with Section 5.6 *[Phase 1 and Construction Completion]* of the Agreement and Section 14.3 *[Advance Notice of Application for Construction Completion]* of this Schedule, then Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for Construction Completion.

14.7 Inspection for Construction Completion

No later than fifteen (15) Business Days after Project Co delivers to the City's Representative and the Independent Certifier:

(a) an application for Construction Completion pursuant to Section 14.3 *[Advance Notice of Application for Construction Completion]* 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 14.5 *[Conditions Precedent to Construction Completion]* of this Schedule have been satisfied, the Parties shall require the Independent Certifier, in co-operation with Project Co's Representative and the City's Representative, to complete the following:

(i) review and verify the accuracy of the Construction Completion Deficiencies;

(ii) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent to Construction Completion have been satisfied; and

(iii) perform and complete an inspection of the Infrastructure to determine whether Construction Completion has been achieved.

14.8 Certification of Construction Completion

No longer than ten (10) Business Days of the completion of the inspection under Section 14.7 *[Inspection for Construction Completion]* of this Schedule, the City and Project Co shall cause the Independent Certifier, to either:

(a) issue the Certificate of Construction Completion for the Infrastructure (the "**Certificate of Construction Completion**"), stating the Construction 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 Certificate of Construction Completion and state the reasons in detail for such decision, including the further work that is required to achieve Construction Completion.

14.9 Refusal to Certify Construction Completion

The Independent Certifier may refuse to issue the Certificate of Construction Completion only if:

(a) the Infrastructure does not meet the conditions precedent to Construction Completion specified in Section 14.5 *[Conditions Precedent to Construction Completion]* of this Schedule; or

(b) the Project Safety and Security Certificate has not been Accepted.

14.10 Completion of Further Work for Construction Completion

In the event the Independent Certifier delivers as notice under Section 14.8(b) *[Certification of Construction Completion]* of this Schedule, Project Co shall issue a notice to the Independent Certifier and the City not less than five (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 Construction Completion. 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 within five (5) Business Days of receipt of such notice cause the Independent Certifier to commence, an inspection of such further work or measures and the provisions of Section 14.5 *[Conditions Precedent to Construction Completion]* of this Schedule through to this Section 14.10 *[Completion of Further Work for Construction Completion]*, inclusive, shall thereafter apply to such notice mutatis mutandis .

14.11 Correction of Construction Completion Deficiencies

Upon issuance of the Certificate of Construction Completion, Project Co shall proceed expeditiously to correct each Construction Completion Deficiency listed in the list of Construction Completion Deficiencies by the date that is 120 days after the Construction Completion Date, or such later date as may be reasonably required to provide sufficient time to correct the Construction Completion Deficiencies and that is agreed to by the City, acting reasonably. Each Construction Completion Deficiency listed in the list of Construction Completion Deficiencies shall have its own deadline for completion (each, a "**Deficiency Deadline**"). Nothing in this Section 14 *[Construction Completion]* limits Project Co's responsibilities for correction of Deficiencies that are identified after the preparation of the list of Construction Completion Deficiencies.

14.12 Submissions by the City's Representative

The City may, at any time, following receipt of notice given by Project Co pursuant to Section 14.3 *[Advance Notice of Application for Construction Completion]* or Section 14.10 *[Completion of Further Work for Construction Completion]* of this Schedule, and prior to the Independent Certifier issuing the Certificate of Construction Completion, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the Certificate of Construction Completion have been satisfied and, if applicable, the reasons as to why the City considers that the Certificate of Construction Completion should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the Certificate of Construction Completion.

14.13 No Limitation

The issuance of a Certificate of Construction Completion 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.

14.14 Disputed Certificate

A Certificate of Construction Completion issued by the Independent Certifier will be final and not referable to the Dispute Resolution Procedure, provided, however, that Project Co shall be entitled to refer to the Dispute Resolution Procedure a refusal of the Independent Certifier to issue a Certificate of Construction Completion.

14.15 Construction Completion Deficiencies Holdback

(a) Subject to Section 14.16 *[Construction Completion Deficiencies Letter of Credit],* the City may withhold from the Construction Completion Payment a holdback amount that is 200% of the amount estimated by the Independent Certifier for the City to complete and rectify all Construction Completion Deficiencies (the "**Construction Completion Deficiencies Holdback**"), which holdback shall be held in an interest-bearing account;

(b) If Project Co fails to complete and rectify any Construction Completion Deficiency within the time for its completion and rectification specified in Section 14.11 *[Correction of Construction Completion Deficiencies]*, the City may engage others to perform the work necessary to complete and rectify such Construction Completion Deficiency at the risk and cost of Project Co, and may deduct such cost from the Construction Completion Deficiencies Holdback and interest accrued thereon;

(c) Notwithstanding Section 14.15(b) *[Construction Completion Deficiencies Holdback],* the City shall be entitled to set-off against the Construction Completion Deficiencies Holdback any other amounts permitted to be set-off against amounts owing to Project Co pursuant to and in accordance with Section 8.6 *[Set-off]* of the Agreement;

(d) Upon City acceptance that all Construction Completion Deficiencies have been completed, Project Co shall submit an invoice to the City for the Construction Completion Deficiencies Holdback together with all supporting documentation demonstrating completion within 11 Business Days of such invoice, the City shall release to Project Co the Construction Completion Deficiencies Holdback, together with all interest accrued thereon and applicable GST. Where the City exercises its rights pursuant to Section 14.15(b) or (c) *[Construction Completion Deficiencies Holdback],* and the cost of such completion and rectification or other set-off exceeds the amount of the Construction Completion Deficiencies Holdback and interest, Project Co shall reimburse the City for all such excess cost within 11 Business Days. Should additional amounts beyond the Construction Completion Deficiencies Holdback be required to rectify Deficiencies in a timely manner, the City may, in its discretion, also draw upon any available Performance Security required by this Agreement.

14.16 Construction Completion Deficiencies Letter of Credit

As security for Project Co's obligations pursuant to Section 14.11 *[Correction of Construction Completion Deficiencies]*, Project Co may deliver, or cause to be delivered, to the City no later than Construction Completion, an irrevocable letter of credit (the "**Construction Completion Deficiencies Letter of Credit**") substantially in the form of Schedule 30 *[Letter of Credit]* to the Agreement. The Construction Completion Deficiencies Letter of Credit shall be in an amount equal to and in lieu of the Construction Completion Deficiencies Holdback pursuant to Section 14.15 *[Construction Completion Deficiencies Holdback]*. The Construction Completion Deficiencies Letter of Credit shall be subject to the following:

(a) The Construction Completion Deficiencies Letter of Credit must be issued by one or more Permitted Letter of Credit Providers;

(b) In the event that the Construction Completion Deficiencies Letter of Credit must be renewed at any time, Project Co agrees to provide to the City reasonable evidence of the renewal of such Construction Completion Deficiencies Letter of Credit no later than ten (10) Business Days prior to the renewal date, if any, of such Construction Completion Deficiencies Letter of Credit;

(c) In the event that the City has withheld the Construction Completion Deficiencies Holdback pursuant to Section 14.15 *[Construction Completion Deficiencies Holdback]* and Project Co subsequently delivers a Construction Completion Deficiencies Letter of Credit pursuant to this Section 14.16 *[Construction Completion Deficiencies Letter of Credit]*, the City shall release the Construction Completion Deficiencies Holdback and together with all interest accrued thereon, no later than five (5) days following delivery of the Construction Completion Deficiencies Letter of Credit to the City;

(d) If Project Co fails to complete and rectify any Construction Completion Deficiency within the time for its completion and rectification specified in Section 14.11 *[Correction of Construction Completion Deficiencies]*, the City may engage others to perform the work necessary to complete and rectify such Construction Completion Deficiency at the risk and cost of Project Co, and may draw on the Construction Completion Deficiencies Letter of Credit to the extent of costs incurred by the City;

(e) Notwithstanding anything to the contrary in this Section 14.16 *[Construction Completion Deficiencies Letter of Credit]*, the City shall be entitled to draw on the Construction Completion Deficiencies Letter of Credit:

(i) upon the failure of Project Co to renew the Construction Completion Deficiencies Letter of Credit pursuant to Section 14.16(b) *[Construction Completion Deficiencies Letter of Credit]*.

