

SCHEDULE 3**Part 1****TECHNICAL SUBMISSION REQUIREMENTS****A. TECHNICAL SUBMISSION**

The Technical Submission shall provide sufficient information to reasonably demonstrate that the Proponent can meet the responsibilities and obligations of the Proponent as set out in the Project Agreement. In preparing its Technical Submission, the Proponent is encouraged to cite past project experience of a similar nature, including how it and its Proponent Team Members:

- resolved issues;
- addressed counterparty concerns; and
- would apply any lessons learned to the Project.

B. TECHNICAL SUBMISSION REQUIREMENTS

Technical Submission Requirements	
Title	Submission Contents
1.0 Project Management Plan (50 pages, see breakdown below)	<p>The Proponent shall include the following sections under Project Management Plan:</p> <ul style="list-style-type: none"> 1.1 Overall Approach to Partnering, Communications and Integration 1.2 Team Structure and Processes 1.3 Quality Management Plan 1.4 Construction Safety Plan 1.5 Permits and Approvals Strategy
1.1 Overall Approach to Partnering, Communications and	<p>Describe the Proponent's overall approach to partnering, communications and integration, including:</p> <ul style="list-style-type: none"> • Plan for developing and maintaining a successful

<p>Integration (5 pages)</p>	<p>long-term partnership with the City;</p> <ul style="list-style-type: none"> • Managing technical interface structures and interdisciplinary relations, with a description of proposed reporting mechanisms and communications protocols with the City, core stakeholders, government agencies and the public; • Maximizing integration of the activities of the Proponent team members during all phases of the Project, so as to validate and verify that the requirements of the project are met; • Approach to the design development process and issue resolution process including working in collaboration with user groups, design teams, stakeholders, and the technical Advisor; • Approach to incorporating stakeholder input into the Design Data submitted in accordance with the Project Agreement; • Approach to achieving a fully co-ordinated and integrated design and construction phase in collaboration with the City, other agencies and third parties including local utility companies; • Approach to achieving effective coordination of the Works Committee within the parameters of the Project Agreement; • Approach to resolving disputes within the parameters of Schedule 27 – Dispute Resolution Procedure to the Project Agreement; and • To the extent the Proponent has used or intends to use open, fair and transparent competitive procurement processes to engage additional Proponent team members, suppliers or other participants, the Proponent will include a description of those procurement processes.
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<p>1.2 Team Structure and Processes (15 pages, excluding curriculum vitae)</p>	<p>The Proponent shall provide a detailed description of its team structure and processes, including:</p> <ul style="list-style-type: none"> • List of key individuals for both the duration of the Works and the Maintenance Term of the Project; • Organization chart clearly indicating the Proponent's team structure and lines of communication with the City. The organizational chart shall include the names of all staff and their reporting relationships for all project activities; • Approach to managing the Proponent's staffing resources, staff substitution and replacement; • Approach to managing external stakeholder and approval bodies and internal decision making; • Curriculum vitae for all key design, construction, testing and commissioning, and maintenance personnel, which highlights their experience on light rail transit projects of a similar size and nature and includes information about their role, participation and duration of involvement in other similar projects. Each curriculum vitae shall be no more than 3 pages; • Demonstration or commitment that contractors performing the Highway 417 Roadwork are appropriately registered under the MTO's Registry Appraisal and Qualification system (RAQs), including a Necessary Available Financial Rating of \$40,000,000 and a Necessary Available Maximum Workload Rating of \$120,000,000 (as such terms are applied in the Registry Appraisal and Qualification system); and • Completing and submitting the MTO Tender Registration Form attached hereto as Appendix "A".
<p>1.3 Quality Management Plan (15 pages)</p>	<p>The Proponent shall provide a combined Quality Management Plan specific to the Project which demonstrates that the Proponent shall manage the scope of work of the contract using the principles of International Standard ISO 9001:2008, ISO 9001 quality management principles and the minimum requirements stated in Schedule 11 and Schedule 26 of the Project Agreement. The Quality Management Plan shall include</p>

	<p>the following:</p> <ul style="list-style-type: none"> • General approach and statement describing the Proponent's quality policy and philosophy, including the records management processes and procedures; • Required qualifications of quality managers and quality directors as stated in Schedule 11 of the Project Agreement; • Training, education and other measures to be taken to ensure the Proponent is in compliance with all relevant management plans; • The Proponent's quality policy and quality control regime for design quality management, construction quality management, maintenance and rehabilitation quality management, as well as their respective integration; • The Proponent's records management policy and procedures for the design, construction, maintenance and rehabilitation, as well as their respective integration; • Processes for Non-Conformance review and disposition, including the approach for the development of the Non-Conformance Tracking System and its required components and corrective and preventative action response strategies for Non-Conformances; and • An outline of how the key management activities (such as the Proponents controls, design, construction, maintenance and rehabilitation, traffic and mobility management, environmental management and health and safety management) will interface with each other and with the Quality Management System including the reporting and internal governance within and between all activities.
<p>1.4 Construction Safety Plan (10 pages)</p>	<p>The Proponent shall provide a Construction Safety Plan specific to the Project which describes the measures the construction team will follow, including:</p> <ul style="list-style-type: none"> • A description of the approach and process the

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	<p>Proponent will undertake to provide a safe work site for all persons on Site;</p> <ul style="list-style-type: none"> • Statement from the construction team emphasizing a commitment to the principles of construction safety; • Valid corporate health and safety policy as prescribed in the Occupational Health and Safety Act, R.S.O. 1990 c.O.1; • Initial and ongoing safety training plans for the construction team's personnel including any site specific training necessary for issues related to the Site; • The approach for dealing with Site specific hazards on the Project during the Works and the Maintenance Term; • A description of the safety monitoring, inspection and record keeping process; • The Proponent shall provide an organizational chart and narrative that fully describes the roles, responsibilities, qualifications and experience of each member of the staff dedicated to site safety; • Process for accident and incident reporting and response including procedure for responding to occupational health and safety issues. Description of the construction team's overall safety record over the last five (5) years including a list of orders received from the Ontario Ministry of Labour and any relevant authority having jurisdiction over the occupational health and safety to which the construction team has been subject over the last five (5) years; and • Description of the role of staff dedicated to site safety.
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<p>1.5 Permits and Approvals Strategy (5 pages)</p>	<p>The Proponent shall provide a detailed description of the Proponent's approach to obtaining required Project Co Permits, Licences and Approvals in time for successful completion of the Project and the Key Individuals and agencies involved in the process.</p>
<p>2.0 Risk Management Plan (15 pages, see breakdown below. Excludes Risk Register)</p>	<p>The Proponent shall include the following sections under the Risk Management Plan (RMP):</p> <p>2.1 Overall Approach to Risk Management;</p> <p>2.2 Initial Risk Assessment and Planning;</p> <p>2.3 Risk Register.</p>
<p>2.1 Overall Approach to Risk Management (5 pages)</p>	<p>The Proponent shall provide a narrative that outlines the Proponent's risk management approach and methodologies. The Proponent shall address, but not be limited to the following:</p> <ul style="list-style-type: none"> • How risks will be identified, assessed, responded to, and monitored throughout the Project; • Categories and definitions to be used in support of qualitative analysis of risks; • Tools and techniques to be used for quantitative analysis of risks; • How contingency and/or mitigation plans will be developed, implemented, and monitored; and • How the Proponent's Risk Management process will be integrated with Proponent Team Members.
<p>2.2 Initial Risk Assessment and Planning (10 pages)</p>	<p>The Proponent shall provide a narrative that outlines the Proponent's understanding of the risks and challenges specific to the Project. The Proponent shall identify and describe, features of the Proponent's approach to design and construction that the Proponent considers unique and/or innovative relative to reducing or eliminating Project risk.</p>
<p>2.3 Risk Register (no page limit)</p>	<p>The Proponent shall provide a detailed risk register that identifies:</p> <ul style="list-style-type: none"> • Project risk items;

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	<ul style="list-style-type: none"> • Probability/likelihood of such risks manifesting themselves on the Project; • Potential severity of impact to Project objectives should such risks occur; • Triggering events or root causes; • Ability to predict or control occurrence; • Timeline horizon (i.e. near-term, mid-term, or long-term); • Response strategy and plans for managing each risk; • Residual risk assessment after implementation of response plan; and • Regularity of reassessment (i.e. monthly, quarterly, annually; or after a particular Project event or milestone).
<p>3.0 Design and Construction Schedule (15 pages, see breakdown below. Excludes printed schedule)</p>	<p>The Proponent shall provide a Design and Construction Schedule which shall be prepared and submitted using Oracle Primavera P6 or other software compatible with Oracle Primavera P6, and include the following sections:</p> <p>3.1 Proponent Strategies</p> <p>3.2 Project Schedule</p>
<p>3.1 Proponent Strategies (15 pages)</p>	<p>The Proponent shall provide a narrative description of the Proponent's strategies related to the development and implementation of the proposed schedule. The Proponent shall articulate its schedule for communication, adherence and recovery strategies, so as to illustrate how it will maintain its proposed schedule. The narrative shall provide clear references and linkage to the project schedule. The narrative shall also provide details of the Proponent's approach to managing the schedule control mechanisms.</p>
<p>3.2 Project Schedule (no page limit)</p>	<p>The Proponent shall provide a summary Design and Construction schedule including the Commercial Close Target Date, Financial Close Target Date, Design and Construction Works Date, the Scheduled Milestone Acceptance Date, the Scheduled Substantial Completion</p>

	<p>Date and the Required Revenue Service Availability Date in accordance with the Project Agreement.</p> <p>The submission shall include a detailed critical path network based schedule for the Project, and include, at a minimum the following:</p> <ul style="list-style-type: none"> • Critical path, including relationship lines; • Construction start and completion dates for all construction phases, such that Scheduled Revenue Service Availability shall occur no later than June 2018; • Staging and sequencing; • Major detailed design milestones, including consultations and major submittals; • Coordination with federal, provincial and City authorities; • Design packages, and discipline specific submittal start and completion dates for all sections and phases; • Securing the Project Co Permits, Licences and Approvals; • Design review and audit schedule including key dates for submissions; • Integration, testing and commissioning process, including System Safety Certification Audit; • Procurement of equipment and materials; • Mobilization; • Demolition; • Preparatory work (maintenance of traffic, temporary works, detour routes, etc.); • Key dates for environmental mitigation preparation and works related to the Environmental Assessments; • Drainage works, and construction associated with
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	<p>hydro-geological works;</p> <ul style="list-style-type: none"> • Geotechnical/foundation/earthworks/soft soils/consolidation periods; • Major structure construction (tunnels, bridges, guideway, road construction, MSF, stations and retaining walls); • Major construction milestone dates for the Highway Work; • Utility relocations and/or protection; • Urban design and landscape architecture works; • Works being handed back to the City; • Other significant work functions; • Establishment, implementation and maintenance of the Quality Management System (“QMS”), highlighting the schedule for the implementation of the QMS; • Final works, including site clean-up, compaction and landscaping; • Certification of structures design work; and • The Proponent’s submitted schedule must provide three-point duration estimates for all activities.
<p>4.0 Project Sustainability (40 pages, see breakdown below)</p>	<p>The Proponent shall include the following sections under its Project Sustainability submission:</p> <p>4.1 Project Sustainability Plan; and</p> <p>4.2 Environmental Management Plan.</p>
<p>4.1 Project Sustainability Plan (20 pages)</p>	<p>The Proponent shall provide a Project Sustainability Plan which clearly demonstrates the Proponent’s approach to sustainability and shall at a minimum include the following:</p> <ul style="list-style-type: none"> • Approach to fulfilling the objectives and targets of the “Sustainability Plan” (as outlined in Section

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	<p>2.2(a)(i) of Schedule 17 of the Project Agreement);</p> <ul style="list-style-type: none"> • Development and implementation of sustainability practices as outlined in Schedule 17 of the Project Agreement, in the Design and Construction Phase of the Project addressing Environmental Assessment requirements, credits being sought for rating under LEED® for the MSF Administration Building and Maintenance Building only, good industry practices, new technologies or approaches, and City initiatives; • Development and implementation of sustainability practices as outlined in Schedule 17 of the Project Agreement, in the Maintenance Term of the Project addressing Environmental Assessment requirements, good industry practices, new technologies or approaches, and City initiatives; • Historical experiences and lessons learned in past projects involving sustainability practices for LRT projects of a similar size and/or scope; • Articulation of objectives and metrics relating to sustainability practices to be achieved throughout the Project Term; • Identification of a framework, strategy, methods and tools, including innovative approaches, to achieve the sustainability objectives and metrics; • Articulation of the approach to training, education and communication of sustainability objectives and activities for the Project Co Parties to achieve sustainability practices; • Communication of other sustainability achievements to Stakeholders and other relevant parties. • Approach to gaining Stakeholder and other party support and engagement in the process; • Identification of the organizational responsibilities relating to the development, implementation, reporting and continual improvement of sustainability practices.
4.2 Environmental	The Proponent shall provide an Environmental