(ii) upon the downgrading of any of the banks or other financial institutions that issued the Construction Completion Deficiencies Letter of Credit so that they no longer meet the requirements of a "Permitted Letter of Credit Provider" where the Construction Completion Deficiencies Letter of Credit has not been replaced by Project Co with a replacement Construction Completion Deficiencies Letter of Credit from a Permitted Letter of Credit Provider within 30 calendar days of such downgrading; or

(iii) upon the bankruptcy or insolvency of any of the banks or other financial institutions that issued the Construction Completion Deficiencies Letter of Credit,

provided that the City shall provide Project Co at least two Business Days prior written notice before drawing on the Construction Completion Deficiencies Letter of Credit pursuant to this Section 14.16 *[Construction Completion Deficiencies Letter of Credit]*;

(f) In the event that the Construction Completion Deficiencies Letter of Credit is drawn down in accordance with Section 14.16(d) *[Construction Completion Deficiencies Letter of Credit]*, the City shall hold the cash proceeds thereof in an interest bearing account (provided that such account must be at a Permitted Letter of Credit Provider) and such cash proceeds shall thereupon stand in place of the Construction Completion Deficiencies Letter of Credit until Project Co delivers (or causes the delivery of) a replacement Construction Completion Deficiencies Letter of Credit to the City. All interest earned on such cash proceeds shall be for the benefit of Project Co. The City shall be entitled to withdraw such cash proceeds in the same manner that it is

permitted to draw upon the Construction Completion Deficiencies Letter of Credit pursuant to 14.16(d) *[Construction Completion Deficiencies Letter of Credit]*. Upon the replacement of the Construction Completion Deficiencies Letter of Credit by Project Co, the City shall return all remaining cash proceeds and all accrued interest thereon from such segregated bank account to Project Co or as Project Co may direct within five (5) Business Days.

(g) The City may make multiple calls on the Construction Completion Deficiencies Letter of Credit in accordance with this Section 14.16 *[Construction Completion Deficiencies Letter of Credit]*; and

(h) Unless the Construction Completion Deficiencies Letter of Credit is fully drawn by the City in accordance with the provisions of this Agreement, upon City acceptance that all Construction Completion Deficiencies have been completed, the City shall release to Project Co the Construction Completion Deficiencies Letter of Credit. Where the City exercises its rights pursuant to Section 14.15(b) *[Construction Completion Deficiencies Holdback]* and the cost of such completion and rectification exceeds the amount of the Construction Completion Deficiencies Letter of Credit and interest, Project Co shall reimburse the City for all such excess cost within 11 Business Days. Should additional amounts beyond the Construction Completion Deficiencies Letter of Credit be required to rectify Construction Completion Deficiencies in a timely manner, the City may, in its discretion, also draw upon any available other Performance Security required by this Agreement.

15. SERVICE READINESS

15.1 Project Co Involvement in Service Readiness

(a) Project Co acknowledges that, for a 180-day period immediately following the Construction Completion Date and prior to Infrastructure Performance Demonstration, the City and the Operator will be preparing for Service Readiness of the Valley Line LRT Stage 2. Project Co shall cause the relevant Project Co Persons to be available in Edmonton on 24 hours' notice by the City, or as otherwise agreed by the City, to respond to questions, issues, training, site visits, Deficiency corrections or other needs related to Project Co's fulfillment of the Project Requirements.

16. FINAL COMPLETION

16.1 Advance Notice of Application for Final Completion

(a) Project Co acknowledges that the Independent Certifier will need sufficient time to complete any inspections, consult with the City and Project Co. Accordingly, Project Co shall:

(i) at least 30 days (but no more than 45 days) before the anticipated date of Final Completion, deliver to the Independent Certifier and the City's Representative a notice setting out:

(A) identification of all outstanding Design and Construction to be completed by Project Co prior to Final Completion; and

(B) list of all Construction Completion Deficiencies at the time of the notice; and

(ii) assist the Independent Certifier in making any advance inspections requested by the Independent Certifier.

(b) If Project Co has, at any time, reason to believe that the anticipated date of Final Completion will be delayed or achieved earlier by more than five (5) Business Days, it shall issue a fresh notice informing the Independent Certifier and the City's Representative of the new date on which Final Completion is anticipated to occur.

16.2 Conditions Precedent to Final Completion

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

(a) Construction Completion has been achieved;

(b) all incomplete Design and Construction and all Construction Completion Deficiencies have been certified by the Independent Certifier to be complete or rectified, as the case may be; and

(c) Infrastructure Performance Demonstration has been successfully completed and the Certificate of Infrastructure Performance Demonstration Completion has been issued.

16.3 Application for Final Completion

If Project Co is of the opinion that it has achieved the requirements for Final Completion and it has complied with Section 16.1 *[Advance Notice of Application for Final Completion]* of this Schedule, Project Co may apply to the Independent Certifier (with a concurrent copy to the City's Representative) for Final Completion.

16.4 Inspection for Final Completion

No later than ten (10) Business Days after Project Co delivers to the City's Representative and the Independent Certifier:

(a) an application for Final Completion pursuant to Section 16.3 *[Application for Final Completion]* of this Schedule;

(b) all relevant Certificates and supporting documentation in accordance with the Project Requirements to confirm that all conditions precedent to Final Completion as set forth in Section 16.2 *[Conditions Precedent to Final Completion]* of this Schedule have been satisfied;

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

(i) review and verify the accuracy of the listed Construction Completion Deficiencies and any other incomplete Design or Construction;

(ii) review all other relevant Certificates and supporting documentation to determine whether all conditions precedent to Final Completion as set forth in Section 16.2 *[Conditions Precedent to Final Completion]* of this Schedule have been satisfied; and

(iii) perform an inspection of the Infrastructure to determine whether Final Completion has been achieved.

16.5 Certification of Final Completion

Within five (5) Business Days of the commencement of the inspection under Section 16.4 *[Inspection for Final Completion]* of this Schedule the City and Project Co shall cause the Independent Certifier to either:

(a) issue the Certificate of Final Completion (the "**Certificate of Final Completion**"), stating the Final 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 Certificate of Final Completion and state the reasons in detail for such decision, including any further work that is required to achieve Final Completion.

16.6 Refusal to Certify Final Completion

The Independent Certifier may refuse to issue the Certificate of Final Completion only if:

(a) the Infrastructure does not meet the conditions precedent to Final Completion as set forth in Section 16.2 *[Conditions Precedent to Final Completion]* of this Schedule; or

(b) the Project Safety and Security Certificate has not been Accepted.

16.7 Completion of Further Work for Final Completion

In the event the Independent Certifier delivers a notice under Section 16.5(b) *[Certification of Final Completion]* of this Schedule, Project Co shall issue to the Independent Certifier and the City a notice not less than five (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 Final Completion. 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 five (5) Business Days of receipt of such notice, an inspection of such further work or measures and the provisions of Section 16.2 *[Conditions Precedent to Final Completion]* of this Schedule through to this Section 16.7 *[Completion of Further Work for Final Completion]*, inclusive, shall thereafter apply to such notice *mutatis mutandis*.

16.8 Submissions by the City's Representative

The City may, at any time following receipt of notice given by Project Co pursuant to Section 16.1 *[Advance Notice of Application for Final Completion]* or Section 16.8 *[Completion of Further Work for Final Completion]* of this Schedule and prior to the Independent Certifier issuing the Certificate of Construction Completion, provide the Independent Certifier and Project Co with the City's submissions as to whether the conditions for issuance of the Certificate of Final Completion have been satisfied and, if applicable, any reasons as to why the City considers that the Certificate of Final Completion should not be issued. The Independent Certifier shall consider such submissions in determining whether to issue the Certificate of Final Completion.

16.9 No Limitation

The issuance of a Certificate of Final Completion 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.

16.10 Disputed Certificate

A Certificate of Final Completion issued by the Independent Certifier will be final and not referable to the Dispute Resolution Procedure, provided, however, that Project Co shall be entitled to refer to the Dispute Resolution Procedure a refusal of the Independent Certifier to issue a Certificate of Final Completion.

17. LANDSCAPE AND VEGETATION HANDBACK

(a) Commencing at the Construction Completion Date, until the Landscape and Vegetation Handback Date, Project Co shall inspect each Native Forest Reclamation Area, Naturalization Area and the Landscaped Areas on a monthly basis from May through to October. Project Co shall submit to the City a report, within 10 days after completion of each such inspection, that:

(i) describes the inspection, including the date on which the inspection was conducted, the name of the person who conducted the inspection and the weather conditions at the time of inspection;

(ii) details the condition of the Native Forest Reclamation Areas, the Naturalization Areas, and the Landscaped Areas at the time of inspection, noting any plants that have failed to germinate, or that have died or that are showing any signs of disease or stress;

(iii) describes any adverse conditions in the areas; and

(iv) contains a detailed assessment of the ability of the areas to meet the Vegetation Handback Requirements or Landscape Handback Requirements, as applicable, by the Landscape and Vegetation Handback Date and describing any mitigation or other measures Project Co will implement to correct any Deficiencies in the condition of those areas and to ensure that those areas will meet the Vegetation Handback Requirements or Landscape Handback Requirements, as applicable, by the Landscape and Vegetation Handback Date.

(b) On the Landscape and Vegetation Handback Date, Project Co and the City shall arrange for an inspection by the Independent Certifier of all Native Forest Reclamation Areas, Naturalization Areas and Landscaped Areas. The Parties shall instruct the Independent Certifier to issue a report to Project Co and the City within 30 days after the Landscape and Vegetation Handback Date stating whether or not the Native Forest Reclamation Areas and Naturalization Areas meet the Vegetation Handback Requirements and the Landscaped Areas meet the Landscape Handback Requirements.

(c) For each area that does not meet the Vegetation Handback Requirements or Landscape Handback Requirements, as applicable, the Independent Certifier shall be instructed to:

(i) identify specific Deficiencies that are to be corrected in order for the area to meet the Vegetation Handback Requirements or Landscape Handback Requirements, as applicable;

(ii) provide an estimate of the cost to correct the identified Deficiencies; and

(iii) provide an estimate of what the total value of the landscaping, reclamation work and Naturalization in the area would have been had all Vegetation Handback

Requirements or Landscape Handback Requirements applicable to such area been met.

(d) The City may provide the Independent Certifier and Project Co with submissions regarding all matters to be included in the Independent Certifier's report. The Independent Certifier shall consider such submissions in preparing its report. The issuance of the Independent Certifier's report 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.

(e) If the Independent Certifier's report states that all Vegetation Handback Requirements have been met for all Native Forest Reclamation Areas and Naturalization Areas and all Landscape Handback Requirements have been met for all Landscaped Areas, then Project Co's obligations and liabilities under this Agreement with respect only to vegetation maintenance, pest management and fencing in such areas shall cease to be effective as of the Landscape and Vegetation Handback Date;

(f) If the Independent Certifier's report states that the Vegetation Handback Requirements have not been met for a Native Forest Reclamation Area or Naturalization Area or that the Landscape Handback Requirements have not been met for a portion of the Landscaped Areas but the estimated cost as set out in the Independent Certifier's report to correct the identified Deficiencies is less than 5% of the total value (as estimated in the Independent Certifier's report) of what the reclamation work and Naturalization in the area would have been had all Vegetation Handback Requirements or Landscape Handback Requirements applicable to such area been met, then Project Co's obligations and liabilities under this Agreement with respect only to vegetation maintenance, pest management and fencing in such area shall cease to be effective as of the Landscape and Vegetation Handback Date, and the City shall be entitled to draw on the Performance Letter of Credit or the Performance Letter of Credit Holdback, as applicable, in an amount equal to the Independent Certifier's estimate to correct the identified Deficiencies. For certainty, nothing in this Section 17(f) shall derogate from or negate any of Project Co's other obligations and liabilities under this Agreement for any other aspect of the Project, the Project Work or the Infrastructure.

(g) If the Independent Certifier's report states that the Vegetation Handback Requirements have not been met for a *Native Forest Reclamation Area or Naturalization Area or that the* Landscape Handback Requirements have not been met for a portion of the Landscaped Areas, and the estimated cost as set out in the Independent Certifier's report to correct the identified Deficiencies is 5% or more of the total value (as estimated in the Independent Certifier's report) of what the landscaping, reclamation work and Naturalization in the area would have been had all Vegetation Handback Requirements or Landscape Handback Requirements applicable to such area been met, then Project Co shall promptly undertake all work identified in the Independent Certifier's report as required to meet the Vegetation Handback Requirements or Landscape Handback Requirements for such area. In this circumstance, Project Co shall remain responsible for such area and shall continue to conduct all maintenance and monitoring of such area in accordance with the Landscape Handback Requirements, the Vegetation Handback Requirements and this Section 17 *[Landscape and Vegetation* Handback], and the Landscape and Vegetation Handback Date for such area only shall be extended to the first July 31 that is at least two years (730 days) after the original Landscape and Vegetation Handback Date, subject to further extension in accordance with Section 10 *[Force Majeure]* or Section 11 *[Relief Events and Limited Relief Events]* of this Agreement. At such revised Landscape and Vegetation Handback Date, the provisions of Section 17 *[Landscape and Vegetation*

Handback] shall apply again and the process described in this Section 17 *[Landscape and Vegetation Handback]* shall continue every two years until the report described in Section 17(b) *[Landscape and Vegetation Handback]* of this Schedule has been delivered stating that such area meets the Landscape Handback Requirements or Vegetation Handback Requirements for such area.

(h) For greater certainty, for the purposes of this Section 17 *[Landscape and Vegetation Handback]* of this Schedule, each Native Forest Reclamation Area and each Naturalization Area shall be treated as a separate area.

18. NON-PERFORMANCE EVENTS

Failure by Project Co to comply with the obligations set forth in this Schedule 4 *[Design and Construction Protocols]* may constitute Non-Performance Events and may result in adjustments to the Payments, as more particularly provided in Schedule 16 *[Payment Mechanism]*.

Appendix 4A - CERTIFICATE FORMS

CONTENTS

Form of:

ROAD SAFETY AUDIT CERTIFICATE

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: [Detailed Design OR In-Service] Road Safety Audit Certificate for the following project:
Valley Line West LRT

Form of Certificate for certifying that a [Detailed Design OR In-Service] 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 Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (the "***Agreement***").

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

has been the subject of a Road Safety Audit in accordance with Section 5.8 *[Road Safety Audits]* of Schedule 4 *[Design and Construction Protocols]*, 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.

OR

I certify that all Roadways constructed as part of this project have been the subject of an In-Service Road Safety Audit in accordance with Section 5.8 [*Road Safety Audits*] of Schedule 4 [*Design and Construction Protocols*] and all other relevant provisions of the Agreement. The In-Service Road Safety Audit Report and statement certifying that the In-Service Road Safety Audit has been carried out are attached.]

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

(Affix Professional Seal In Space Above)

PROJECT SAFETY & SECURITY CERTIFICATE

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: Project Safety & Security Certificate for the following project:
Valley Line West LRT

CERTIFICATE

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (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)

_____

CERTIFICATION FOR DESIGN AND COMMITMENT FOR FIELD REVIEW

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: Certification for Design and Commitment for Field Review for the following project:
Valley Line West LRT

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 Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (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
- ☐ MECHANICAL
- ☐ OTHER STRUCTURE
- ☐ SYSTEM INTEGRATION
- ☐ SYSTEMS
- ☐ TRACTION POWER
- ☐ TRAFFIC SIGNAL
- ☐ TRANSPORTATION STRUCTURE
- ☐ OTHER (SPECIFY): _____

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

Initials _____

CERTIFICATION FOR DESIGN AND COMMITMENT FOR FIELD REVIEW

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 Construction Completion 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

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: Construction Certificate for the following project:
Valley Line West LRT

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 Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (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
- ☐ MECHANICAL
- ☐ OTHER STRUCTURE
- ☐ SYSTEM INTEGRATION
- ☐ SYSTEMS
- ☐ TRACTION POWER
- ☐ TRAFFIC SIGNAL
- ☐ TRANSPORTATION STRUCTURE
- ☐ OTHER (SPECIFY): _____

components of 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

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.

CHECKING TEAM DESIGN CERTIFICATE

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: Checking Team Design Certificate for the following project:
Valley Line West LRT

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 Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (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

Date: _____

To: The City of Edmonton

Re: Commissioning Certificate for the following project:
Valley Line West LRT

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 Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (the "***Agreement***").

I hereby give assurance that:

I have fulfilled my obligations for Commissioning as outlined in Section 9.1 *[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 9 *[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 9 *[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))

ASSURANCE OF DESIGN COORDINATION CERTIFICATE

GENERAL INFORMATION

Date: _____

To: The City of Edmonton

Re: Assurance of Design Coordination for the following project:
Valley Line West LRT

CERTIFICATE

In this Certificate, capitalized terms have the meaning set out in the project agreement between The City of Edmonton and Marigold Infrastructure Partners Limited Partnership dated December 22, 2020 (the "***Agreement***").