<p>Management Plan (20 pages)</p>	<p>Management Plan that clearly demonstrates the Proponent's approach to meeting the requirements of Project Agreement Schedule 17 – Environmental Obligations, and shall include, as a minimum, the following:</p> <ul style="list-style-type: none"> • Demonstrate understanding, commitment, capability and approach to comply with the requirements of the Environmental Assessments, and other requirements under Environmental Laws; • Provide a narrative on the approach in developing and meeting the requirements of an Environmental Awareness and Education Plan and other environmental plans and reports as outlined in Schedule 17 of the Project Agreement; • Provide a narrative on the approach for developing and meeting environmental plans and reports as outlined in Schedule 17 of the Project Agreement; • Define and describe processes for monitoring and reporting on environmental obligations; • Describe the Proponent's strategy for the management, removal or remediation of waste and contamination, and the management of waste, fill materials and earth encountered in the Project. As part of the strategy, include a description of the extent of contamination that has been inferred for the following OLRT sites: Bayview Station, Lebreton Station, Downtown Tunnel, Lees Station, Hurdman Station and the Maintenance and Storage Facility; • Describe the Proponent's strategy for assessing and mitigating noise and vibration impacts during the Project Term. As part of the strategy, specifically describe the approach for protecting sensitive receivers; • Provide a description of the pertinent environmental processes to be undertaken by the Proponent during all phases of the Project, including processes leading to securing all required Project Co Permits, Licenses, and Approvals relating to environmental matters, and identification of key environmental considerations affecting design, construction, and operations, maintenance and rehabilitation;
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	<ul style="list-style-type: none"> • Describe the processes for environmental incident reporting and tracking; • Describe the approach to the coordination/integration of the environmental strategy with the Project Sustainability Plan; • Describe the approach to the coordination/integration with the Quality Management Plan defined in Project Agreement Schedule 11 - Quality Management; and • Identify resources, roles, responsibilities, authority, and reporting structure within the environmental team, including the Environmental and Sustainability Director, Environmental and Sustainability Manager, environmental specialists, and others that will be engaged in performing tasks associated with environmental matters.
DESIGN SUBMISSION	
<p>5.0 Design Submission (345 pages, see breakdown below. Excludes drawings, schematics, cut sheets, diagrams, renderings and Output Specification Checklists)</p>	<p>The Proponents shall include the following sections in their Design Submission:</p> <ul style="list-style-type: none"> 5.1 Utilities, Geotechnical, Drainage, Urban Design, Landscape Architecture and Artwork, and Safety Management and Certification and Regulatory Matters 5.2 Guideway 5.3 Tunnel 5.4 LRT Systems and Vehicles 5.5 Stations 5.6 Maintenance and Storage Facility (MSF) 5.7 Consultation Plan 5.8 Output Specifications Assumptions and Variance Analysis
<p>5.1 Utilities, Geotechnical, Drainage, Urban Design, Landscape Architecture and Artwork and Safety Management and</p>	<p>The Proponent shall address the Utilities, Geotechnical, Drainage, Urban Design, Landscape Architecture and Artwork, and Safety Management and Certification and Regulatory Matters Requirements at an appropriate level of detail, as set out in or otherwise referenced in Schedule</p>

<p>Certification and Regulatory Matters (60 pages)</p>	<p>15-2 of the Project Agreement, and is to include the following:</p> <p>Utilities</p> <p>The Proponent shall submit a narrative that provides a description of the approach to:</p> <ul style="list-style-type: none"> • Identification of existing Utilities; • Utility relocation, including protection; • Communication and coordination with Utility Companies including articulating an understanding of operational constraints; • Communication and coordination with other stakeholders including businesses and property owners; • Management of service interruption to property owners; • Early identification and mitigation of impacts to critical Utilities; • Obtaining Utility Permits and Approvals; and • Supplying Utility services to the OLRT infrastructure and facilities. <p>The Proponent shall submit drawings showing the following:</p> <ul style="list-style-type: none"> • Preliminary composite Utility plans showing relocation/protection plans for West Portal area (cut and cover and U-sections), Downtown West Station, Downtown East Station, Rideau Station, East Portal area (cut and cover and U-sections), and MSF connection link. <p>Geotechnical</p> <p>The Proponent shall submit a plan that provides a description demonstrating a clear understanding of key geotechnical issues and challenges for all major structures. The plan shall include, at a minimum:</p> <ul style="list-style-type: none"> • An interpretation of the geotechnical conditions used in the design development including geotechnical profiles for all major structures and a summary of
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	<p>geomechanical design properties;</p> <ul style="list-style-type: none"> • A summary of the identified geotechnical conditions, constraints, concerns and outstanding issues. An outline of any additional geotechnical investigations, laboratory testing and analyses proposed to address identified geotechnical issues; • A summary of the estimated ground movements that will result from Construction Activities and the approach(s) used to control ground movements and issues related to ground conditions, including issues related to the presence of sensitive clays; • A preliminary hydrogeological impact assessment and associated risk assessment which includes: <ul style="list-style-type: none"> ○ For the Construction Period, anticipated groundwater control strategy for all subsurface excavations, narrative and working drawings describing analysis methods and anticipated inflows into all subsurface excavations, anticipated groundwater drawdown outside of project excavations, anticipated impacts of groundwater drawdown in terms of potential for groundwater lowering induced settlement of compressible soils within the zone of groundwater drawdown and risk for migration of contaminated groundwater to project excavations, shale swelling due to groundwater drawdown, and mitigation measures to control groundwater inflow and/or detrimental impacts of anticipated groundwater drawdown; and ○ For the permanent condition, anticipated groundwater control strategy for all subsurface excavations, narrative and working drawings depicting the waterproofing systems and describe anticipated inflows into both the drained and undrained Structures, and a presentation of the anticipated long term groundwater drawdown outside of project structures and impacts. • Identification of any geotechnical concerns related to construction adjacent to any existing structures and
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	<p>utilities, including the design of temporary excavation support, geotechnical instrumentation and monitoring approach and mitigation to protect those facilities.</p> <p>Drainage</p> <p>The Proponent shall provide a design proposal associated with the design of all drainage elements including new elements and modifications to existing elements.</p> <p>At a minimum the proposal will demonstrate the following:</p> <ul style="list-style-type: none"> • The design standard and criteria that will be adopted for each of the different drainage elements, including quantity, quality, erosion control and water balance; • Approach to drainage design including data requirements for design and decision making, identifying any additional data that will continue to be collected and how it will be used to support the design process; • Hydrologic and hydraulic models and procedures to be used, including their rationale and applicability to the Project; • A description of key drainage issues at the different locations, including a plan and approach of how they are to be addressed in design. These include, but are not limited to, issues regarding groundwater and fisheries, spills, flooding, and other environmental impacts; • A description of potential issues and approach in meeting requirements from Relevant Authorities; and • A description of how drainage runoff will be collected and directed away from the guideway. <p>Urban Design, Landscape Architecture and Artwork</p> <p>The Proponent shall provide a narrative on the approach it intends to implement with the intention of developing the Urban Design and Landscape Plan, as required by the Project Agreement.</p> <p>The Proponent Designs shall reflect the spirit of the NCC requirements and conditions as outlined in Appendices 1</p>
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	<p>and 2 of the February 6th, 2012 NCC Limited Endorsement Letter.</p> <p>The Proponent shall provide an organizational chart and narrative that describes the roles, responsibilities and experience of each member of the Urban Design and Landscape Architectural Team.</p> <p>The Urban Design and Landscape Plan shall include at a minimum:</p> <ul style="list-style-type: none"> • An overall landscape drawing for each Project station-scale 1:250, demonstrating the following, but not limited to: <ul style="list-style-type: none"> ○ The integration of the station and related site development into the adjacent context; ○ Identification of pedestrian and cycling connections; ○ Integration of all streetscape elements identified in the landscape design criteria; and ○ All other elements required for the successful implementation of each Project station. • A landscape drawing for each section of the Project corridor requiring additional work including but not limited to: <ul style="list-style-type: none"> ○ the West Portal; ○ the East Portal; ○ Ottawa University interface from Laurier Avenue to Highway 417. • The typical enlargements (plan or section), at an appropriate scale to fully illustrate the construction requirements, including the following, but not limited to: <ul style="list-style-type: none"> ○ Detailed drawing at appropriate scale to indicate grading, layout, plaza paving patterns, site furnishings, seating walls, light standards, site furniture, bicycle racks, signage, plant
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	<p>material and spacing, and miscellaneous works to complete the exterior site works.</p> <ul style="list-style-type: none"> • Visualizations (renderings, manufacturer's cut-sheets, or precedent images) displaying the distinctive character of the Project, including, but not limited to: <ul style="list-style-type: none"> ○ Design proposal of a cohesive family of furnishings, including, but not limited to benches, railings, pedestrian lighting, bicycle racks, trash receptacles and miscellaneous street furniture as required. • The Proponent shall submit its approach to public art. <p>Safety Management and Certification and Regulatory Matters</p> <p><i>Safety Management and Certification</i></p> <ul style="list-style-type: none"> • Provide a narrative detailing how safety and systems assurance will be systematically managed throughout design, construction and maintenance and the process that will be used to develop the system safety case and safety management system. • Describe the methodology that will be used to evaluate and develop system assurance requirements including the identification and mitigation of hazards associated with the proposed design. • Provide a narrative detailing how the design of the OLRT system will be optimized in terms of safety, operations, reliability, availability, maintainability and life cycle cost, service dependability, failsafe design and failure management of the system operation. • Provide a narrative detailing how systems assurance requirements outlined during the design phase will be implemented throughout the Maintenance Term. • The above narratives shall consider and address the following key issues: <ul style="list-style-type: none"> ○ Safety and security certification plan, independent verification and management of OLRT safety and security for the construction
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	<p>and operation;</p> <ul style="list-style-type: none"> ○ Configuration control; application of controls throughout the concession period; ○ Integration; details of the processes and schedule used to connect all systems and prove functionality and safe operation; ○ Post construction pre-revenue certification; details of the process of independent reviews on system safety critical items; and ○ Safety auditing during operational service. Schedule of regular audit and controls. Reporting of key metrics to the City. <p><i>Regulatory Matters (Technical Compliance with Schedule 15-4 of the Project Agreement)</i></p> <p>The Proponent is to provide a written narrative for its approach to the requirements of the OLRT Regulatory Framework that describes the process of planning for, managing, developing, and achieving the obligations set out in Schedule 15-4 of the Project Agreement.</p> <p>While not limited by the following items, the narrative shall:</p> <ul style="list-style-type: none"> ● Describe the approach for development of the Safety Management System (SMS), Security Management System (SeMS), Threat and Vulnerability Assessment (TVA), Standard Operating Procedures (SOPs), and the LRT Rules (aka LRT Operating Rule Book); ● Include details of the organizations and service providers including roles and responsibilities of the key personnel involved and related experiences for their respective role; ● Demonstrate how design and detailing of the System Components will address the Safety and Security of the System, including the findings from the Threat and Vulnerability Assessment (TVA); ● Demonstrate how means and methods used for the construction of the System will address the Safety and
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	<p>Security of the System, including the findings from the TVA; and</p> <ul style="list-style-type: none"> • Describe the approach in which the OLRT Rules and Regulations will be developed; <p>The narrative shall include preliminary OLRT Regulatory Standards which:</p> <ul style="list-style-type: none"> • Defines the scope, activities and processes associated with OLRT Regulatory Standards and Support Documentation including the SMS, SeMS, TVA, SOPs, and LRT Rules. • Defines the preliminary or initial Regulations Timetable, including the elements listed in Section 2.0(b), on a schedule and timetable that is aligned to the Works Schedule, and clearly illustrates compliance with the timing and protocol for approval provisions in Schedule 15-4. <p>The narrative shall define the details of the organizations and service providers including roles and responsibilities of the key personnel involved and related experiences for their respective role.</p>
<p>5.2 Guideway Design (25 pages)</p>	<p>The Proponent shall address the Guideway design at an appropriate level of detail, as set out in or otherwise referenced in Schedule 15-2 of the Project Agreement, and shall provide a narrative statement describing the alignment design that includes:</p> <ul style="list-style-type: none"> • A geometric design brief that outlines horizontal and vertical alignment envelope criteria and lists the features of all alignment segments to confirm that the geometric criteria of the Output Specifications have been met; • A description of the rationale for the approach alignment into the Stations; • A description of the rationale for and preliminary details of transitions between the various guideway types; • A description of how the track and guideway will be designed to remain free of snow, ice build-up and

	<p>vegetation that could impact operation of the system;</p> <ul style="list-style-type: none"> • A description of how the Vehicle dynamic envelope will be accounted for in the design of all guideway elements; • A description of how the guideway will be designed to minimize stray current from entering the ground for all guideway types; • A description of how system elements will be accommodated within the guideway; and • Confirmation that the alignment can be designed within the Lands provided, including the vertical and horizontal alignment envelope. <p>Provide alignment drawings including:</p> <ul style="list-style-type: none"> • key plan and legend; • continuous plans at no less than 1:1000 scale, showing the LRT alignments with curve data and locations of key features such as special track sections, turnouts, embankment grading and other key features; • profiles at no less than 5H:1V and no less than 1:200 vertical scales; • schematic representations of the guideway types in plan and profile; • typical guideway sections for each guideway type including drainage provisions; • typical sections at major change intervals; and • Vertical alignment envelope drawing for the tunnel segment. <p>Provide a structural approach describing the preliminary structures design and demonstrating how the designs will conform to the Output Specifications. The structural design approach shall include:</p> <ul style="list-style-type: none"> • A preliminary design brief outlining the design approach and design criteria to be used for all new
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	<p>structures, with particular attention to structural designs, foundation designs, retaining wall designs and modifications to existing structural elements; and</p> <ul style="list-style-type: none"> • A description of the proposed construction or erection strategy to be used. <p>Provide structural drawings including:</p> <ul style="list-style-type: none"> • A set of general arrangement drawings at a scale of 1:500 of each guideway structure, showing the horizontal and vertical geometry, deck cross-section, type of structure, structure depth, horizontal and vertical clearance to all roads and existing facilities, span arrangements, and preliminary column locations. The drawings shall also address the integration of the Booth Street bridge with the architectural elements of the LeBreton Station; • Abutment drawing including plan, elevations and sections; and • Pier drawings showing typical columns (one per type) including plans, elevations and sections. <p>Provide a roadway approach describing the preliminary roadway design and demonstrating how the designs will conform to the Output Specifications. The roadway design approach shall include:</p> <ul style="list-style-type: none"> • A preliminary design brief outlining the design approach and design criteria to be used for all new roadways; and • A description of the proposed approach to municipal roadway alteration and restoration. <p>Provide roadway drawings including:</p> <ul style="list-style-type: none"> • A set of geometry and general layout drawings at a scale of 1:500 of the roadways; • A set of grading and drainage drawings at a scale of 1:500 of the roadways; and • Roadway components of the guideway and municipal road alterations and restoration associated with the
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	<p>guideway at a scale of 1:500.</p> <p>Provide a Trackwork approach describing the preliminary designs for track structure/rail fastening systems and special trackwork demonstrating how the designs will conform to the Output Specifications. The approach shall include the following:</p> <ul style="list-style-type: none"> • A description of design methods, standards used and supporting design criteria; • A description of the approach to installation, testing and commissioning of trackwork components; • A description of special trackwork design; • A description of the design of the proposed track structure/rail fastening systems including the interaction with the elevated guideway and existing bridge components as they relate to the expansion of track and structure; • A description of all infrastructure installed in support of the signalling and communications equipment and electrification; and • A description and drawing of the proposed end of track device and an explanation providing that it is suitable for use. <p>Provide trackwork drawings-scale 1:100 including:</p> <ul style="list-style-type: none"> • Preliminary drawings of special trackwork geometry, guardrails, and restraining rails; • Preliminary drawings of all proposed track structure/rail fastening systems and their associated assemblies; and • Preliminary drawings for the signals and communications infrastructure.
<p>5.3 Tunnel Design (40 pages)</p>	<p>The Proponent shall address the Tunnel design at an appropriate level of detail, as set out in or otherwise referenced in Schedule 15-2 of the Project Agreement, and shall include the following:</p>