The undersigned hereby gives assurance that

- the Final Design of the Infrastructure has been appropriately coordinated;
- design of each element and Work Package has been effectively coordinated with every other element and Work Package; and
- sufficient inter-disciplinary review meetings have taken place;

in accordance with the Agreement and the Design Management Plan

PROFESSIONAL ENGINEER

I certify that I am a registered professional engineer

Print Name	Date
Signature	Initials Sample
Address	
Address	
Phone	(Affix Professional Seal in Space Above)

Appendix 4B - PROJECT SPECIFIC SUBMISSION REQUIREMENTS

1. INTERIM DESIGN REQUIREMENTS

The contents of the Interim Designs for each discipline shall contain an appropriate amount of information to allow for a multidisciplinary review of the Work Packages at the applicable level of design. Interim Designs for the same Work Package shall be submitted at two distinct, reasonable levels of design (e.g. 50% and 75%). The requirements identified below for the Interim Designs are not meant to form an exhaustive list.

(a) For all Roadway Interim Designs:

(i) first Interim Design to include:

(A) roll plans with profiles drawn to scale of 1:500 horizontal and 1:100 vertical containing:

(I) Design criteria/standards/considerations (for example, design and posted speed, design vehicle and e-rate) for the existing and ultimate stages;

(II) Proposed access locations (including width and curve radii);

(III) Proposed turn bay locations and requirements (taper and bay lengths);

(IV) Horizontal and vertical alignment;

(V) Pedestrian and cyclist accessibility, curb ramps, and bus stop requirements;

(VI) Typical and non-typical road cross-sections showing lane width, sidewalks, shared-use path, streetlights, trees, utilities alignments, ditch, berms, noise attenuation, superelevation;

(VII) Pavement marking that indicates lane width and turn bay/taper requirements; and

(VIII) Existing accesses and infrastructure.

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design; and

(B) plans and profiles drawn to a scale of 1:500 horizontal and 1:100 vertical organized into:

(I) Alignment drawings ("A" plans) containing:

1) road, alley, shared-use path and sidewalk alignments;

2) trackway

3) bus stop pads and walk connections; and

4) alignments of immediately adjacent existing or proposed streets, walks, alleys, roads and ditches, interim access connections and alignment data; and

5) any other elements listed in Section 4.1 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(II) Grading drawings ("G" plans) containing:

1) existing ground profile;

2) intersection grades, including PI and 1/4pt elevations;

3) profiles of proposed lip of gutters, alley grades and cross elevations for all intersecting roadways;

4) grade of proposed and field-established elevations of existing local improvements affecting proposed design;

5) gutter elevations of catch basins;

6) curb elevations at beginning and end of corner radii, horizontal and vertical curves and locations where a break in grade takes place;

7) centreline grades on profiles; and

8) any other elements listed in Section 4.5 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(III) Details drawings ("D" plans) containing:

1) Pavement structures;

2) Concrete medians, sidewalks, and infill;

3) Shared-use paths;

4) Structures such as retaining walls and guardrails;

5) Grind and overlay limits at tie-ins to existing roads; and

6) any other elements listed in Section 4.2 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(IV) Cross-section drawings showing typical and non-typical road cross-sections cross-referenced to relevant plans containing:

1) trackway

2) lane widths;

3) sidewalks;

4) shared-use paths;

5) streetlights;

6) property lines;

7) trees;

8) above and underground utilities;

9) ditches;

10) berms;

11) fences;

12) retaining walls

13) superelevation;

14) pavement structures for roadway construction; and

15) any other elements listed in Section 4.12 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(V) Pavement marking, signage drawings ("P" plans) containing:

1) sign locations and numbers;

2) pavement marking line types and extents;

3) pavement marking symbol types and locations; and

4) any other elements listed in Section 4.9 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(VI) Any additional drawings as required such as for guardrails and delineators within the TUC.

(b) for all Civil Drainage Interim Designs:

(i) first Interim Design to include:

(A) sewer removal/abandonment plans;

(B) sewer relocation plan/profile drawings drawn at 1:500h / 1:100v;

(C) new drainage system plan and profile drawings drawn at 1:500h / 1:100v containing the minimum information requirements outlined in Section 21.3 of the City of Edmonton Design and Construction Standards Volume 3: Drainage; and

(D) track drainage plans;

(ii) second Interim Design to include an update to the information provided in the first Interim Design and additional details showing further progression of the design;

(c) for all Landscaping and Landscaping/Streetscaping Interim Designs:

(i) first Interim Design to include:

(A) soil and material plans (excluding Utility Complexes, Lewis Farms Storage Facility and Gerry Wright OMF Building B);

(B) planting plans and details (excluding Utility Complexes, Lewis Farms Storage Facility and Gerry Wright OMF Building B);

(C) furnishing plans (excluding Stop and Station furnishings and WEM Transit Centre furnishings);

(D) Jasper Place Opportunity Area streetscape design, which shall include (at a minimum) all information shown in Appendix 5-2B *[Jasper Place Opportunity Area Streetscape Drawings]* of Schedule 5 *[D&C Performance Requirements]*;

(E) Downtown Opportunity Area streetscape design, which shall include (at a minimum) all information shown in Appendix 5-2A *[Downtown Opportunity Area Streetscape Drawings]* of Schedule 5 *[D&C Performance Requirements]*;

(F) Under Guideway Landscape Area landscape/streetscape design, which shall include (at a minimum) all information shown in Appendix 5-2C *[Under Guideway Landscape Area Drawings] of Schedule 5 [D&C Performance Requirements]*;

(ii) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design;

(d) for all Traffic Signals Interim Designs:

(i) first Interim Design to include:

(A) Traffic Signal Equipment location plans;

(B) site drawings; and

(C) Traffic Signal Equipment typical details;

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) shop drawings of all traffic signal poles used;

(C) logic wiring diagrams; and

(D) Traffic Controller cabinet wiring diagrams;

(e) for all Street Lighting Interim Designs:

(i) first Interim Design to include:

(A) pole types;

(B) photometric result drawings; and

(C) pole location plans.

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) banner supports for free-standing pedestrian light poles in the Downtown Opportunity Area and Jasper Place Opportunity Area; and

(C) street lighting drawings ("L" plans) containing:

(I) the location and type of lighting davit;

(II) pole base;

(III) underground cable alignment;

(IV) offsets to new pole locations;

(V) new cabinet locations; and

(VI) any other elements listed in Section 4.8 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(f) for all 87 Avenue Elevated Guideway Interim Designs:

(i) first Interim Design to include:

(A) bridge and girder cross-sections;

(B) horizontal and vertical clearances;

(C) pier elevations;

(D) foundation designs;

(E) MEP integration;

(F) overall plans and elevations; and

(G) safety barriers and Protection Railings;

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) bearing details;

(C) expansion joints;

(D) plans and elevations of any required slope stabilization; and

(E) for Anthony Henday Drive LRT Bridge, section view of approach spans and integration with retaining wall structures.

(g) for all Retaining Walls Interim Designs:

(i) first Interim Design to include:

(A) finishes, including textures and colours; and

(B) structural plans, elevations and cross-sections;

(ii) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design;

(h) For all Sign Structure Interim Designs:

(i) first Interim Design to include:

(A) roll plans identifying the locations of any sign structures:

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design; and

(B) Overhead signage drawings ("F" plans) containing

(I) sign cross sections;

(II) sign boards;

(III) pile specifications; and

(IV) any other elements listed in Section 4.4 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

(i) for all LRT Stop Interim Designs:

(i) first Interim Design to include:

(A) branding;

(B) architectural design, including finishes, textures and colours;

(C) structural design;

(D) electrical design;

(E) mechanical design;

(F) drainage design;

(G) locations and types of furnishings;

(H) accessibility treatments, including the locations of all tactile attention indicators;

(I) crossing treatments, including pedestrian refuge areas, to illustrate relationships between the Trackway, Roadway and Platform grading;

(J) locations and types of all signage;

(K) Platform surface treatment;

(L) locations and sizes of all systems cabinets; and

(M) locations of Passenger Interface Equipment;

(j) for all LRT Station Interim Designs:

(i) first Interim Design to include:

(A) branding;

(B) architectural design;

(C) exterior finishes, including textures and colours;

(D) structural design;

(E) mechanical design;

(F) electrical design;

(G) drainage design;

(H) locations of furnishings;

(I) accessibility treatments, including the locations of all tactile attention indicators and tactile direction indicator surfaces;

(J) locations and types of all signage;

(K) locations of Passenger Interface Equipment;

(L) locations and types of vertical circulation;

(M) room layouts for L1 Ground, L2 Mezzanine, and L3 Platform; and

(N) energy model outputs;

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design; and

(B) types of furnishings.