	<ul style="list-style-type: none"> • Overall approach to design and construction of tunnels and other underground structures including anticipated construction methods and sequence, construction traffic and staging areas and muck handling for the downtown tunnel and the MSF connection tunnel. Overall approach shall be described in narrative format and with working drawings including plans, profiles, sections and details as necessary to clearly convey the Proponent's proposed approach; • Assessment of anticipated ground conditions along tunnel alignments and at major shafts, including narrative and geotechnical profiles for the downtown tunnel, MSF connection tunnel and all shafts larger than 3 meters in diameter. Geotechnical profiles shall include classification of ground types, anticipated distribution of the various ground types, and other important parameters for design and construction including rock mass rating; • Anticipated temporary excavation support method narrative and drawings for both soil and rock for cut-and-cover structures. Drawings shall include plans, profiles, sections and details as necessary to clearly convey the Proponent's proposed approach; • Details of anticipated TBM and supporting TBM operation requirements for any proposed bored tunnels; • Narrative and drawings indicating analysis methods and anticipated sequence of excavation and temporary ground support for Mined Structures (including any cross-passages). Drawings shall include plans, profiles, sections and details as necessary to clearly convey the Proponent's proposed approach; • Anticipated final lining design requirements for the Tunnels including narrative describing proposed approach to analysis and design of all cut-and-cover, bored or mined structures and working drawings including plans, profiles, sections and details as necessary to clearly convey the Proponents proposed final lining design requirements; • Preliminary assessment of impacts to Adjacent
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	<p>Structures due to construction of underground structures, including analysis methods and estimated limits of Zone of Influence, tabulation and graphic depiction of all Adjacent Structures within the Zone of Influence, anticipated deformations and potential damage level of same. Identify Adjacent Structures for which mitigation is anticipated and type of mitigation anticipated;</p> <ul style="list-style-type: none"> • Proposed geotechnical instrumentation program including narrative and working drawings indicating overall approach to geotechnical instrumentation and monitoring, proposed types and locations of geotechnical instrumentation, proposed data collection method, reading frequency for each type of instrument, proposed approach for developing trigger and action levels and proposed approach for developing contingency plans when limits are exceeded; • Anticipated approach for ground improvement or other proposed means and methods for ground control in the bedrock valley located just east of the intersection of Rideau Street and Colonel By Drive, and other areas where the Proponent anticipates that surface or sub-surface pre-excavation ground improvement will be required; • Overall approach to design and construction of the operation and control of the emergency ventilation systems for the Tunnels and for the Stations and how the system satisfies the requirements of the Output specifications and applicable codes and standards, particularly NFPA 130, including and drawings and diagrams; • Smoke dispersion analysis for emergency ventilation systems to demonstrating Smoke discharged from emergency ventilation shafts is not drawn into the Station entrances or other Station air intakes and Smoke discharged from emergency ventilation shafts is not drawn into entrances or air intake shafts of adjacent buildings; • Provide site drawings indicating the location of the smoke ventilation shafts, and relationship to Station
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**Schedule 3-1 to Request for Proposals
RFP Version 4.1**

Ottawa Light Rail Transit Project

	<p>entrances, Station air intakes and openings of other buildings height above grade and other objects; and</p> <ul style="list-style-type: none"> • Approach for accommodating the proposed 3000mm CSO at Kent Street including a narrative and sketches/working drawings demonstrating the planned design and construction approach. If Project Co elects to design the Tunnel Structure below the Vertical Alignment Envelope limit of 50.0 meters at this location, a technical and cost analysis report will be required. The report shall demonstrate that the lower design elevation is technically feasible and will not impact construction or maintenance of the proposed CSO. The report shall include both narrative and working drawings and shall include the anticipated loads that will be imposed on the proposed CSO tunnel.
<p>5.4 LRT Systems and Vehicles (125 pages in respect of the requirements of Section 5.4 of this Schedule 3 Part 1 of the RFP, excluding the materials under the heading “Light Rail Vehicles – Canadian Content Policy”. 25 pages in respect of the requirements under the heading “Light Rail Vehicles – Canadian Content Policy”, including the Canadian Content Certificate attached as Appendix B to this Schedule 3 Part 1 of the RFP.)</p>	<p>The Proponent shall submit a single Vehicle and Train Control package with its Technical Submission.</p> <p>The Proponent shall address the LRT Systems and Vehicles design at an appropriate level of detail, as set out in or otherwise referenced in Schedule 15-2 of the Project Agreement, including, but not limited to, the following:</p> <ul style="list-style-type: none"> • The proponent shall detail how the following integrate into the systems design processes, through the use of block diagrams or flowcharts to illustrate the process interfaces: <ul style="list-style-type: none"> ○ Design methodology; including narrative and lessons learned. This will also include a description of the project wide processes, specific documentation and deliverables during the project lifecycle and coordination with systems assurance, quality, safety and RAMS; ○ System Interface management; including a narrative of the process and the control of information to all disciplines and multi-discipline checking; ○ Verification and validation strategy; including narrative and process flow chart describing testing regime;

	<ul style="list-style-type: none"> ○ Configuration control methodology; including a narrative of how software and hardware configuration status is managed throughout the project lifecycle and how the proposed equipment proposed will be managed to operate safely for the operational life; ○ RAMS; including a narrative on the management of the systems assurance process, how this will affect the design process and how reliability, availability, maintainability and safety are addressed throughout the project lifecycle; ○ Climatic performance: including methodology and strategy of how design of LRV and Systems address the climatic challenges, including examples of vehicles and systems operating in similar environments. Methodology of dealing with extremes of weather during testing of components and sub-components; ○ A narrative of integration methodology: How the systems are connected together and evaluated as part of the integration process and supporting process flow charts and lessons learned from other project integrations; and ○ A narrative describing how the City will have input into the overall branding of the systems equipment and information (including the integration of vehicle branding into the overall system branding) and the flexibility within the design solutions to accommodate City branding requirements. <p>Light Rail Vehicles – Canadian Content Policy</p> <p>The OLRT Project is subject to Canadian Content Policy in respect of the proposed Vehicles included in a Proponent’s Proposal. Proponents will submit with their Proposals:</p> <ul style="list-style-type: none"> ● Certification in the form attached as Appendix B. ● Sufficient supporting information to demonstrate their
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	<p>compliance with the Canadian Content Policy, including names of potential manufacturers and equipment types manufactured in Canada, evidence of equipment type and place of manufacture, contact details for each manufacturer proposed, sub-supplier certificates of conformity and baselined breakdown of the requirements of the Canadian Content Policy calculated in accordance with the Canadian Content Policy, to support the Canadian Content Policy. In particular, Proponents must address and provide information about expenditures for eligible costs in respect of the proposed Vehicles for the following items and which are directly related to the manufacturing process, distribution and acquisition, including:</p> <ul style="list-style-type: none"> ○ Labour; ○ Sub-components and components; ○ Project management; ○ Engineering; ○ Manual; ○ Special tools; ○ Test equipment; ○ Freights; and ○ Warranty. <ul style="list-style-type: none"> ● A narrative on the Proponent's strategy to meet the Canadian Content Policy and the process of integrating this with the design, including: <ul style="list-style-type: none"> ○ Consent to the disclosure, verification and audit of the information forming the basis of their certification, during the evaluation stage, and any other steps taken before Commercial Close and, for the Successful Proponent and Vehicle manufacturer, during and after the term of the Project Agreement. Such disclosure, verification and audit shall apply to the Province of Ontario, MTO, the Auditor
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	<p>General of Ontario and their designates.</p> <ul style="list-style-type: none"> ○ If Proponents have additional items which they feel should be taken into account in the evaluation of their compliance with the Canadian Content Policy, they are required to itemize those particular items and indicate how they factor into the Proponent's compliance with the Canadian Content Policy and include a narrative of the interpretation to warrant such an inclusion. <ul style="list-style-type: none"> ● A Proponent's Proposal shall address the requirements of both in this RFP and the Canadian Content Policy. <p>Light Rail Vehicles – General</p> <p>Proponent will submit with their Proposals:</p> <ul style="list-style-type: none"> ● A branding strategy, with a narrative to describe how the City has input into the branding of the proposed Vehicle and its suitability towards the image of Ottawa as the Capital of Canada. The narrative shall include possible branding schemes and methods of changing the brand image; ● A description of the type and manufacturer of proposed Vehicle, its internal and external arrangements and expected performance levels. Performance, reliability and safety of the proposed Vehicle in similar climatic conditions and details of the specific climatic enhancements for the proposed Vehicle to address the climatic conditions; ● Service history of the type of vehicle proposed: <ul style="list-style-type: none"> ○ Number of vehicles; ○ Years in service; ○ Reliability program results and data; and ○ Differences between referenced vehicle and proposed Vehicle. ● Experience with consist arrangements that are
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	<p>proposed for the OLRT Project;</p> <ul style="list-style-type: none"> • Proponents shall provide the following; <ul style="list-style-type: none"> ○ A list of tests on substantially equivalent vehicles the Proponent wishes the City to accept; ○ The actual test results from substantially equivalent vehicles; and ○ Any other test results for the proposed Vehicle. • Proponents shall provide preliminary design drawings to accompany the narrative that supports the development of a general arrangement drawing(s). Drawings are to illustrate, at a minimum, the development of the Vehicle design plan; • The dimensioned drawings shall consist of: plan view of roof equipment and pantograph, car body, and truck; side view of proposed Vehicle; cut-aways to show autocoupler and truck details; and cab layout, passenger compartment layout and equipment cabinets and housings. Block diagrams of systems shall be provided to support the understanding of the proposed Vehicle functionality and shall include but not be limited to communications, braking systems, HVAC, auxiliary power systems, Traction Control, and passenger interfaces; • The proponent shall provide industrial design representations of the proposed Vehicle; • Previous vehicle dynamic modelling and simulation results to validate system performance and applicability to Ottawa; • A narrative of the design approach to accessibility of the proposed Vehicle and how the design can accommodate the AODA and ADA requirements and accompanying drawings and layouts detailing features of the proposed Vehicle; • A narrative of the train systems and safety critical items, including descriptions of key components of the
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	<p>proposed Vehicle. Drawings reflecting spatial requirements and the potential impact to interior body space;</p> <ul style="list-style-type: none"> • A narrative describing spin/slide control system; • A narrative describing delivery of proposed Vehicle to site and any partial assembly required for the delivery system; • A narrative of key system interfaces between the proposed Vehicle and the wayside subsystems; • Selected working voltage for the power system; • Car body strength and supporting test results; • Vehicle weights and axle loads; • Crashworthiness and supporting modelling results; • A development, production, testing and commissioning schedule for the proposed Vehicles, identifying key design components and elements of the proposed Vehicle's lifecycle and its associated milestones; • A compliance matrix that confirms compliance with all requirements included in Part 4 of Schedule 15-2 of the Project Agreement; • Heating and cooling calculations to demonstrate capacity to meet or exceed climatic requirements; • A narrative describing the approach to the following requirements outlined in Article 3 of Part 4 of Schedule 15-2 of the Project Agreement: <ul style="list-style-type: none"> ○ Pushing/Towing; ○ Fire Safety; and ○ Ride Quality. <p>Train Control</p> <ul style="list-style-type: none"> • Demonstration and supply of modelling and results of
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	<p>expected system performance and applicability to the OLRT. Description of the interaction of the Train Control System with proposed Vehicles (revenue and non-revenue), drivers and staff at TSCC, including BCC and MSF yard control functions;</p> <ul style="list-style-type: none"> • Identification of the proposed Train Control System, its manufacturer and Train Control system software and hardware including software development lifecycle and configuration control; • Description of key functions, both in normal and abnormal conditions, and the interaction of the Train Control System with respect to all modes of operation including: <ul style="list-style-type: none"> ○ ATP Only (Vehicle) ○ ATO Mode (Vehicle) ○ Non-CBTC Territory Mode (Vehicle) ○ ATS Automatic Mode (Line Operation) ○ Manual Release Mode (Vehicle) ○ ATS Manual Operation Mode (Interlockings) • A narrative and functional description of the Train Control System and backup methodology in case of communication failure and methodology for broken rail detection; • A description of the proposed yard control strategy; • A description of the safety verification standards for the proposed CBTC system and interlocking controller; • A description of how the redundancy of the CBTC vital and non-vital systems will be implemented; and • A description of train/wayside communications reliability. <p>Operational Performance Requirements</p>
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	<p>The Proponent shall provide a narrative describing compliance with Project Agreement Schedule 15-2 Part 1 Article 2 – Operational Performance Requirements and other operations-related criteria, While not limited to the following items, the narrative shall:</p> <ul style="list-style-type: none"> • Summarize the operational capabilities, Vehicle and line capacity, passenger density and results of system performance simulations and modelling; • Describe the vehicle configuration and proposed consist arrangements to meet the operational requirements of the City, and provide scale drawings of the vehicle layout, as well as standee area calculations; • Describe proposed terminal operations including terminal time, minimum sustainable operating headway, and approach to handling disabled trains at Terminal Stations; • Describe the Station dwell time analysis and assumptions underlying the performance simulations and run time estimates including the basis for Passenger flow rates, non-passenger flow time, and variations in dwell time; • Demonstrate the capability to reliably support the operational headways required (including single track operation) based on performance simulations; • Provide projected Terminal to Terminal trip times for manual and ATO modes demonstrating compliance with simulation requirements of Project Agreement Schedule 15-2 Part 1 Article 2 - Operational Performance Requirements; • Validate Operating Scenarios 1 and 2 based on the proposed Train configuration combined with the performance simulations of proposed headways, dwell times and terminal times for each scenario; and • Detail the approach to expansion of the system to accommodate the ultimate system capacity of 24,000 pphpd.
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	<p>Non-Revenue Vehicles</p> <ul style="list-style-type: none"> • A narrative on proposed Non-Revenue Vehicles for specific maintenance activities and tasks; and • A description of maintenance lessons learned from other projects and applicability to the proposed Non-Revenue Vehicle choices. <p>Traction Power</p> <ul style="list-style-type: none"> • Traction power supply design process, software tools and prior evaluation of load flow modelling and the service plan proposed; • A description of the traction power supply design, failure modes and mitigations including a description of interfaces to HOL and power management and monitoring; • A preliminary traction power system single line diagram including main line, yard leads, and all yard tracks; and • The proposed substation locations. <p>Overhead Catenary System</p> <ul style="list-style-type: none"> • A description of the OCS and its suitability to the climatic conditions of the OLRT; • Typical OCS arrangements within the tunnel and in areas with height constraints; • In areas outside the tunnel, a description of how the visual impact of the OCS will be minimized; • Typical power controls and sectionalisation from the TSCC, YCC, BCC; • A description of how passengers and public will be protected from OCS failures; and • A description of methods to reduce EMI impacts to sensitive receptors along the alignment
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	<p>Communication System</p> <ul style="list-style-type: none"> • An overall systems topology / systems connection diagram detailing the key subsystems within the OLRT, including: <ul style="list-style-type: none"> ○ TSCC, YCC, BCC ○ BAS ○ BMS ○ CTS ○ PA ○ PIDS ○ IAC ○ Telephone and Intercom System ○ Radio Communications ○ Train-to-Wayside Wireless System • Description of the communications system and functionality required in stations, TSCC, YCC and BCC; • Methodology of how system safety and security are maintained; • Methods of providing an ‘open-data’ link to provide information on Vehicle and system scheduling and announcements; and • A description of how the proposed communication systems will be integrated with the existing City communication systems. <p>Medium Voltage Distribution</p> <ul style="list-style-type: none"> • The Proponent shall provide a narrative describing the typical medium voltage services in stations, TSCC, YCC and BCC; • The narrative shall include details of control and
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	<p>monitoring of services and equipment in the above locations;</p> <ul style="list-style-type: none"> • The Proponent shall provide drawings or descriptions of the location of the substation transformers and associated ancillary equipment such as breakers, bus bars and isolation switches; and • The Proponent shall provide a narrative describing the redundant supply methodology, the applications of UPS and generators to maintain operations for essential loads in the event of maintenance or supply failures. <p>Corrosion Control</p> <ul style="list-style-type: none"> • A description of the corrosion control strategy proposed for OLRT and identification/mitigation of specific risks perceived for the project; • Methodology and design for controlling corrosion in, but not limited to, underground elements, structural supports and services; • Approach and design concepts for reducing stray current and meeting the requirements of stakeholders/sensitive receptors; • Methodology for monitoring and metering stray current during construction and operation; and • A description of stray current best practices and their applicability to the OLRT Project. <p>EMI/EMC</p> <ul style="list-style-type: none"> • Methodology and design for EMC. Mitigation of Traction Power System and reduction of radiated electromagnetic fields; • Approach and design concepts for reducing EMI and meeting the requirements of Stakeholders/sensitive receptors; and • A description of EMI/EMC best practices and their applicability to the OLRT Project.
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<p>5.5 Station Design (50 pages)</p>	<p>The Proponent shall address the Station design at an appropriate level of detail, as set out in or otherwise referenced in Project Agreement Schedule 15-2, and shall include the following:</p> <p>Architectural Written Narrative The Proponent shall provide a written design response which shall address the concept proposed for the Stations, their interface with the guideway, and the functional relationships between station elements, demonstrating the following:</p> <ul style="list-style-type: none"> • Schematic diagrams and narrative that show passenger flow is efficient, direct, accessible, and designed with CPTED principles throughout the entire station from street entrance to platform. Diagrams should show the approach for entrance configuration, connecting tunnels, concourses and mezzanines to ensure the most intuitive station design for passengers; • Approach to integration of the station entrances into the surrounding urban context with a focus on pedestrian and cycling connections and orientation of entrances with respect to dominate passenger flow and circulation routes; • The aesthetic nature of the design for all of stations including the integration of way finding, signage, landscaping and artwork; • Approach to vertical circulation elements of the downtown stations including approach to redundancy of vertical circulation, climatic effects (snow, ice, sand, salt) on vertical circulation equipment and how this would be mitigated with station entrance enclosures. Narrative on addressing the approach to maintenance and reliability associated with vertical circulation and anticipated measures to be taken to minimize maintenance costs; • Approach to life safety code requirements, emergency smoke evacuation systems and the impact of these code requirements on station design; • Approach to future expansion of the station platforms including consideration of future vertical circulation, platform edge doors, knock-out panels for future
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	<p>connections and impacts on passenger flows such that future costs are minimized;</p> <ul style="list-style-type: none"> • Approach to the Federally Mandated Stations and approach to ensure continuity of Station designs across the entire system. Proponents are advised that their submission, as it relates to any works under Federal jurisdiction, may be used by the City as part of its submittal for or in connection with the NCC FLUA; • Approach to building envelope and weather protection. Describe how the station designs will mitigate the impact of varying climatic conditions to provide maximum passenger comfort and provide protection to vertical circulation equipment. Narrative should include approach to radiant on-demand heating and windscreens; • Approach to BRT Station designs including approach to fare control at Tunney's Pasture Station, Hurdman Station and Blair Station; • Approach to reuse of existing station components including components that are planned to be re-used, re-furnished or demolished with particular emphasis on Tunney's Pasture, Lees, Cyrville and Blair; • That the Proponent has reviewed and considered the Background Information provided in the Data Room with respect to a potential connection from the Downtown East Station to the existing parking garage tunnel of the National Arts Centre, located under Queen Street west of Elgin Street. The Proponent may be directed by the Sponsors to attend a one (1) day meeting with the National Arts Centre to discuss the feasibility and potential of adding the potential connection, in which case the Proponent shall provide the following to the Sponsors at least 5 days prior to the meeting for review, comment and, if acceptable to the Sponsors, use, at such meeting: <ul style="list-style-type: none"> ○ Schematic Design drawings in plan and cross section of a recommended design for the pedestrian tunnel; ○ Schematic Design drawings showing how
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	<p>this tunnel would integrate into the Downtown East Station concourse;</p> <ul style="list-style-type: none"> ○ Order of magnitude cost estimate; and ○ Preparation for discussions on constructability, schedule and other impacts. <p>For greater certainty, the Proponent shall not include provision for such potential connection in its Financial Submission;</p> <ul style="list-style-type: none"> ● Accessibility Analysis <ul style="list-style-type: none"> ○ Provide a description of the proposed design complies with CSA B651-04, Ontario Building Code, City of Ottawa Accessibility Design Guidelines, AODA requirements and Good Industry Practice. ● Net and Gross Floor Area Summary <ul style="list-style-type: none"> ○ Provide a final floor area summary chart listing individual space requirements identified in the Output Specifications and Proponent-proposed measured areas by element and individual space including final building gross areas on a floor by floor basis and total building gross area. ● Provide a preliminary Code analysis for each Station, identifying the following: <ul style="list-style-type: none"> ○ Required occupancy separation and rating; ○ Platform sizing calculations demonstrating the sizing provided in the design satisfies code and level of service minimums; and ○ Calculations, drawings, or modeling supporting the design of the circulation elements satisfy the code minimum egress capacities and evacuation times. ● Provide a micro-climate study for each Station
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	<p>including but not limited to the following:</p> <ul style="list-style-type: none"> ○ Diagram indicating the orientation of the Station on the site; ○ Diagram of each Station indicating the prevailing winds in summer and fall; ○ Diagram of the sunlight penetration into the Station; and ○ Drawings of each Station demonstrating how mitigation measures protect passengers and provide a level of comfort with respect to but not limited to the following: <ul style="list-style-type: none"> ● Protection of passengers from the prevailing winds in the winter; ● Protection of passenger from rain and snow; and ● Protection of passengers from direct sunlight in summer and how sunlight adds to comfort in the winter. ● Provide general narrative describing how the Proponent intends to utilize the City provided ash wood including but not limited to the following: <ul style="list-style-type: none"> ○ Where the Proponent intends on utilizing the material on the Project; ○ Quantify the minimum amount of material required Project wide; and ○ Provide an estimate of the total amount of material required. <p>Architectural Drawings and Renderings</p> <ul style="list-style-type: none"> ● Context Plan scale: 1:1000; ● Site Plan scale - 1:400;
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	<ul style="list-style-type: none"> • Reflected Ceiling Plans – scale 1:200 of all station levels; • Floor plans - scale 1:200, showing all rooms/areas numbered. List additional rooms not previously identified. Include the following: <ul style="list-style-type: none"> ○ All existing and new walls and partitions; ○ Doors, windows, sidelights; ○ Structural grid lines and references cross-referenced on all drawings; ○ All station and room furniture, and equipment; ○ Location of all systems to ensure integration, avoidance of conflict, functionality and net area requirements; and ○ Entrance connection(s) to existing buildings and strategies for the protection of connections to future buildings. ○ Floor plans and building sections of each entrance integrated into a Third Party Facility indicating all permanent and temporary easements required to construct the entrance within the Third Party Facility- scale 1:200. <p>Architectural Detailed Drawings</p> <ul style="list-style-type: none"> • 1:100 and 1:50 scale floor plans including roof plan(s), interior elevations and reflected ceiling plans indicating development of design intent and showing resolution of material and finish use, floor treatments, furnishings/millwork, special features such as, ornamental, iconographic and/or commemorative features, stairs, escalator, and elevators, lighting and all other security, electrical and mechanical items. Demonstrate details including allowance for protection of platform edge doors in underground stations.
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	<ul style="list-style-type: none"> • Plans detailing Station platform width and slope. • Exterior Building Elevations – scale 1:200: <ul style="list-style-type: none"> ○ All building elevations including all hidden or partial elevations with a legend describing the extent of all glazing and cladding materials; and ○ Elevations to be fully rendered, in colour. • Building Sections – scale 1:200 through entire building. • Exterior Wall Assembly Details – scale 1:50, representative wall sections and plan details through principal elements to describe the Project. • Building Perspectives – minimum of 3 exterior perspectives per station in full colour describing the developed exterior with context: <ul style="list-style-type: none"> ○ Exterior perspective view at eye level showing at main entrance to station; ○ Exterior perspective view from bird eye level showing the total extent of the station; and ○ Exterior perspective view showing total extent of the station from street. • Building Perspectives – minimum of 3 interior perspectives per station in full colour; <ul style="list-style-type: none"> ○ Interior perspective view taken at eye level of the station platform level; ○ Interior perspective view taken at eye level of the station concourse level; and ○ Interior perspective of the main entrance interior. <p>Structural Design</p> <ul style="list-style-type: none"> • Written Narrative
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	<ul style="list-style-type: none"> ○ Provide a written narrative of the proposed structural system. Demonstrate how each component will comply with the structural requirements in the Output Specifications. Include design criteria and references to the applicable standards. ○ Provide a structural design brief, including outline specifications and drawings or sketches as appropriate. Describe the main structural elements in a preliminary manner, including but not limited to the following: <ul style="list-style-type: none"> ● Foundations, floor, roof and structural framing systems, including materials and spans; ● Lateral load resisting system; ● Design dead and live loads for all areas; ● Design or specification measures to meet serviceability criteria; and ● Column spacing and layout. ○ For stations which will be modified and retained, provide a written narrative describing the structural adequacy of the existing structure. Verify that the existing structure meets current OBC requirements, and describe the strengthening measures proposed. ○ Provide a written narrative of the lateral load resisting system, and its capability to resist live loads and seismic loads. ● Structural drawings including: <ul style="list-style-type: none"> ○ Structural framing and foundation and details as required to sufficiently describe the intended systems and integration with the architectural and other systems at an appropriate scale to communicate the
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	<p>design intent.</p> <p>Mechanical Design</p> <ul style="list-style-type: none"> • Written Narrative <ul style="list-style-type: none"> ○ Provide a written narrative for the mechanical systems demonstrating how they will meet the requirements as set out in the Output Specifications; ○ Provide BAS description and description of sensor layout; ○ General design approach to mechanical systems including HVAC, plumbing and drainage systems, equipment selection, etc. with specific references to the Output Specifications requirements; and ○ Provide drawings and diagrams that fully illustrate how the mechanical systems, including HVAC, fire protection, plumbing and drainage will meet the requirements as set out in the Output Specifications. • Mechanical drawings, diagrams, and schematics: <ul style="list-style-type: none"> ○ Provide air handling unit drawings illustrating smoke ventilation systems where applicable; ○ System schematics for all major systems including, but not limited to: <ul style="list-style-type: none"> • Incoming water and fire protection systems; • Plumbing distribution systems; • Air handling and air distribution systems; controls, storm drainage systems; and • Zoning diagrams showing zoning for standpipe systems, sprinkler systems and air distribution systems.
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	<p>Electrical Design</p> <ul style="list-style-type: none"> • Written Narrative <ul style="list-style-type: none"> ○ Provide a written narrative and design summary for the electrical systems demonstrating how they will meet the requirements set out in the Output Specifications; ○ General design approach to electrical systems including redundancy and emergency power, equipment selection, etc. with specific references to the Output Specification requirements; and ○ General design approach to provision of CCTV, PA, advertising, signage, fare collection, PIDS, pumps etc. • Electrical drawings, schematics, product cuts and diagrams: <ul style="list-style-type: none"> ○ Provide drawings and diagrams that illustrate how the electrical systems, including power, lighting, life safety and emergency services will meet the requirements as set out in the Output Specifications. ○ Single line diagrams; ○ Single line diagram, preliminary sizing of equipment and feeders to provide a clear understanding of the electrical distribution, emergency and critical power systems along with the expected station electrical demand load calculations; and ○ Fire life safety system block diagram including description of functionality and operation.
<p>5.6 MSF Design (30 pages)</p>	<p>The Proponent shall address the MSF design at an appropriate level of detail, as set out in or otherwise referenced in Project Agreement Schedule 15-2, and is to</p>