(k) for all Utility Complex Interim Designs:

(i) first Interim Design to include:

(A) site layout, including driveways and parking stalls;

(B) plan layout, including all Systems components and clearances;

(C) wall elevations, including location of doors and designated spaces for Public Art;

(D) exterior finishes, including textures and colours;

(E) structural design;

(F) site landscaping; and

(G) site drainage design;

(l) for Gerry Wright OMF Stage 2 Yard Interim Design:

(i) first Interim Design to include:

(A) site layout, including locations of outdoor storage;

(B) pipeline crossing details;

(C) track layout;

(D) OCS yard wiring plans, yard sectioning details and schedules;

(E) yard TPSS submissions as defined in Section 1.r.i [Interim Design Requirements] of this Appendix;

(F) drainage;

(G) site landscaping and screening; and

(H) building footprint;

(ii) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design;

(m) for Gerry Wright OMF Building B Interim Design:

(i) first Interim Design to include:

(A) branding;

(B) architectural design, including design of the AVIS facility;

(C) exterior finishes, including textures and colours;

(D) structural design, including foundation design;

(E) electrical design;

(F) mechanical design;

(G) locations and types of vertical circulation;

(H) room layouts for each floor; and

(I) energy model outputs.

(ii) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design;

(n) for Lewis Farms Storage Facility Yard Interim Design:

(i) first Interim Design to include:

(A) site layout, including locations of outdoor storage;

(B) track layout;

(C) OCS yard wiring plans, yard sectioning details and schedules;

(D) yard TPSS submissions as defined in Section 1.r.i [Interim Design Requirements] of this Appendix;

(E) drainage;

(F) site landscaping and screening; and

(G) building footprint.

(ii) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design;

(o) for Lewis Farms Storage Facility Interim Design:

(i) first Interim Design to include:

(A) branding;

(B) architectural design;

(C) exterior finishes, including textures and colours;

(D) structural design, including foundation design;

(E) electrical design;

(F) mechanical design;

(G) locations and types of vertical circulation;

(H) room layouts for each floor;

(I) energy model outputs.

(ii) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design;

(p) for Lewis Farms Park and Ride Interim Design:

(i) first Interim Design to include:

(A) overall site plan at a minimum scale of 1:1000, showing the locations of all items on the site, including:

(I) Lewis Farms Transit Centre:

(II) proposed property lines;

(III) all structures, including retaining walls;

(IV) Lewis Farms Storage Facility;

(V) Lewis Farms Stop Platform;

(VI) all Track;

(VII) Roadways;

(VIII) pedestrian connections and crosswalks;

(IX) vehicle parking areas and accesses; and

(X) track crossings.

(B) site plan drawings, at a minimum scale of 1:500, detailing all of the above items, and including:

(I) Track drawings showing all Track, including:

1) Limits of Track Types;

2) Track Clearance Envelopes and crossovers; and

3) OCS pole locations.

(II) Lewis Farms Park and Ride, including:

1) Streets / Avenues / Roads labels;

2) lane widths;

3) pavement markings including parking bays, longitudinal markings, crosswalk markings and stop bars;

4) turn bay lengths;

5) turn bay tangents;

6) taper lengths;

7) corner radii;

8) existing and proposed sidewalks and SUPs;

9) curb ramp locations;

10) utility crossings;

11) existing and proposed curb lines;

12) locations and number of each type of parking;

13) landscaping areas;

14) bicycle parking; and

15) LRT Track (centerlines, and Track Clearance envelopes and crossovers), and related structures including platforms.

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design; and

(B) The following plans in accordance with Section 4.1 of the City of Edmonton Roadways Design Drawing Standards 2016:

(I) Alignment drawings (“A” plans);

(II) Details drawings (“D” plans);

(III) Electrical drawings (“E” plans);

(IV) Grading drawings (“G” plans);

(V) Landscaping drawings (“H” plans);

(VI) Street Lighting Drawings (“L” plans);

(VII) Pavement Marking and Signage drawings (“P” plans);

(VIII) Utility drawings (“U” plans); and

(IX) Cross Section drawings (“X” plans)

(q) For West Edmonton Mall Transit Centre Interim Design

(i) first Interim Design to include:

(A) overall site plan at a minimum scale of 1:1000, showing the locations of all items on the site, including:

(I) West Edmonton Mall Station Footprint:

(II) proposed property lines;

(III) all structures, including retaining walls;

(IV) Elevated Guideway supports;

(V) islands and busway;

(VI) pedestrian connections and crosswalks; and

(VII) accesses.

(B) site plan drawings, at a minimum scale of 1:500, detailing all of the above items, and including:

(I) Streets / Avenues / Roads labels;

(II) lane widths;

(III) pavement markings including longitudinal markings, crosswalk markings and stop bars;

(IV) bus bay dimensions;

(V) turn bay lengths;

(VI) turn bay tangents;

(VII) taper lengths;

(VIII) corner radii;

(IX) existing and proposed sidewalks and SUPs;

(X) curb ramp locations;

(XI) utility crossings;

(XII) existing and proposed curb lines;

(XIII) furnishings;

(XIV) landscaping areas;

(XV) bicycle parking;

(XVI) Elevated Guideway supports and

(XVII) station footprint, including access points.

(ii) second interim Design to include:

(A) update to the information provided in the first Interim Design; and

(B) The following plans in accordance with Section 4.1 of the *City of Edmonton Roadways Design Drawing Standards 2016*:

(I) Alignment drawings ("A" plans);

(II) Details drawings ("D" plans);

(III) Electrical drawings ("E" plans);

(IV) Grading drawings ("G" plans);

(V) Street Lighting Drawings ("L" plans);

(VI) Pavement Marking and Signage drawings ("P" plans);

(VII) Utility drawings ("U" plans); and

(VIII) Cross Section drawings ("X" plans)

(r) for all Track Interim Designs:

(i) first Interim Design to include:

(A) roll plans with profiles drawn to scale of 1:500 horizontal and 1:100 vertical containing:

(I) Design criteria/standards/considerations (for example, design and operating speed);

(II) special trackwork type and location;

(III) locations of embedded, direct fixation, and ballasted track;

(IV) vehicle arrestors, including colours, wraps and other treatments;

(V) beginning and end of tangents, spirals and curves; and

(VI) curve radii, Actual Superelevation (Ea), Unbalance Superelevation (Eu);

(VII) Track spacing throughout Trackway

(B) Typical Cross Sections and details of each track type with Dynamic Envelope

(C) Connection and transition details for embedded track tie-in to Valley Line Stage 1 embedded track

(D) Track Design Criteria Report for all trackwork and track alignment requirements including material requirements, rail neutral temperature and other elements which the design will follow.

(E) Track Optimization Study as described in Section 3-1.1.2.A *[Track Alignment]* of Schedule 5 *[D&C Performance Requirements]*;

(ii) second Interim Design to include:

(A) Update to the information provided in the first interim design; and

(B) Plans and details including the following:

(I) All Special Trackwork details including turnout and crossover geometry, details of switch points, frogs, switch blower or heating and connection details (for all track types),

(II) Track fastening details, including reinforcement and product materials for all track types

(III) Typical sections for all track conditions with clearance envelopes and dimensions including adjacent road, platforms, structures and grading

(IV) Layout details in plan for all track types (including direct fixation rail fastening structures/plinths)

(V) Typical plan and sections of track drains for each track type

(VI) Plan and section of Track transition zones

(VII) Layout and fastening details of vehicle arrestors

(C) Swept path analysis report including figures for all track conditions (i.e. track spacing change, tight radius curves, etc.)

(D) Rail/Structure interaction report including rail gap analysis for all track types and rail deflection with respect to fastener spacing

(E) Track construction specifications for all track types

(F) Material procurement specifications for all rail materials including rail, special trackwork, fastening systems, and Other Trackwork Materials (OTM).

(s) for all Systems Integration and Commissioning Interim Design:

(i) first Interim Design to include:

(A) a narrative description of the overall approach and technical details for each signalling system, including how Project Co will conform to the requirements set out in Section 6-1 [*Rail Systems*] of Schedule 5 [*D&C performance Requirements*];

(B) interface control documents for each system;

(C) system requirements specifications, including derived requirements;

(D) design drawings, including:

(I) single line diagrams;

(II) concept of operations and riser diagrams;

(III) layout plans and schedules; and

(IV) electro-mechanical interface requirements to support system functionality;

(E) cable and fibre routing;

(F) site locations and site plans;

(G) equipment layout drawings;

(H) interface control documents;

(I) conduit continuity diagrams;

(J) conduit fill calculations;

(K) identification of major raceway routes;

(L) fibre optic cable allocation tables;

(M) Fibre Optic Backbone routing and termination details;

(N) peripheral device space requirements; and

(O) wayside equipment enclosure wrap designs.

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) ICS Interface Control Documents for each system;

(C) local control panel HMI interface layouts for each individual system;

(D) wiring plans and schedules;

(E) local control panel layouts;

(F) system elements mounting details;

(G) backup OCC room layouts;

(H) wiring diagrams for backup OCC equipment;

(I) bandwidth calculations for CTS elements;

(J) optical power and loss budgets for CTS elements;

(K) network security analysis;

(L) IP addressing details; and

(M) obsolescence management plan

(t) for all Signalling System Interim Design:

(i) first Interim Design to include:

(A) a narrative description of the overall approach and technical details for each signalling system, including how Project Co will conform to the requirements set out in Section 6-1 [*Rail Systems*] of Schedule 5 *[D&C performance Requirements*];

(B) TRPS Integration Plan;

(C) interface control documents for each system;

(D) system requirements specifications, including derived requirements;

(E) design drawings, including:

(I) single line diagrams;

(II) concept of operations and riser diagrams;

(III) layout plans and schedules; and

(IV) electro-mechanical interface requirements to support system functionality;

(F) conduit fill calculations;

(G) identification of major raceway routes;

(H) fibre optic cable allocation tables;

(I) Fibre Optic Backbone routing and termination details;

(J) network diagram;

(K) fibre splice schedule; and

(L) peripheral device space requirements for each signalling system;

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) ICS Interface Control Documents for each system;

(C) wiring plans and schedules;

(D) local control panel layouts;

(E) system elements mounting details; and

(F) obsolescence management plan;

(u) for all Communication Systems Interim Designs:

(i) first Interim Design to include:

(A) a narrative description of the overall approach and technical details for each communication system, including how Project Co will conform to the requirements set out in Section 6-1 [*Rail Systems*] of Schedule 5 [*D&C performance Requirements*];

(B) interface control documents for each system;

(C) system requirements specifications, including derived requirements;

(D) cable and fibre routing;

(E) site locations and site plans;

(F) equipment layout drawings;

(G) interface control documents;

(H) conduit continuity diagrams;

(I) conduit fill calculations;

(J) identification of major raceway routes;

(K) fibre optic cable allocation tables;

(L) Fibre Optic Backbone routing and termination details;

(M) network diagram;

(N) fibre splice schedule; and

(O) peripheral device space requirements for each communication system;

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) ICS Interface Control Documents for each system;

(C) local control panel HMI interface layouts for each individual system;

(D) wiring plans and schedules;

(E) local control panel layouts;

(F) system elements mounting details;

(G) backup OCC room layouts;

(H) wiring diagrams for backup OCC equipment;

(I) bandwidth calculations for CTS elements;

(J) optical power and loss budgets for CTS elements;

(K) network security analysis;

(L) IP addressing details; and

(M) obsolescence management plan;

(v) for all Systems Duct Bank Interim Designs:

(i) first Interim Design to include:

(A) conduit fill calculations;

(B) identification of major raceway routes;

(C) fibre optic cable allocation tables;

(D) Fibre Optic Backbone routing and termination details;

(E) drainage design from maintenance holes and embedded pullboxes; and

(F) duct bank configuration, maintenance holes, access points, termination boxes and duct bank capacity allocations;

(ii) second Interim Design to include;

(A) update to the information provided in the first Interim Design; and

(B) conduit and Systems Duct Bank drawings.

(w) for all Traction Power Substation Supply and Distribution Interim Designs:

(i) first Interim Design to include:

(A) a narrative description of the overall approach and technical details of the Traction Power System, including how Project Co will conform to the requirements set out in Section 6-2 *[Traction Power System]* of Schedule 5 *[D&C performance Requirements]*;

(B) the Load Flow Simulation Study as described in Section 6-2.3.1 *[Traction Power – General]* of Schedule 5 *[D&C Performance Requirements]*;

(C) conduit and duct bank routing to all TPSS locations;

(D) TPSS internal conduit and cable trays routing layouts;

(E) TPSS building below grade grounding drawings;

(F) TPSS lighting and 110V services drawings;

(G) TPSS equipment layout;

(H) maintenance holes and pullbox locations;

(I) tie-breaker room layout;

(J) negative tie provisions;

(K) HVAC ducts and cable trays routing layouts;

(L) auxiliary and emergency trip systems concept of operations;

(M) fire and smoke detection concept of operations;

(N) security and intrusion detection concept of operations;

(O) network diagram;

(P) fibre splice schedule;

(Q) peripheral device space requirements;

(R) Emergency Alarm Station locations and conduit stub-ups;

(S) a description of the Traction Power supply design, failure modes and mitigations; and

(T) a description of the Traction Power grounding and corrosion control strategy;

(ii) second Interim Design to include:

(A) update to the information provided in the first Interim Design;

(B) protective relaying and transfer trip concept of operation;

(C) AC and DC circuit breaker control schematic diagrams;

(D) ground grid design calculations;

(E) detailed design for each TPSS;

(F) TPSS conduit and cable tray layout;

(G) auxiliary and emergency trip systems riser diagrams;

(H) fire and smoke detection riser diagrams;

(I) security and intrusion detection riser diagrams;

(J) protective relaying schedules; and

(K) traction feeder schedule.

(x) for all OCS and OCS Line Wide Interim Designs:

(i) first Interim Design to include:

(A) a narrative description of the overall approach and technical details of the OCS system, including how Project Co will conform to the requirements set out in Section 6-3 *[Overhead Catenary System]* of Schedule 5 *[D&C performance Requirements]*;

(B) a description of the OCS grounding and corrosion control strategy;

(C) typical OCS arrangements within mixed-use sections, confined sections, character zones and areas with height restrictions;

(D) switchgear, transformers, and load centres identification and ratings;

(E) OCS overlap charts and tension lengths;

(F) typical loading tables;

(G) wind, ice and radial loads and calculations;

(H) along track movement, stagger change and effect, auto tension catenary diagrams;

(I) feeder and jumper details;

(J) section isolator design;

(K) catenary hangers and suspension assemblies;

(L) negative return details;

(M) pole types, including finishes; and

(N) pole locations;

(x) second Interim Design to include update to the information provided in the first Interim Design and additional details showing further progression of the design.

2. 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 where applicable shall include final versions of the drawings and documents provided in the second Interim Design, including any updated information. The contents of the Final Designs for certain disciplines shall also include:

(a) for all Traffic Signal Final Designs:

(i) final versions of all previous submittals;

(ii) Traffic Controller programming sheets;

(iii) cabinet layouts; and

(iv) Traffic Controller database files.

(b) for all System Integration and Commissioning Final Designs:

(i) final versions of all previous submittals;

(ii) detailed configuration information, including a network administration guide and a system administration guide; and

(iii) shop drawings and cutsheets

(f) for all Signalling System Final Designs:

(i) final versions of all previous submittals;

(ii) detailed configuration information, including a network administration guide and a system administration guide; and

(iii) shop drawings and cutsheets;

(g) for all Communication Systems Final Designs:

(i) final versions of all previous submittals;

(ii) detailed configuration information, including a network administration guide and a system administration guide; and

(iii) shop drawings and cutsheets.

(h) for all Traction Power Substation Supply and Distribution Final Designs:

(i) final versions of all previous submittals;

(ii) TPSS civil and structural drawings;

(iii) relaying and coordination study;

(iv) system start-up plan;

(v) TPSS shop drawings;

(vi) Traction Power System shop drawings; and

(vii) description of the Traction Power System, including normal and abnormal operation modes.

(i) for all OCS and OCS Line Wide Final Designs:

(i) final versions of all previous submittals;

(ii) section isolator hardware; and

(iii) OCS shop drawings.

Appendix 4C - 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 DWG format compatible with Autodesk 2018 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.