	<p>include the following:</p> <p>Design Approach:</p> <ul style="list-style-type: none"> • Through narrative and design drawings, address the design concept proposed for the MSF, its interface with the main line, and the functional flow of the site and its industrial processes; • Site plans for the ultimate build out of the facility, showing its full capacity and how the design and construction of the facility may be phased to accommodate this expansion and the meet the requirements of Article 2 of Part 1 of Project Agreement Schedule 15-2 – Operational Performance Requirements; • A description and narrative, along with schematic drawings, showing the location and facilities within the MSF where train consists will be transferred between Project Co and Drivers and how the facility design will optimize the handover process; and • A proposed LEED® check-list and a narrative of the Proponent’s intended approach to ensure the MSF Administration Building is LEED® Certified or better. <p>General Architectural Description</p> <ul style="list-style-type: none"> • General architectural design description of all buildings within the MSF, including reference to the following: <ul style="list-style-type: none"> ○ Description of the overall facility design, functional and technical requirements; and ○ Design drawing indicating all spaces with the MSF that will be occupied by City Staff and the functional relationships. • Materials and Finishes <ul style="list-style-type: none"> ○ Design description of building image, including selection and use of materials/finishes in the building elevations;
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	<ul style="list-style-type: none"> • Life Cycle Analysis <ul style="list-style-type: none"> ○ A written narrative describing life cycle approach to all building components, systems and major pieces of equipment including but not limited to: <ul style="list-style-type: none"> • Building envelope and exterior finishes; • Interior finishes; • Mechanical & electrical equipment; and • Industrial equipment. • Code Analysis <ul style="list-style-type: none"> ○ Provide Life Safety code analysis. • Environmental Considerations <ul style="list-style-type: none"> ○ A written narrative describing the noise and vibration and light trespass mitigation techniques that are proposed for the MSF in relation to the surrounding neighbourhoods. Noise impacts to be considered include vehicle movements. • Net and Gross Floor Area Summary <ul style="list-style-type: none"> ○ Provide a final floor area summary chart indicating individual space requirements identified in the Output Specifications and the Proponent-proposed measured areas by element and individual space including final building gross areas on a floor by floor basis and total building gross area. • Architectural drawings including <ul style="list-style-type: none"> ○ Context Plan scale: 1:1000; ○ Site Plan scale - 1:400; ○ Floor plans - scale 1:100, showing all
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	<p>rooms/areas numbered.</p> <ul style="list-style-type: none"> • MSF Detailed Drawings <ul style="list-style-type: none"> ○ Exterior Building Elevations – scale 1:100, including the extent of all glazing and cladding materials. ○ Elevations to be fully rendered, in colour. ○ Building Sections – scale 1:100 through entire building indicating relative location of grade. Building Sections – at 1:50 scale. Building sections to be taken through the main shop space, and any other special conditions, particularly pit areas. ○ Building Perspectives – 4 exterior perspectives in full colour describing the developed exterior with context: <ul style="list-style-type: none"> • Exterior perspective view at eye level taken from Belfast Road (looking west); • Exterior perspective view at eye level taken from Belfast Road (looking east); • Exterior perspective view taken from the approximate upper floor elevation of the residential properties to the north of the site (looking south); and • Exterior perspective aerial view taken from the Belfast Road overpass of the VIA right of way (looking towards the east). <p>Structural Design</p> <ul style="list-style-type: none"> • Written Narrative <ul style="list-style-type: none"> ○ A written narrative of the proposed structural framing system including foundation design.
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	<p>Mechanical Design</p> <ul style="list-style-type: none"> • Written Narrative <ul style="list-style-type: none"> ○ General design approach to mechanical systems including HVAC, plumbing and drainage systems, equipment selection, etc.; ○ Main mechanical equipment schedules. <p>Electrical Design</p> <ul style="list-style-type: none"> • Written Narrative <ul style="list-style-type: none"> ○ General design approach to electrical systems including redundancy and emergency power (particularly as it applies to the YCC and BCC), and equipment selection; ○ General design approach to provision of CCTV, PA, data/communications systems, etc; and ○ Proposed tie-in to OC Transpo TSCC at 875 Belfast Road. • Electrical drawings including: <ul style="list-style-type: none"> ○ Single line diagram, preliminary sizing of equipment and feeders to provide a clear understanding of the electrical distribution, emergency and critical power systems along with the expected electrical demand load calculations; and ○ Emergency backup generator(s) detail, location and capacity. <p>Shop Equipment</p> <ul style="list-style-type: none"> ○ Proponent to submit proposed shop equipment list for the MSF Facility. <p>Security & Communications</p> <ul style="list-style-type: none"> ○ Proponent to provide drawings and
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	<p>narrative to show proposed perimeter security system, proposed access points and any other security systems planned for the facility.</p>
<p>5.7 Consultation Plan (15 pages)</p>	<p>The Proponent shall prepare a preliminary consultation plan that reflects obligations outlined in Schedule 17 of the Project Agreement. The Consultation Plan shall outline a strategy for supporting the City during the detailed design, construction and maintenance stages of the project.</p> <p>The Consultation Plan shall, as a minimum, include the following elements:</p> <ul style="list-style-type: none"> • An understanding of essential issues, and the ability to conceive of and implement effective and coordinated approaches; • Principles to guide all consultation activities; • Types and number of consultation meetings planned to be held. • Key issues, challenges, opportunities and approach to consultation for each of the identified consultation groups: <ul style="list-style-type: none"> ○ the City; ○ NCC; ○ the public; ○ affected businesses and properties; and ○ other Relevant Authorities. <p>The Proponent shall describe, with specific references to past experiences, how the Proponent intends to, at a minimum:</p> <ul style="list-style-type: none"> • Support the City in its design and implementation of a comprehensive approach to public and stakeholder engagement; • Provide information for use in public materials that

	<p>can help inform people to most effectively participate in an involved and meaningful way; and</p> <ul style="list-style-type: none"> • Use consultation in support of complaints management and dispute resolution. <p>In addition the Proponent shall describe how the experiences, skills and competencies of proposed project personnel would best be used to implement the Consultation Plan.</p>
<p>5.8 Output Specifications Assumptions and Variance Analysis (no page limit)</p>	<p>5.8.1 Self Reporting Output Specifications Checklist</p> <p>Complete the “Self Reporting Output Specifications Checklist” posted to the Data Room as these documents relate to the Technical and Design Submissions. Subject to Section 5.0, state and describe any:</p> <ul style="list-style-type: none"> • assumptions made by the Proponent either: (i) to assist the Proponent in its interpretation of; or (ii) as a result of the Proponent’s independent interpretation of, the Output Specifications, and which, in the opinion of the Proponent, are not explicitly stated in the Output Specifications provided by the Sponsors (“Assumptions”); and • departures from or alternate solutions or approaches to the Output Specifications (“Variations”) along with a rationale for any proposed Variations. <p>5.8.2 Conditions of submitting the Self Reporting Output Specifications Checklist</p> <p>Submission of the Self Reporting Output Specifications Checklist is solely for the purposes of evaluation of the Proponent’s Design Submission and shall constitute neither an amendment of the Output Specifications nor the Sponsors’ acceptance of any proposed Assumptions or Variations. For clarity:</p> <ul style="list-style-type: none"> • selection of the Preferred Proponent shall not constitute acceptance of that the Proponent’s proposed Assumptions or Variations, which stated Assumptions or proposed Variations may be agreed to or accepted at the Sponsors’ sole

	<p>discretion;</p> <ul style="list-style-type: none"> • notwithstanding the submission of a proposed Self Reporting Output Specifications Checklist and except as the consequence of any Innovation accepted by the Sponsors, it is the sole responsibility of the Proponent and, after Financial Close, the Proponent, to meet the Output Specifications at no additional cost to the Sponsors; • submission of a Self Reporting Output Specifications Checklist shall not in itself constitute a material deviation from the requirements of the RFP, however, the Proponents are cautioned that, depending on the nature or extent of stated Assumptions or proposed Variances, such Assumptions or Variances may be determined to be a material deviation from the requirements of the RFP; • The Proponent may submit an Innovation Submission if the Proponent wishes the Sponsors to consider acceptance of any changes to the Output Specifications; • submission of a Self Reporting Output Specifications Checklist that neither states any Assumptions nor proposes any Variances will be interpreted by the Sponsors as a statement by the Proponent that its Design Submission complies with all aspects of the Output Specifications, as such Output Specifications are interpreted by the Sponsors in their sole discretion; and • submission of a Self Reporting Output Specifications Checklist, including any of the stated Assumptions or proposed Variances therein, shall at all times comply with Applicable Law and be in accordance with and subject to the terms of the Project Agreement (excluding the Output Specifications).
CONSTRUCTION SUBMISSION	
<p>6.0 Construction Submission (110 pages, see breakdown below. Excludes drawings,</p>	<p>The Proponent shall describe how the construction activities will be carried out in a safe, effective manner while demonstrating that the Proponent has the capability</p>

<p>if applicable)</p>	<p>to achieve its proposals in a reasonable and realistic manner, having regard to the requirements of the Project Agreement.</p> <p>The following Plans shall be provided:</p> <p>6.1 Construction Management Plan</p> <p>6.2 Traffic and Transit Management Plan</p> <p>6.3 Communication Plan</p>
<p>6.1 Construction Management Plan (20 pages)</p>	<p>The Proponent shall address the construction management design at an appropriate level of detail, as set out in or otherwise referenced in Schedule 15-2 of the Project Agreement, and is to include a Construction Management Plan specific to the Project which shall describe the construction team's approach and methodology, including its approach to scheduling, materials management, procurement, resource management (labour and equipment), subcontractor management, coordination, reporting and internal governance and integration of design and construction activities.</p> <p>At a minimum, the following items will be addressed (The Proponent shall include staging drawings to effectively illustrate proposed methodology):</p> <ul style="list-style-type: none"> • Key issues and constraints affecting construction and strategies to manage those issues; • Construction sequencing and strategy, including: <ul style="list-style-type: none"> ○ Issues related to restrictions on hours of work, closures and other constraints; ○ Issues and proposed methodology associated with hauling; and ○ Placement or disposal of excavated and excess materials. • Temporary works and detours; • Access issues for construction;

	<ul style="list-style-type: none"> • Traffic and Transit management for the Design and Construction Phase; • Permanent and temporary utility works; • Federal, Provincial and Municipal road coordination; • Coordination with Transit authorities; • Work in and around water crossings and roadways; • Work and interface with government agencies and other third parties; • Environmental management during construction; and • Operations and maintenance activities during construction.
<p>6.2 Traffic and Transit Management Plan (75 pages)</p>	<p>The Proponent shall provide a preliminary Traffic and Transit Management Strategy and a Traffic and Transit Management Plan (coordinated with the City Traffic Demand Management plan) that describes the Proponent's approach to managing general, transit, and construction vehicle traffic during construction, its ability to meet the requirements of Schedule 15-2 of the Project Agreement, its approach to the integration of Highway Works Traffic Management with the OLRT Traffic and Transit Management, and its approach to coordinating with the City, OC Transpo, and other Stakeholders.</p> <p>The Proponent shall describe traffic control provisions, specific to the project, which shall demonstrate an understanding of relevant traffic standards and the Proponent obligations.</p> <p>The preliminary Traffic and Transit Management Plan shall include, but not be limited to:</p> <ul style="list-style-type: none"> • The Proponent's demonstration of a clear understanding of the key considerations, principles and requirements for preparing design drawings for detour routes, diversions and closures, sign locations and details, PVMS, pavement markings, barriers, and protective works;

	<ul style="list-style-type: none"> • A monitoring plan including integration with the existing City traffic monitoring system; • Communication plan in support of the City and OC Transpo on traffic management during construction period to minimize traffic disruption and provide for timely information to travelling public and Stakeholders, including areas and elements that will require consultations with Stakeholders; • The Proponent's approach to minimizing delays to OC Transpo bus operations, increases to OC Transpo costs, and inconvenience to OC Transpo patrons caused by the construction of the project; • The Proponent's approach to the duration of the closure of the existing BRT system; • The proponent shall provide a preliminary traffic and pedestrian study narrative and drawings that articulate the traffic flow and staging around the entrances and exits to Rideau Station. The study and drawings shall indicate all clearances to adjacent amenities for both the temporary conditions during construction and the final permanent configuration • The Proponent shall provide an organizational chart and narrative that fully describes the roles, responsibilities, qualifications and experience of each member of the staff dedicated to Traffic and Transit Management; and • The Proponents approach to the following subplans, as outlined in Schedule 15-2 of the Project Agreement: <ul style="list-style-type: none"> ○ Traffic Control Plan; ○ Emergency Traffic Plan; ○ Incident Management Plan; ○ Implementation Plan; ○ Transit Management Plan;
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	<ul style="list-style-type: none"> ○ Advisory Temporary Signing Plan; ○ Risk Assessment Plan; and ○ Traffic and Transit Management Communications Plan.
<p>6.3 Communication Plan (15 pages)</p>	<p>The Proponent will be expected to collaborate with the City to develop and implement a comprehensive communications and stakeholder plan, as well as a crisis communications plan. The plans will provide both parties with a coordinated and streamlined approach to the management of communications, issues management and media and stakeholder relations, as they relate to the development and operations of the Project.</p> <ul style="list-style-type: none"> ● As part of the technical submission, the Proponent shall provide an overview of its approaches and innovative tools, to effectively plan and manage ongoing: <ul style="list-style-type: none"> ○ Stakeholder relations; ○ Community relations; ○ Media relations; ○ Issues management; ○ Crisis communications; ○ Complaints management; and ○ Government relations. ● The overview shall reflect the requirements of Project Agreement Schedule 17 – Environmental Obligations and Schedule 18 – Communications Protocol, including but not limited to the following: <ul style="list-style-type: none"> ○ An outline of the Proponent’s communications/stakeholders strategies for supporting the City during the detailed design, construction and operation/maintenance phases of the Project;

	<ul style="list-style-type: none"> ○ A description of the Proponent's plans for managing the timing and flow of information between the Proponent and the City regarding construction milestones/timing, community/stakeholder issues and information requests, new and emerging issues, general communications, and media relations issues/activities; ○ A description of how the Proponent intends to integrate its communications and consultation activities; and ○ An organizational chart and narrative that fully describes the roles, responsibilities, qualifications and experience of each member of the staff dedicated to communication.
MAINTENANCE AND REHABILITATION SUBMISSION	
7.0 Maintenance and Rehabilitation Plan (125 pages, excluding the Lifecycle Replacement / Refurbishment Schedule)	<p>Technical Compliance with Appendix A to Schedule 15-3 of the Project Agreement</p> <p>The Proponent is to provide a written narrative for its approach to the requirements regarding the Maintenance Services that describes the process of planning for, managing, implementing and achieving the obligations set out in Schedule 15-3 of the Project Agreement.</p> <p>While not limited by the following items, the narrative shall:</p> <ul style="list-style-type: none"> ● Demonstrate how design and detailing of the guideway, MSF and station will minimize the need for future M&R; ● Demonstrate how the Infrastructure will be maintained with minimal impact on Project operations throughout the life of the Project; ● Demonstrate how means and methods used for the construction of the System will minimize the need for future maintenance and rehabilitation and how the construction quality plan will ensure this is accomplished;

	<ul style="list-style-type: none"> • Include details of the organizations and service providers including roles and responsibilities of the key personnel involved; • Describe processes for data management during the Maintenance Term in order to ensure ongoing coordination and communication with the City and stakeholders; • Describe approach to mobilization and implementation of the Maintenance Services for the System. This shall include details of the Proponent's processes for safety, quality and environmental compliance, communications strategy, training and addressing identified issues; • Describe approach to traffic and transit management for the various maintenance activities during the Maintenance Term including strategies to limit the impact to the traveling public (operations, safety, etc) and minimize circumstances where operations of the System and adjacent facilities are impeded; specific traffic management approaches for key Maintenance Services; strategies for working around closures of track sections, stations, adjacent or crossing roadways, and other facilities; approach for preparing operational strategies, passenger information, signage, and other mitigation strategies, and the associated communication and coordination protocols with the City for timely distribution to the public; and • Include a detailed description of the Maintenance Management System defining the OLRT System elements data collection, records and reporting during the Maintenance Term. <p>Include preliminary Maintenance and Rehabilitation Plan which:</p> <ul style="list-style-type: none"> • Defines the scope, activities and processes associated with custodial, preventive and corrective maintenance to be used to achieve the performance requirements contained within Schedule 15-3 of the Project Agreement, and Appendix A in particular. This shall include full details of the Proponent's approach to maintenance planning, implementation,
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	<p>reporting requirements and quality management reporting and responsibilities to ensure compliance with the relevant requirements of the Project Agreement. The plans shall also address methods and processes to limit the impact on the travelling public and minimizing circumstances during which the Service Availability Standard or the Quality Availability Standard is not met;</p> <ul style="list-style-type: none"> • Outlines the Helpdesk services defining the scope, activities, and processes associated with the requirements of the performance criteria and obligations contained in Schedule 15-3, including management of non-compliances, events, remedial action taken, and response times for action taken; • Details the approach to Maintenance coordination and interface with Operations of the System, including activities and processes with Revenue Service Vehicle availability, Track availability, Station availability, and Operations Centre / Systems availability; • Demonstrates, within the Maintenance and Rehabilitation Plan submissions, the correlation between the maintenance and rehabilitation activities and other Project Agreement requirements, such as quality management, environmental management, design requirements, transit / traffic management, and the Payment Mechanism procedures. <p>Technical Compliance with Appendix B to Schedule 15-3 of the Project Agreement</p> <p>The Proponent is to provide a written narrative for its approach to the asset management and preservation requirements that describes the process of planning for, managing, implementing and achieving the design life or life cycle requirements set out in Schedule 15-3 of the Project Agreement.</p> <p>While not limited to the following items, the narrative shall:</p> <ul style="list-style-type: none"> • Define the scope, activities and processes associated with capital asset renewal to be used to achieve the performance requirements contained within
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	<p>Appendix B of Schedule 15-3 of the Project Agreement. The narrative should be accompanied by a preliminary Asset Management Plan and shall include full details of the Proponent's approach to planning, data collection, evaluation of assets and their performance, rehabilitation planning and anticipated activities, including a 5 year look ahead, implementation of rehabilitation and asset preservation activities, reporting requirements and quality management reporting and responsibilities to ensure compliance with the relevant requirements of the Project Agreement;</p> <ul style="list-style-type: none"> • Describe the approach to Major Maintenance Shutdown Periods including the scope, activities and processes associated with Maintenance Services requiring the Major Maintenance Shutdown Periods; and • Describe the approach to ensuring compliance with all regulatory testing and inspections, including the management of records and reporting as indicated in the Project Agreement and for compliance with the SMS and SeMS. <p>Technical Compliance with Appendix C to Schedule 15-3 and Schedule 24 of the Project Agreement</p> <p>The Proponent is to provide a written narrative for its approach to the Handover Maintenance requirements that describes the process of planning for, managing, implementing and achieving the Remaining Service Life or life cycle or Expiry Date requirements set out in Appendix C of Schedule 15-3 and Schedule 24 of the Project Agreement.</p> <p>While not limited to the following items, the narrative shall:</p> <ul style="list-style-type: none"> • Include a preliminary plan defining the scope, and processes associated with handover maintenance to be used to achieve the performance requirements contained within Appendix C of Schedule 15-3 of the Project Agreement. This shall include full details of the Proponent's approach to responsibilities regarding data submission and reporting, implementation, reporting requirements and ensuring
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	<p>compliance, quality management reporting. It shall also define and describe processes in order to achieve requirements contained in Schedule 24 of the Project Agreement.</p> <p>Unit Rates for Maintenance Change Instruction</p> <p>Provide unit rates for all labour materials and equipment for the following services:</p> <table data-bbox="652 577 1395 903"> <tr> <td>Power Cut</td> <td>(cost/daily shift)</td> </tr> <tr> <td>Flag Person</td> <td>(rate/hour)</td> </tr> <tr> <td>Flag Car</td> <td>(rate/hour)</td> </tr> <tr> <td>Flag Car with beam crane</td> <td>(rate/hour)</td> </tr> <tr> <td>Diesel Locomotive</td> <td>(rate/hour)</td> </tr> </table> <p>Unit rates shall start with a base rate in year 1 and escalated to year 30 of the concession period. Unit rates shall be provided for in a table with each year having its own column.</p> <p>Lifecycle Replacement/Refurbishment Schedule</p> <p>The Proponent shall provide a Lifecycle Replacement/Refurbishment Schedule which clearly identifies the asset life, strategy and replacement schedule for the elements of the Fixed Facilities, Fixed Equipment, Vehicles, and Vehicle Equipment which will require replacement, refreshment, and/or refurbishment, during the Maintenance Term.</p> <p>The Lifecycle Replacement/Refurbishment Schedule must be consistent with the schedule of Lifecycle Payments submitted by the Proponent pursuant to Part E, Section 2.28 of RFP Schedule 3(2). The Sponsors will compare the Lifecycle Replacement/Refurbishment Schedule with the Proponent's scheduled Lifecycle Payments and, in the event of material inconsistency between the two, reserve the right to assign the Proponent's Maintenance and Rehabilitation Submission a lower score.</p>	Power Cut	(cost/daily shift)	Flag Person	(rate/hour)	Flag Car	(rate/hour)	Flag Car with beam crane	(rate/hour)	Diesel Locomotive	(rate/hour)
Power Cut	(cost/daily shift)										
Flag Person	(rate/hour)										
Flag Car	(rate/hour)										
Flag Car with beam crane	(rate/hour)										
Diesel Locomotive	(rate/hour)										
ENERGY SUBMISSION											

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Ottawa Light Rail Transit Project

<p>8.0 Energy Submission (10 pages, excluding Target Letter, see breakdown below)</p>	<p>The following Plans shall be provided as further outlined below:</p> <p>8.1 Energy Efficiency – Maintenance and Storage Facility</p> <p>8.2 Energy Efficiency – Traction Power</p>
<p>8.1 Energy Efficiency – Maintenance and Storage Facility (5 pages, excluding Energy Target Letter)</p>	<p>Provide a draft of the Energy Target Letter as required by the Project Agreement, stating the Aggregate Energy Target and Discrete Energy Target for the Maintenance and Storage Facility. The Energy Utilities consumed due to Traction Power will be excluded from the gainshare/painshare calculation in Part 1 of Project Agreement Schedule 8 – Energy Matters. For certainty, the Preferred Proponent shall deliver an updated Energy Target Letter and supporting Aggregate Energy Model at Commercial Close reflecting development of the design of the Maintenance and Storage Facility as at Commercial Close, and which such Energy Target Letter shall take into account all of the requirements set forth in this Section 8.1.</p> <ul style="list-style-type: none"> • The Aggregate Energy Target shall include and account for all requirements of the Output Specifications. In addition to standard HVAC and lighting loads predicted by the energy modeling software, any systems that are installed by the Project Co as part of the Works and that will be required to be maintained by Project Co as part of the Project Co Services are considered base building loads and must be included in the Aggregate Energy Target. Such loads shall include, without limitation, each of the following: <ul style="list-style-type: none"> ○ Vertical transportation; ○ Domestic water booster pumps, sump pumps, domestic hot water recirculation pumps, irrigation system pumps, fire protection pumps etc., as required; ○ Exterior lighting; ○ Security Systems; ○ Any Built-in audio-visual systems

	<p>provided by Project Co;</p> <ul style="list-style-type: none"> ○ Building Automation Systems; ○ IT Server room cooling and ventilation; and ○ Heat tracing. <ul style="list-style-type: none"> ● Proponents shall also provide the Energy Model Summary Report with their Submissions. The Energy Model Summary Report summarises the results of: (a) the Forecast Energy Model; (b) the Reference Building Energy Model; and (c) the Aggregate Energy Model. ● Proponents shall provide a narrative explaining the variance between the Aggregate Energy Target provided in the draft Energy Target Letter and the Forecast Energy Model. ● Proponents shall provide a narrative indicating primary energy features included in the Proponent's Forecast Energy Model and Aggregate Energy Model and illustrating the energy saving measures incorporated into the Proponent's design. Proponents shall also provide a written statement of how Project Co will operate the Maintenance and Storage Facility to ensure the energy saving measures in the Proponent's design realise their full potential. ● Submissions made pursuant to this Section 8.1 – Energy Efficiency – Maintenance Storage Facility shall not include items submitted as Innovations. ● A separate draft Energy Target Letter(s) and Energy Model Summary Report shall be submitted with Innovation Submissions, if related to Energy Matters – Maintenance Storage Facility.
<p>8.2 Energy Efficiency – Traction Power (5 pages, excluding Energy Target Letter)</p>	<p>Provide a draft of the Energy Target Letter Traction Power as required by the Project Agreement, stating the Aggregate Energy Target Traction Power and for the Traction Power System. For certainty, the Preferred Proponent shall deliver an updated Energy Target Letter Traction Power and supporting Aggregate Energy Model Traction Power at Commercial Close reflecting</p>