(g) Drawings shall be in accordance with the City of Edmonton Roadways Design Drawing Standards where indicated.

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 4C1:

Table 4C-1. Preferred Drawing Scales

Type of Drawing		Preferred
Overall Plans		1:500
Plan / Profiles	Horizontal	1:500
	Vertical	1:100
Cross Sections	Horizontal	1:100
	Vertical	1:20
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.

1.4 Drawing Content

For all design within the Road Right of Way, design drawings sets shall be organized in accordance with Chapter 4 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

For all other disciplines, design drawings sets shall be organized in accordance with current best practice.

1.5 Layer Naming Conventions

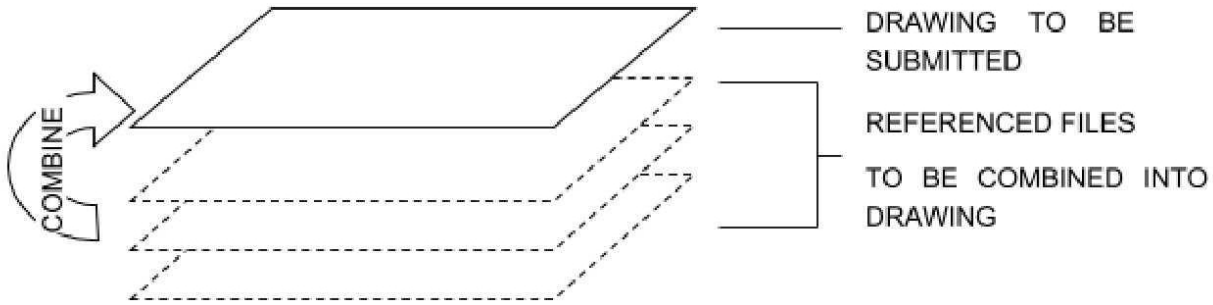
A system of CAD layer naming conventions shall be developed and used in accordance with the level structure set out in Chapter 2 of the *City of Edmonton Roadways Design Drawing Standards 2016*, available in the Disclosed Data.

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 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, 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) a DWG format compatible with Autodesk 2018 or newer products; 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 DWG format compatible with Autodesk 2018 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 Stakeholders; and

(ii) submitted in the following electronic formats:

(A) PDF; and

(B) a DWG format compatible with Autodesk 2018 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 stamped, 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 DWG format compatible with Autodesk 2018 or newer products on CD, DVD, USB drive or portable HDD;

(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 stamped, and by whom on the AutoCAD versions of the drawing; and

(iii) be submitted in the following electronic formats:

(A) PDF; and

(B) a DWG format compatible with Autodesk 2018 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 DGN format compatible with Microstation Select Series 10 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 stamped full sized set of Record Drawings on 24 lb bond paper; and

(vii) 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 Final 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 final Roadways base drawing file shall be submitted in DGN format compatible with Microstation Select Series 10 or newer products, 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.

Appendix 4D - WORK BREAKDOWN STRUCTURE

Item No.	Level	Name	WBS Discipline
1	Level 0	Construction	
2	Level 1	Area 1 - From east of 102 Ave/102 St to west of 102 Ave/107 St, and from south of 102 Ave/107 St to south of 104 Ave/107 St	
3	Level 2	Alex Decoteau Stop	Facilities
4	Level 2	NorQuest Stop	Facilities
5	Level 2	Utilities	Utilities
6	Level 2	Civil Drainage	Drainage
7	Level 2	Roadways	Roads
8	Level 2	Track Structure	Structures
9	Level 2	Landscaping/Streetscaping	Landscaping
10	Level 2	107 Street/104 Avenue Utility Complex	Facilities
11	Level 2	Retaining Walls	Structures
12	Level 2	OCS Foundations	Structures
13	Level 2	Duct Bank	Duct Banks
14	Level 2	Street Lighting	Street Lighting
15	Level 2	Traffic Signals	Traffic Signals
16	Level 2	Public Art	Public Art
17	Level 2	Systems Integration and Commissioning	System Integration
18	Level 1	Area 2 -From east of 104 Ave/105 St to west of 104 Ave/121 St	
19	Level 2	MacEwan Arts/112 Street Stop	Facilities
20	Level 2	The Yards/116 Street Stop	Facilities
21	Level 2	Brewery/120 Street Stop	Facilities
22	Level 2	Utilities	Utilities
23	Level 2	Civil Drainage	Drainage
24	Level 2	Roadways	Roads
25	Level 2	Track Structure	Structures
26	Level 2	Landscaping	Landscaping
27	Level 2	Retaining Walls	Structures
28	Level 2	Oliver Square Utility Complex	Facilities
29	Level 2	OCS Foundations	Structures
30	Level 2	Duct Bank	Duct Banks
31	Level 2	Street Lighting	Street Lighting
32	Level 2	Traffic Signals	Traffic Signals
33	Level 2	Public Art	Public Art
34	Level 2	Systems Integration and Commissioning	System Integration
35	Level 1	Area 3 - From west of 104 Ave/121 St to west of Stony Plain Rd./139 St	
36	Level 2	124 Street Stop	Facilities
37	Level 2	Glenora Stop	Facilities
38	Level 2	Utilities	Utilities
39	Level 2	Stony Plain Road Bridge	Structures
40	Level 2	Civil Drainage	Drainage
41	Level 2	Roadways	Roads

42	Level 2	Track Structure	Structures
43	Level 2	Landscaping	Landscaping
44	Level 2	124 Street/Stony Plain Road Utility Complex	Facilities
45	Level 2	Stony Plain Road/132 Street Utility Complex	Facilities
46	Level 2	Retaining Walls	Structures
47	Level 2	OCS Foundations	Structures
48	Level 2	Duct Bank	Duct Banks
49	Level 2	Street Lighting	Street Lighting
50	Level 2	Traffic Signals	Traffic Signals
51	Level 2	Public Art	Public Art
52	Level 2	Systems Integration and Commissioning	System Integration
53	Level 1	Area 4 - From west of Stony Plain Rd./139 St to west of Stony Plain Rd./156 St, and from north of Stony Plain Rd./156 St to north of 156 St/99 Ave	
54	Level 2	Grovenor/142 Street Stop	Facilities
55	Level 2	Stony Plain Road/149 Street Stop	Facilities
56	Level 2	Jasper Place Stop	Facilities
57	Level 2	Utilities	Utilities
58	Level 2	Civil Drainage	Drainage
59	Level 2	Roadways	Roads
60	Level 2	Track Structure	Structures
61	Level 2	Landscaping/Streetscaping	Landscaping
62	Level 2	Retaining Walls	Structures
63	Level 2	Stony Plain Road/144 Street Utility Complex	Facilities
64	Level 2	100A Avenue/156 Street Utility Complex	Facilities
65	Level 2	OCS Foundations	Structures
66	Level 2	Duct Bank	Duct Banks
67	Level 2	Street Lighting	Street Lighting
68	Level 2	Traffic Signals	Traffic Signals
69	Level 2	Public Art	Public Art
70	Level 2	Systems Integration and Commissioning	System Integration
71	Level 1	Area 5 - From north of 156 St/99 Ave to south of Meadowlark Rd, and from east of Meadowlark Rd to east of 87 Ave/163 St	
72	Level 2	Glenwood/Sherwood Stop	Facilities
73	Level 2	Meadowlark Stop	Facilities
74	Level 2	Utilities	Utilities
75	Level 2	Civil Drainage	Drainage
76	Level 2	Roadways	Roads
77	Level 2	Track Structure	Structures
78	Level 2	Landscaping	Landscaping
79	Level 2	Retaining Walls	Structures
80	Level 2	156 Street/94 Avenue Utility Complex	Facilities
81	Level 2	89 Ave/Meadowlark Road Utility Complex	Facilities
82	Level 2	OCS Foundations	Structures
83	Level 2	Duct Bank	Duct Banks
84	Level 2	Street Lighting	Street Lighting
85	Level 2	Traffic Signals	Traffic Signals