	<p>development of the design of the Traction Power System at Commercial Close, and which such Energy Target Letter Traction Power shall take into account all of the requirements set forth in this Section 8.0.</p> <ul style="list-style-type: none"> • The Aggregate Energy Target Traction Power shall include and account for all requirements of the Output Specifications. In addition to Traction Power loads predicted by the energy modeling software, any systems that are installed by Project Co as part of the Works and that will be required to be maintained by Project Co as part of the Project Co Services and are fed by the Traction Power electrical service are considered base loads and must be included in the Aggregate Energy Target Traction Power. • Proponents shall also provide the Energy Model Summary Report Traction Power with their Submissions. The Energy Model Summary Report Traction Power summarises the results of the Aggregate Energy Model Traction Power. • Proponents shall provide a narrative explaining the variance between the Aggregate Energy Target Traction Power provided in the draft Energy Target Letter Traction Power and the Forecast Energy Model Traction Power. • Proponents shall provide a narrative indicating primary energy features included in the Proponent's Forecast Energy Model Traction Power and Aggregate Energy Model Traction Power and illustrating the energy saving measures incorporated into the Proponent's design. Proponents shall also provide a written statement of how Project Co will operate the Traction Power System to ensure the energy saving measures in the Proponent's design realise their full potential. • Submissions made pursuant to this Section 8.2 – Energy Efficiency – Traction Power shall not include items submitted as Innovations. • A separate draft Energy Target Letter Traction Power and Energy Model Summary Report Traction Power shall be submitted with Innovation Submissions if
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	related to Energy Efficiency Traction Power.
MOBILITY SUBMISSION	
9.0 Mobility Submission (10 pages, excluding TTMP and Lane Closure Target Letter, see breakdown below)	<p>The following Plans shall be provided as further outlined below:</p> <p>9.1 Mobility – Bus Rapid Transit</p> <p>9.2 Mobility – Lane Closures</p>
9.1 Mobility – Bus Rapid Transit (5 pages, excluding TTMP and Lane Closure Target Letter)	<p>Provide a draft of the BRT Lane Closure Target Letter as required by the Project Agreement, stating the Aggregate BRT Lane Target Closure for the BRT system. For certainty, the Preferred Proponent shall deliver an updated BRT Lane Closure Target Letter and supporting Aggregate BRT Lane Target Closure at Commercial Close reflecting development of the design of the BRT Lane Closures at Commercial Close, and which such BRT Lane Closure Target Letter shall take in to account all of the requirements set forth in this Section 9.1</p> <ul style="list-style-type: none"> • The Aggregate BRT Lane Target Closures include and account for all requirements of the Output Specifications. In addition to BRT Lane Closures predicted by the TTMP, any BRT closures required by Project Co are considered BRT Lane Closures and must be included in the Aggregate BRT Lane Target Closures. • Proponents shall also provide the TTMP with their Submissions. The TTMP shall support the Aggregate BRT Lane Target Closure. • Proponents shall provide a narrative explaining the variance between the Aggregate BRT Lane Target Closure provided in the draft BRT Lane Closure Target Letter and the TTMP. • Proponents shall provide a narrative indicating primary features included in the Proponent's TTMP and Aggregate BRT Lane Target Closure and illustrate the measures incorporated into the Proponent's approach. Proponents shall also provide a written statement of how Project Co will manage construction to ensure the measures in the

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	<p>Proponent's design realise their full potential.</p> <ul style="list-style-type: none"> • Submissions made pursuant to this Section 9.1 Mobility – Bus Rapid Transit shall not include items submitted as Innovations. • A separate draft BRT Lane Closure Target Letter and TTMP shall be submitted with Innovation Submissions if related to BRT Lane Closures.
<p>9.2 Mobility – Lane Closures (5 pages, excluding TTMP and Lane Closure Target Letter)</p>	<p>Provide a draft of the Lane Closure Target Letter as required by the Project Agreement, stating the Aggregate Lane Target Closure for the city streets. For certainty, the Preferred Proponent shall deliver an updated Lane Closure Target Letter and supporting Aggregate Lane Target Closure at Commercial Close reflecting development of the design of the Lane Closures at Commercial Close, and which such Lane Closure Target Letter shall take in to account all of the requirements set forth in this Section 9.2</p> <ul style="list-style-type: none"> • The Aggregate Lane Target Closures include and account for all requirements of the Output Specifications. In addition to Lane Closures predicted by the TTMP, any lane closures required by Project Co are considered Lane Closures and must be included in the Aggregate Lane Target Closures. • Proponents shall also provide the TTMP with their Submissions. The TTMP shall support the Aggregate Lane Target Closure. • Proponents shall provide a narrative explaining the variance between the Aggregate Lane Target Closure provided in the draft Lane Closure Target Letter and the TTMP. • Proponents shall provide a narrative indicating primary features included in the Proponent's TTMP and Aggregate Lane Target Closure and illustrate the measures incorporated into the Proponent's approach. Proponents shall also provide a written statement of how Project Co will manage construction to ensure the measures in the Proponent's design realise their full potential. • Submissions made pursuant to this Section 9.2

	<p>Mobility – Lane Closures shall not include items submitted as Innovations.</p> <ul style="list-style-type: none"> • A separate draft Lane Closure Target Letter and TTMP shall be submitted with Innovation Submissions if related to Lane Closures.
OPERATIONS MATTERS SUBMISSION	
<p>10.0 Operations Matters (10 pages, excluding Annual Driver Hours Target Letter and Operational Performance Simulation)</p>	<p>Provide a draft of Annual Driver Hours Target Letter as required by the Project Agreement, stating the Aggregate Annual Driver Hours Target. For certainty, the Preferred Proponent shall deliver an updated Annual Driver Hours Target Letter and supporting Aggregate Annual Driver Hours Target at Commercial Close reflecting development of the Operational Performance Simulation at Commercial Close, and which such Annual Driver Hours Letter shall take in to account all of the requirements set forth in this Section 9.3 Operations Matters.</p> <p>The Aggregate Annual Driver Hours Target shall include and account for all requirements of the Output Specifications. In addition to Annual Driver Hours predicted by the OPS, any Annual Driver Hours required by Project Co must be included in the Aggregate Annual Driver Hours Target.</p> <p>Proponents shall also provide the OPS with their Submissions. The OPS shall support the Aggregate Annual Driver Hours Target.</p> <p>Proponents shall provide a narrative explaining the variance between the Aggregate Annual Driver Hours Target provided in the draft Annual Driver Hours Target Letter and the OPS.</p> <p>Proponents shall provide a narrative indicating primary features included in the Proponent’s OPS and Aggregate Annual Driver Hours Target and illustrate the measures incorporated into the Proponent’s approach. Proponents shall also provide a written statement of how Project Co will manage their obligations to ensure the measures in the Proponent’s design realise their full potential.</p> <p>Submissions made pursuant to this Section 9.3</p>

	<p>Operations Matters shall not include items submitted as Innovations.</p> <p>A separate draft Annual Driver Hours Target Letter and OPS shall be submitted with Innovation Submissions if related to Annual Driver Hours.</p>
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PART A

ENERGY MATTERS – MAINTENANCE AND STORAGE FACILITY

1. GENERAL REQUIREMENTS OF ENERGY MODELS

1.1 Approved Software

- (a) Building energy models shall be prepared using EE4 Version 1.7 software in general accordance with the latest rules of the “LEED ® Canada NC 2009” with all addenda (available from the Canada Green Building Council) and the “EE4 Software Version 1.7 Modeling Guide” (available from Natural Resources Canada).
- (b) Modifications to the DOE-2 code generated by EE4 are permitted for the purposes of modeling systems and energy efficiency measures not handled by EE4. However, any such changes shall be fully described and justified in the energy modeling reports submitted with the models.
- (c) For specific energy efficiency measures not handled by EE4 (e.g. sustainable energy technologies) other software may be used to determine the energy savings. Only software approved by Natural Resources Canada for the intended application shall be used (see the latest version of “EE4 Software Version 1.7 Modeling Guide” available from Natural Resources Canada). If software other than EE4 is used, the complete software files shall be submitted and the methodology and procedures used shall be fully described in a narrative.

1.2 Simulator Qualifications

- (a) Building energy models shall be prepared by an “experienced consultant” listed on the Natural Resources Canada OEE website:

<http://oee.nrcan.gc.ca/commercial/newbuildings/consultants.cfm>

- (b) Alternatively, energy models may be completed by experienced simulators that have completed 3 successful simulations for CBIP, EcoEnergy Validation, or the Ontario Power Authority’s High Performance New Construction Program.

2. SPECIFIC REQUIREMENTS OF ENERGY MODELS

2.1 Forecast Energy Model

- (a) Summary
 - (i) Each Proponent shall create a Forecast Energy Model during the development of their Proposal upon which the Reference Building Model and Aggregate Energy Model shall be based.

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- (ii) Energy modeling performed under this Section shall comply with the general requirements listed in Part A, Section 1 (General Requirements of Energy Models).
- (b) EE4 “Building Level” Simulation Parameters
 - (i) The selected location shall be “Ottawa, Ontario”, and the associated default weather file shall be used.
 - (ii) For the purposes of NPV calculations, the following energy prices shall be used for the simulations:

2.2 Baseline Energy Rates-Maintenance and Storage Facility:

- (a) Electricity \$0.112 cents per kWh escalated at 2.5% yearly;
- (b) Natural Gas: \$0.24/m³ escalated at 2.5% yearly.

2.3 Ventilation Rates

- (a) The design shall comply with ASHRAE 62-2007 ventilation requirements (in accordance with LEED® Canada NC 2009) and the ventilation requirements listed on the room data sheets.
- (b) The ventilation rates shall be the same in the proposed and reference cases except as indicated below.

2.4 Fixed EE4 Parameters

- (a) Fixed Parameters that the simulator may not modify in the simulation are as follows:
 - (i) Operating schedules shall be default schedules corresponding to the appropriate space function selected by the Proponent;
 - (ii) Desired winter temperature, except in partially conditioned spaces;
 - (iii) Desired summer temperature, except in partially conditioned spaces; and
 - (iv) Any EE4 inputs marked by the “non-compliance input” symbol (i.e. red circle and slash).
- (b) Exterior lighting shall be included in the Forecast Energy Model and the Reference Building Model by means of manual calculation outside of the EE4 software.

3. SUBMITTALS – MAINTENANCE AND STORAGE FACILITY

Each Proponent shall submit the following with its Proposal:

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- 3.1 Draft Energy Target Letter as required by the Project Agreement, based on the Aggregate Energy Model and including the Aggregate Energy Target and the Discrete Energy Target, together with the Proponent's Energy Model Summary Report in the form of Table 1 to this Part A appended to the Energy Target Letter.
- 3.2 Summary Compliance Report from EE4, including Parts 1 of 5 through Part 5 of 5 inclusive. Appropriate DOE-2 reports must be selected so that values are reported in all tables. If demand ventilation measures are used, Proponents must submit two Summary Compliance Reports from EE4, one for each of the Proposed and Reference Buildings.
- 3.3 Narrative indicating primary energy features included in the Proponent's Forecast Energy Model and Aggregate Energy Model and illustrating the energy saving measures incorporated into the Proponent's design. Provide a written statement of how Project Co will operate the Facility to ensure the energy saving measures in the Proponent's design realize their full potential.
- 3.4 Description and reports of any software or calculations used outside of EE4, such as renewable and sustainable energy software, exterior lighting calculations, process load assumptions, etc. If software other than EE4 is used, the complete software files shall be submitted and the methodology and procedures used shall be fully described in a narrative.
- 3.5 Narrative describing differences between results of Forecast Energy Model and Aggregate Energy Target.
- 3.6 Monthly energy use and costs reflective of the Aggregate Energy Target MSF (using the stipulated energy prices as described in Section 2 of this Part A). For the purposes of generating the NPV, the monthly energy use should be entered into RFP Schedule 6 – Price Form.

Table 1
Energy Model Summary Report

A	B	C	D	E	F
Row		Formula	Proposed Building	Reference Building (MNECB)	Aggregate Energy Target
Total Energy					
1	Electricity (MJ)	[From model] / [calculations]			
2	Natural Gas (MJ)	[From model] / [calculations]			
3	Other (MJ)	[From model] / [calculations]			
4	Total Energy (MJ)	[Row 1]+[Row 2]+[Row 3]			
Unit Energy Prices					
5	Electricity	See prices noted above in Section 2, paragraph 2.2	n/a	n/a	n/a
6	Natural gas	See prices noted above in Section 2, paragraph 2.2	n/a	n/a	n/a
7	Other	n/a	n/a	n/a	n/a
Annual Energy Costs					

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8	Electricity	[Row 1] x [Cell 5C]			
9	Natural gas	[Row 2] x [Cell 6C]			
10	Other	[Row 3] x [Cell 7C]			
11	Total	[Row 8]+[Row 9]+[Row 10]			
12	NPV	Excel XNPV formula	n/a	n/a	
LEED Calculation					
13	Regulated Energy Cost	per LEED®			n/a
14	Non-regulated Energy Cost	per LEED®			n/a
15	Annual Energy Cost Savings from Non-regulated Process Loads or Renewable Energy	From Proponent Calculations		n/a	n/a
16	% Savings vs. MNECB	$1 - ((D13-D15)/E13)$		n/a	n/a
17	LEED® EA c1 Points	per LEED®		n/a	n/a
Energy Intensity					
18	Actual sq.m.	From Stats			

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19	Modeled sq.m.	From Compliance Report			
20	Electricity (MJ/m2)	[Row 1] / [Row 18]			
21	Natural Gas (MJ/m2)	[Row 2] / [Row 18]			
22	Other (MJ/m2)	[Row 3] / [Row 18]			
23	Total (MJ/m2)	[Row 4] / [Row 18]			
Energy Breakdown by End-Use					
Regulated Loads ¹ (MJ)					
24	Lights	From Compliance Report ²			
25	Space Heating	From Compliance Report			
26	Space Cooling	From Compliance Report			

¹ “Regulated” and “Non-Regulated” loads are as defined in the LEED® Canada NC 2009, pg 209.

² Compliance Report means the Summary Compliance Report produced by the EE4 energy modeling software. Building energy by End-Use is reported in the report labeled “Part 5 of 5”. The DOE-2 “BEPS Report” must be selected in “Calc Manager – Options – Plant Reports” for the energy number to appear. For the Proposed Building and Reference Building, the values indicated in Table A-1 must match (units are to be converted from MBTU to MJ using the factor 1 MBTU = 1055 MJ). Corresponding values in the Aggregate Energy Model may vary from the Summary Compliance Report as per the Proponent’s variance calculations.

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27	Heat Rejection	From Compliance Report			
28	Pumps & Miscellaneous	From Compliance Report			
29	Fans	From Compliance Report			
30	Domestic Hot Water	From Compliance Report			
31	Regulated Process Loads ³	From Proponent Calculations			
Non-Regulated Loads					
32	Miscellaneous Equipment ⁴	From Compliance Report			n/a
33	Exterior Lighting ⁵	From Proponent Calculations			

³ Regulated process loads are as defined on Page 209 of the LEED® Canada NC 2009 and may include elevators, laundry, process exhaust, appliances, and heating requirements for heated parking garages.

⁴ Miscellaneous Equipment generally means receptacle loads.

⁵ All exterior lighting is to be included in the Aggregate Energy Model.

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34	Other Adjustments ⁶	From Proponent Calculations			
35	Total (MJ)				

⁶ “Other Adjustments” may include, but are not limited to, non-regulated process energy, vertical transportation, domestic water pumps, heat tracing, security systems, Project Co installed AV systems etc. The energy for these loads may or may not be included in the Forecast Energy Model or Reference Building Model according to LEED® Canada NC 2009 rules. The Aggregate Energy Model must include most base-building loads as described in Section 3.1.

PART B

ENERGY MATTERS – TRACTION POWER

1. REQUIREMENTS OF ENERGY MODELS

1.1 Forecast Energy Model – Traction Power

(a) Summary

- (i) Each Proponent shall create an Aggregate Energy Model Traction Power during the development of their Proposal upon which the Aggregate Energy Target Traction Power shall be based.

(b) Simulation Parameters

- (i) The selected location shall be “Ottawa, Ontario”.
- (ii) The following inputs shall be reflected in the energy modelling:
- (a) The service requirements contained in RFP Schedule 10 – Preliminary Service Plan;
- (b) The service levels and quantities as determined through the Interactive Spreadsheet (Attachment A of RFP Schedule 10 – Preliminary Service Plan); and
- (c) The average bidirectional passenger loads per period provided in Table A of RFP Schedule 10 – Preliminary Service Plan.

2. SUBMITTALS – TRACTION POWER

Each Proponent shall submit the following with its Proposal:

- 2.1 Draft Energy Target Letter Traction Power as required by the Project Agreement, based on the Aggregate Energy Model Traction Power and including the Aggregate Energy Target Traction Power together with the Proponent’s Energy Model Summary Report in the form of Table 2 to this Part B appended to the Energy Target Letter.
- 2.2 Narrative indicating primary energy features included in the Proponent’s Aggregate Energy Model Traction Power and illustrating the energy saving measures incorporated into the Proponent’s design. Provide a written statement of how Project Co will operate the Traction Power System to ensure the energy saving measures in the Proponent’s design realize their full potential.

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- 2.3 Description and reports of any software or calculations used. Narrative describing differences between results of Aggregate Energy Model Traction Power and Aggregate Energy Target Traction Power.
- 2.4 Monthly energy use and costs reflective of the Aggregate Energy Target Traction Power (using the stipulated energy prices as described in Section 2.2 of Part A). For the purposes of generating the NPV the monthly energy use should be entered into RFP Schedule 6 – Price Form.
- 2.5 The Energy Target Letter Traction Power shall also include any information necessary for generating the Energy Analysis Report Traction Power during the Project Term in accordance with PA Schedule 8 – Energy Matters.

Table 2
Energy Model Summary Report

	Year 1	Year 2	Year 3	Year 4	(*)
Preliminary Service Plan Periods	Avg. Consumption (KWh)	Avg. Consumption (KWh)	Avg. Consumption (KWh)	Avg. Consumption (KWh)	
Weekday					
Early morning					
Morning peak					
Midday					
Afternoon peak					
Early evening					
Late evening (M-Th)					
Late evening (Fri)					
Night (M-Th)					
Night (Fri)					
Saturday					
Daytime					
Evening					
Night					
Sunday					
Daytime					
Evening					
Aggregate Energy Target Traction Power					
Annual KWh					
Vehicle Kilometres					
KWh / Vehicle Kilometre					

*Table 2 shall include calculations up to the 30th year of Total Energy calculations.

PART C**MOBILITY MATTERS – BUS RAPID TRANSIT****1. REQUIREMENTS OF TRAFFIC MOBILITY MANAGEMENT PLAN****1.1 Traffic and Transit Management Plan – BRT****(a) Summary**

- (i) Each Proponent shall create a TTMP during the development of their Proposal upon which the Reference BRT Lane Closures and Aggregate BRT Lane Target Closure shall be based.
- (ii) For the purposes of NPV calculations, the following BRT Lane Closure prices shall be used:

BRT Lane Closure Prices			
	Peak \$/hr	Off-Peak \$/hr	Nights \$/hr
Segment 1	300	150	75
Segment 2	300	150	75
Segment 3	400	200	100
Segment 4	600	300	150
Segment 5	300	150	75
Segment 6	300	150	75
Segment 7	300	150	75

2. SUBMITTALS – BUS RAPID TRANSIT

Each Proponent shall submit the following with its Proposal:

- 2.1 Draft BRT Lane Closure Target Letter as required by the Project Agreement, based on the TTMP and including the Aggregate BRT Lane Target Closure together with the Proponent's TTMP in the form of Table 2.1 to this Attachment A appended to the BRT Lane Closure Target Letter.

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- 2.2 Narrative indicating primary features included in the Proponent's TTMP and illustrating the measures incorporated into the Proponent's design. Provide a written statement of how Project Co will manage construction to ensure the measures in the Proponent's design realize their full potential.
- 2.3 Description and reports of any software or calculations used. Narrative describing differences between results of TTMP and Aggregate BRT Lane Target Closure.
- 2.4 30 year NPV calculations (using Excel's XNPV formula) showing use and costs (using the stipulated prices as described in Section 1.1).

**Table 3
TTMP Summary Report - BRT**

Milestone*	Peak		Off-Peak		Nights		Cost
	Hrs	\$	Hrs	\$	Hrs	\$	
Segment 1							
Segment 2							
Segment 3							
Segment 4							
Segment 5							
Segment 6							
Segment 7							
Milestone Totals							

*Table 3 shall be completed for each milestone period leading up to and including Revenue Service Availability.

PART D

MOBILITY MATTERS – LANES

1. REQUIREMENTS OF TRAFFIC MOBILITY MANAGEMENT PLAN

1.1 Traffic and Transit Management Plan – Lanes

(a) Summary

- (i) Each Proponent shall create a TTMP during the development of their Proposal upon which the Reference Lane Closures and Aggregate Lane Target Closure shall be based.
- (ii) For the purposes of NPV calculations, the following Lane Closure prices shall be used:

Lane Closure Prices			
	Peak \$/hr	Off-Peak \$/hr	Nights \$/hr
Rideau Street Lanes	100	50	25
Other Lanes	100	50	25

2. SUBMITTALS – LANES

Each Proponent shall submit the following with its Proposal:

- 2.1 Draft Lane Closure Target Letter as required by the Project Agreement, based on the TTMP and including the Aggregate Lane Target Closure together with the Proponent's TTMP in the form of Table 4 to this Attachment A appended to the Lane Closure Target Letter.
- 2.2 Narrative indicating primary features included in the Proponent's TTMP and illustrating the measures incorporated into the Proponent's design. Provide a written statement of how Project Co will manage construction to ensure the measures in the Proponent's design realize their full potential.
- 2.3 Description and reports of any software or calculations used. Narrative describing differences between results of TTMP and Aggregate Lane Target Closure.

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2.4 30 year NPV calculations (using Excel's XNPV formula) showing use and costs (using the stipulated prices as described in Section 1.1).

**Table 4
TTMP Summary Report – Lanes**

Milestone*	Peak		Off-Peak		Nights		Cost
	Hrs	\$	Hrs	\$	Hrs	\$	
Rideau Street Lanes							
Other Lanes							
Milestone Totals	X		X		X		

*Table 4 shall be completed for each milestone period leading up to and including Substantial Completion.

PART E

OPERATIONS MATTERS

1. REQUIREMENTS OF OPERATIONAL PERFORMANCE SIMULATION

1.1 Operational Performance Simulation – OPS

(a) Summary

- (i) Each Proponent shall develop an OPS.
- (ii) The OPS shall consist of a simulation model in accordance with the requirements of Schedule 15-2 Part 1 Article 2, and shall develop outputs reflecting Project Co's proposed System and operating characteristics, which provide the basis for the development of the Preliminary Service Plan and subsequent Operations Service Plan(s). These outputs will become part of the Operational Performance Parameters to be used in the development of the Aggregate Annual Driver Hours Target in accordance with Schedule 39.
- (iii) The OPS shall include at a minimum the following operational performance requirements: system performance simulations; demonstrated capability to reliably support the required headways; terminal operations; station dwell times; and projected end to end trip times as related to the development of the Preliminary Service Plan and subsequent Operations Service Plan(s).

2. SUBMITTALS – OPERATIONS MATTERS

Each Proponent shall submit the following with its Proposal:

- 2.1 The Proponent shall complete all inputs to Schedule 10-A of the RFP (Interactive Spreadsheet), which generates a forecast of Annual Driver Hours based on the Proponent's stated Operations Performance Parameters input to the spreadsheet. The Proponent shall provide a Draft Annual Driver Hours Target Letter as required by Schedule 39 of the Project Agreement, based on the Annual Driver Hours forecast generated by the Interactive Spreadsheet, including the Aggregate Annual Driver Hours Target in the form of Table 5 to this Attachment A appended to the Annual Driver Hours Target Letter. The Proponent will be permitted to revise the Draft Annual Driver Hours Target Letter as the Operations Service Plan is finalized, in accordance with Section 3.2 of Schedule 39 to the Project Agreement.

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- 2.2 Narrative indicating primary features included in the Proponent's OPS and illustrating the measures incorporated into the Proponent's design. The narrative shall include a written statement of how Project Co will manage its obligations to ensure the measures in the Proponent's design realize their full potential.
- 2.3 Description and reports of any software or calculations used. Narrative describing differences between results of OPS and Aggregate Annual Driver Hours Target resulting from the Interactive Spreadsheet.

Table 5
OPS Summary Report – Annual Driver Hours

Contract Year	Driver Hours

*Table 5 shall be completed for each Contract Year

APPENDIX A

TENDER REGISTRATION FORM

APPENDIX B**CANADIAN CONTENT CERTIFICATE**

	Sub-Systems	Typical Components (but not limited to these)	Manufacturer's name and address	% of Vehicle Contract Total Value	% of Canadian Content	% of Vehicle Supply Costs from Canadian Sources
Vehicle Subcomponents and Component Cost Estimate	Propulsion system	Traction inverters				
		Traction control unit (motor and gearbox)				
		High Speed Circuit Breakers				
		Transmission				
		Pantograph				
		Ice Scraper				
		Wiring				
	Carshell	Stainless steel and aluminum body				
		Under frame/ chassis				
		Insulation Material				
		Corrosion prevention (paints and decals)				
		Windshield (includes wiper)				
		Cabinet Assembly				
		Air horn				
		Panels (exterior)				
		Fixings and Fastenings				
	Fibre Reinforced Plastics					
	Trucks & Suspension	Bearings				
		Coil spring				
		Traction rod				
		Cabling				
		Terminations				
		Suspension control unit				
		Fixings and Fastenings				
		Pipe work				
		Wiring				
		Hydraulic levelling system				
Interior	Panels					
	Material/ fabric					
	Carpet/ flooring					
	Glass partitions					
Low voltage	Advertising panels					
	Auxiliary supply					

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	Sub-Systems	Typical Components (but not limited to these)	Manufacturer's name and address	% of Vehicle Contract Total Value	% of Canadian Content	% of Vehicle Supply Costs from Canadian Sources
	Power supply	converters				
		Circuit breakers				
		Wiring				
		Batteries				
	Brake Equipment	Brake Control Unit (BCU)				
		Brake Resistor				
		Friction brake (track brakes and sanding system)				
		Hydraulic Accumulators				
		Piping				
		Fixings and Fastenings				
		Electrically actuated bi- parting sliding-plug door assembly				
		Automatic passenger counter				
		Photocell obstruction detection system				
		Passenger push buttons				
	HVAC	Cab heater				
		Floor heater				
		Underseat heater				
		Booster fans				
		Smoke alarm system				
		Wiring				
		Fixings and Fastenings				
	Misc. Equipment	Piping and ducts				
		Emergency window				
		Passenger intercom				
		Barriers and guard rails				
		Push button panel				
		First aid box				
		Bicycle racks				
		Hand lamp and emergency hammer				
	Cab Compartment	Fire extinguisher				
		Train computer system & diagnostic system				
		Desk				
		Panels				
			Seat (spare instructor			

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Sub-Systems	Typical Components (but not limited to these)	Manufacturer's name and address	% of Vehicle Contract Total Value	% of Canadian Content	% of Vehicle Supply Costs from Canadian Sources
	seat if required)				
	Desk controls				
	Deadman's Switch				
	Wiring				
	Pipe work				
	Screens (Includes video display screens from CCTV)				
	Radio Handset				
	Control handle				
Articulation Assemblies	Insulated articulation bellows				
	Fixings and Fastenings				
Couplers and Draft Gear	Wiring				
	Fixings and Fastenings				
	Anti-climber				
	Pipe work				
	Interior lighting				
	Emergency interior lighting				
	Hazard and indicator lights				
Seating	Front and rear lighting (including headlamps)				
	Fixings and Fastenings				
Vehicle Train Control System	Interior passenger seats				
	Vital onboard computer				
	Axle speed detectors				
	Wiring and connectors				
	Vehicle location system				
	Fixings and Fastenings				
	Antenna				
Communication Equipment	Doppler shift modules				
	Public address system (including loudspeakers)				
	Passenger Emergency Intercom (PEI)				
	Integrated Diagnostics and Fault Reporting System				
	Electronic Displays (PIS/ PID)				
	CCTV system				
Event recorder					

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	Sub-Systems	Typical Components (but not limited to these)	Manufacturer's name and address	% of Vehicle Contract Total Value	% of Canadian Content	% of Vehicle Supply Costs from Canadian Sources
		Hi-speed data radio and antenna				
		Train computer				
		Radio and radio antenna				
		Wayside communication system				
	Glazing	Vandal-resistant sacrificial film				
		Laminated glass panes				
		Rubber trim/ sealant				
Soft Costs		Labour				
		Project Management				
		Engineering				
		Manuals, Training, Simulators				
		Special Tools				
		Test Equipment				
		Freight				
		Warranty				
		Totals				