86	**Level 2**	**Public Art**	**Public Art**
87	**Level 2**	**Systems Integration and Commissioning**	**System Integration**
88	**Level 1**	**Area 6 – From east of 87 Ave/163 St to 87 Ave/TUC**	
89	**Level 2**	**Misericordia Station**	**Facilities**
90	**Level 2**	**West Edmonton Mall Station**	**Facilities**
91	**Level 2**	**Aldergrove/Belmead Stop**	**Facilities**
92	**Level 2**	**West Edmonton Mall Transit Centre**	**Roads**
93	**Level 2**	**Utilities**	**Utilities**
94	**Level 2**	**87 Avenue Elevated Guideway**	**Structures**
95	**Level 2**	**Civil Drainage**	**Drainage**
96	**Level 2**	**Roadways**	**Roads**
97	**Level 2**	**Track Structure**	**Structures**
98	**Level 2**	**Landscaping**	**Landscaping**
99	**Level 2**	**Retaining Walls**	**Structures**
100	**Level 2**	**87 Avenue/165 Street Utility Complex**	**Facilities**
101	**Level 2**	**87 Avenue/182 St Utility Complex**	**Facilities**
102	**Level 2**	**87 Avenue/190 Street Utility Complex**	**Facilities**
103	**Level 2**	**OCS Foundations**	**Structures**
104	**Level 2**	**Duct Bank**	**Duct Banks**
105	**Level 2**	**Street Lighting**	**Street Lighting**
106	**Level 2**	**Traffic Signals**	**Traffic Signals**
107	**Level 2**	**Public Art**	**Public Art**
108	**Level 2**	**Systems Integration and Commissioning**	**System Integration**
109	**Level 1**	**Area 7 – From east TUC boundary to west TUC boundary**	
110	**Level 2**	**Utilities**	**Utilities**
111	**Level 2**	**Anthony Henday Drive LRT Bridge**	**Structures**
112	**Level 2**	**Civil Drainage**	**Drainage**
113	**Level 2**	**Roadways**	**Roads**
114	**Level 2**	**Track Structure**	**Structures**
115	**Level 2**	**Landscaping**	**Landscaping**
116	**Level 2**	**Retaining Walls**	**Structures**
117	**Level 2**	**OCS Foundations**	**Structures**
118	**Level 2**	**Duct Bank**	**Duct Banks**
119	**Level 2**	**Street Lighting**	**Street Lighting**
120	**Level 2**	**Traffic Signals**	**Traffic Signals**
121	**Level 2**	**Systems Integration and Commissioning**	**System Integration**
122	**Level 1**	**Area 8 – From west TUC boundary to west of Webber Greens Drive/Park and Ride Access Road and Lewis Farms Site**	
123	**Level 2**	**Lewis Farms Stop**	**Facilities**
124	**Level 2**	**Lewis Farms Park and Ride**	**Roads**
125	**Level 2**	**Roadways**	**Roads**
126	**Level 2**	**Civil Drainage**	**Drainage**
127	**Level 2**	**Track Structure**	**Structures**
128	**Level 2**	**Yard and Track Works**	**Track Alignment**
129	**Level 2**	**Lewis Farms Storage Facility**	**Facilities**

130	Level 2	Utilities	Utilities
131	Level 2	Landscaping	Landscaping
132	Level 2	Retaining Walls	Structures
133	Level 2	OCS Foundations	Structures
134	Level 2	OCS	OCS
135	Level 2	Duct Bank	Duct Banks
136	Level 2	Street Lighting	Street Lighting
137	Level 2	Traffic Signals	Street Lighting
138	Level 2	Public Art	Public Art
139	Level 2	Systems Integration and Commissioning	System Integration
140	Level 1	Area 9 - Gerry Wright OMF Stage 2	
141	Level 2	Track Structure	Structures
142	Level 2	Yard and Track Works	Track Alignment
143	Level 2	Gerry Wright OMF Part B and Equipment	Facilities
144	Level 2	Roadways	Roads
145	Level 2	Civil Drainage	Drainage
146	Level 2	Utilities	Utilities
147	Level 2	Landscaping	Landscaping
148	Level 2	Retaining Walls	Structures
149	Level 2	OCS Foundations	Structures
150	Level 2	OCS	OCS
151	Level 2	Duct Bank	Duct Banks
152	Level 2	Public Art	Public Art
153	Level 2	Systems Integration and Commissioning	System Integration
154	Level 1	Area 10 - Alignment Wide Scope	
155	Level 2	Signaling System	Train Signals
156	Level 2	Communications Systems	Communications
157	Level 2	Traction Power Substation Supply and Distribution	Traction Power
158	Level 2	Stray current, EMI, Noise Vibration mitigation line wide	Stray Current
159	Level 2	OCS Line Wide	OCS
160	Level 2	Integrated Testing and Commissioning	System Integration
161	Level 2	Mainline Track Alignment	Track Alignment
162	Level 2	Spare Parts	System Integration
163	Level 2	Environmental	Environmental
164	Level 2	Operations Plan	Operations
165	Level 0	Management, Engineering, and Overhead	
166	Level 1	Project Management	Project Management
167	Level 1	Design/Engineering	Project Management
168	Level 2	Civil	Project Management
169	Level 2	Systems	Project Management
170	Level 2	Structures	Project

			Management
171	Level 2	SUI/Facilities	Project Management
172	Level 1	Construction Management	Project Management
173	Level 1	Professional Advisory Services (Legal/Financial)	n/a
174	Level 1	Communications and Public Engagement	Communications
175	Level 1	Offices	n/a
176	Level 1	SPV Staff and Operations Costs	n/a
177	Level 1	Proposal Phase Costs	n/a
178	Level 1	Construction Independent Certifier Fees	n/a
179	Level 1	Performance Demonstration Independent Certifier Fees	n/a
180	Level 0	Financing Related Costs	
181	Level 1	Upfront Fees and Charges	n/a
182	Level 1	Interest expenses	n/a
183	Total	Total Capital Cost Amount	

APPENDIX 4E - CONSTRUCTION JOINT COMMITTEE TERMS OF REFERENCE

MANDATE

The Construction Joint Committee (CJC) is established in accordance with the Project Agreement.

The CJC provides a forum for the City Representative and its delegates (the "City"), and, Project Co Representative and its delegates ("Project Co") to consult and cooperate in all matters relating to the Valley Line LRT Stage 2, during the Construction Period. The CJC is the central point of communication between the City and Project Co and is the forum to which other sub-committees report.

The CJC is a joint committee and has no authority to amend the Project Agreement (PA).

MEETING SCHEDULE

The CJC shall meet at least once monthly throughout the Construction Period and at other times as determined by the CJC.

DUTIES OF COMMITTEE

- Consult and cooperate in matters relating to the Project during the Construction Period;
- Appoint or delegate representatives to attend the Communications Working Group meetings to align project management, Design, and Construction and operations transition with public and stakeholder communications;
- Report on current status of Design (including Interim Design submissions), Environmental compliance, Quality, Construction, Safety, Commissioning, Relief Event, Limited Relief Event or Force Majeure Event status, Changes, Payments, Communications and Stakeholder Engagement, and other administrative issues;
- Review key points on the 90-day look-ahead schedule;
- Develop subcommittees as required, including the establishment of terms of reference, delegate authority in alignment with the PA, and appoint members based on required experience and qualifications to achieve the objectives laid out in the PA.

OUTCOMES/OUTPUTS

- To align the project management team comprised of City and Project Co key leadership staff, who will work collaboratively in the interests of the Project to execute a successful Project;
- A clear understanding of the activities, opportunities and impacts related to those activities and those accountable for the compliant execution;

- Identification and discussion of important risks and opportunities, as well as issues that may impact the Project and action plans to mitigate them;
- Record meeting minutes to document issues, key discussions and decisions made over the course of the Construction Period;
- Action items that guide implementation and measure progress of important tasks and activities arising from the meetings; and
- Create team relationship built on trust, healthy conflict, commitment, accountability and attention to results through open communication and mutual respect.

ORGANIZATION, ACCOUNTABILITY AND RESPONSIBILITIES

- **City Representation:**
  - City Representative - City Project Director (Chair)
  - City Technical Manager
  - City Commercial Manager
  - Owner's Engineer Project Manager
- **Project Controls Manager (Co-Chair):**
  - Responsible for facilitating meeting, scheduling meeting, location and invites, development and issuance of agenda:
  - City Communications
  - Subject Matter Experts (as required)
- **Project Co Representation:**
  - Project Co Representative
  - Design Manager
  - Construction Manager
  - Communications Manager
  - Quality Manager
  - Integration Manager
  - SUI Leader
  - Utilities Manager
  - Other Key Individuals and Subject Matter Experts (as required)

- **Administration, as required or invited by the Committee:**

  o Responsible for meeting minutes and distribution of meeting discussion documents prior to the meeting (note: meeting minutes are the responsibility of the City unless otherwise agreed)

42194419.3