

**SCHEDULE 15-1**

**TECHNICAL TERMS AND REFERENCE DOCUMENTS**

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**PART 1**  
**TECHNICAL TERMS AND REFERENCE DOCUMENTS**

**ARTICLE 1            DEFINITIONS**

**100-Year Storm** means a storm event with a return period of one hundred (100) years (1-percent annual exceedance probability), as described in the City of Ottawa Sewer Design Guidelines.

**100-Year Plus 20% Storm** means a 100-Year Storm calculated on the basis of a 20% increase of the City's Intensity Duration Frequency (IDF) curves.

**Accident** means an unforeseen event or occurrence which causes death, injury or property damage. Any event involving the revenue service operation of a rail fixed guideway system if as a result:

- An individual dies;
- An individual suffers bodily injury and immediately receives medical treatment away from the scene of the accident; or
- A collision, derailment, or fire causes substantial property damage.

**Action Plan** has the meaning given in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Airport Link** means the approximately 4km long spur line connecting South Keys Station to the OMCIA. The Airport Link includes Stations at Uplands and the OMCIA.

**Airport Restricted Area** means any area on the OMCIAA property to which access is signed as restricted.

**Airport Restricted Area Pass** means a pass that allows non-passengers access to the Airport Restricted Areas.

**Airport Security Requirements** has the meaning given in Schedule 15-2, Part 1, Article 4.6.

**Airport Station Concourse** means the portion of the construction to be completed by the OMCIAA as per Schedule 15-2, Part 4 – Stations.

**Airport Zoning Regulations** means the Transport Canada regulations that restrict the heights of buildings, structures and objects (including natural growth, such as trees) on regulated land.

**Airside** means the part of an airport used by aircraft for loading and unloading and takeoffs and landings.

**Airside Vehicle Operator's Permit** means a permit issued by the OMCIAA to certify those able to drive in the gate, runway and aircraft taxi areas.

**Airside Vehicle Operator’s Permit D** means a permit issue to those with a need and right to regularly access runways and taxiways in the ongoing and regular performance of their duties.

**Airside Vehicle Operator’s Permit DA** means a permit issued to those with a need and right to access airside aprons and vehicle corridors in the ongoing and regular performance of their duties.

**Alert Level** has the meaning given in Schedule 15-2, Part 2, Article 9.

**Ancillary Facilities** means those facilities, buildings, or structures adjacent to or directly linked to Stations. They can also be standalone facilities or structures located within or adjacent to the alignment. They include the following elements:

- Pedestrian overpass or underpass structures;
- Passenger shelter structures;
- Structures containing mechanical, electrical, communications or other service equipment;
- Signal equipment enclosures and bungalows;
- Parking areas;
- Entrances;
- PPUDO;
- Public washrooms;
- Bus Platforms;
- Bus layby areas; and,
- Bus Operations support building (including bus supervisor office).

**Annual Preventive Maintenance Plan** means at any time during the Maintenance Period, that component of the Maintenance and Rehabilitation Plan describing the Preventive Maintenance for the then current or immediately following Contract Year, as the context requires.

**Appointed Railway Bridge Engineer** means a Project Co team member with the responsibilities outlined in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Art Program** includes both temporary and permanent artwork projects that may be linked, permanently affixed to and / or integrated into the architectural and / or landscape design along the streets, guideway, park land or on the exterior or within the interior of the Stations.

**Asset Management Plan** means a plan which identifies the replacement schedule for the Expanded Trillium Line components based on their expected Design Life, and based on the relevant lifespan projections of the individual and combined assets through applicable analysis founded on the design, specifications and asset performance and maintenance, which will be included within the Asset Management Plan, which plan forms part of the Maintenance and Rehabilitation Plan.

**Asset Preservation Performance Measures** has the meaning given in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Authorities Having Jurisdiction** has the meaning given in NFPA 130.

**Availability** means the probability that a system or system element will be operational when required. Mathematically, that equals the ratio of the mean time between failure and the sum of the mean time between failure and the mean down time.

**Backup Control Centre** means an emergency control center facility providing a remote location complete with the basic functioning systems to dispatch, monitor, and control operations of the System in case the TOCC at 875 Belfast is unavailable.

**Baseline Vehicle Kilometers** means the scheduled annual Revenue Service Vehicle Kilometers set out for each Service Level in the Operations Service Plan as of Financial Close.

**Basic Day Demand** is as defined in Schedule 15-2, Part 2, Article 8 – Utility Design Criteria.

**Booking** means the schedule of work assignments for Operators established by the City, several times a year (beginning of January, end of April, end of June, and beginning of September) in accordance with the Operations Service Plan.

**Bridge** means a structure that provides a Roadway, railway or walkway for the passage of vehicles, pedestrians or cyclists (or other similar forms of transportation) across an obstruction, gap or facility that is greater than 3m in span.

**Bridge Condition Index** means a condition rating index for bridges, in accordance with MTO's bridge condition rating procedure.

**Bridge Safety Management Plan** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

The **Canadian Rail Operation Rules** is the official set of rules governing the operation of railways in Canada. The CROR is used by every Canadian Railway.

**Capital Railway** means the entity under which the City of Ottawa operates the Expanded Trillium Line.

**Central Instrument House** means a wayside control room housing all the controls for an interlocking or group of interlockings.

**Certifiable Elements (Lists)** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Certificate of Fitness** means the certificate issued by the CTA to a company proposing to construct or operate a railway under federal jurisdiction, when the company holds adequate liability insurance. Certified companies are monitored by the CTA for continued compliance.

**Certification Program Representative** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Checked Redundancy Principle** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**City Direction** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Civil Works** means the installation or relocation of duct banks, manholes, hand wells, vaults, transformer bases, and pads, or underground support structures in speciality structures.

**Closed Circuit Television** means a video transmission system monitoring a location, recording images and presenting the images to a central location.

**[REDACTED] Walkley Line** is a **[REDACTED]** operated freight rail line that encompasses the Existing Walkley Yard and connects with the Existing Trillium Line via the north connecting Track and the south connecting Track.

**Compensating Construction** has the meaning given to that term in the OBC.

**Computerized Maintenance Management System** means part of an overall integrated information management system which includes a work order based system, maintenance schedule tool, asset registry and inventory, help desk functionality, control room log and performance reporting.

**Concourse Level** means the intermediate level of a Station that connects Platform Level and Entry Level.

**Confederation Line** means all of the existing Confederation Line, located between and including Blair Station in the east and Tunney's Pasture Station in the west; the Confederation Line west extension, an expansion west between and including Tunney's Pasture Station and Baseline and Moodie Stations; and the Confederation Line east extension, an expansion east between and including Blair Station and Trim Station.

**Connecting Track** has the meaning given in Schedule 15-2, Part 2, Article 3 – Trackwork.

**Construction Impact Assessment Report – Level 1** has the meaning given in Schedule 15-2, Part 2, Article 9 – Protection of Existing Adjacent Structures.

**Construction Impact Assessment Report – Level 2** has the meaning given in Schedule 15-2, Part 2, Article 9 – Protection of Existing Adjacent Structures.

**Construction Security Plan** means a plan that is developed to establish the procedures required to provide the Security measures necessary to achieve Security on the Site as outlined in in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Controller** means a City employee that will be assigned to the TOCC and will be responsible for all dispatching functions for the System.

**Controller Training** means a program of Controller Training a City employee must attend prior to becoming a certified Controller. The program is provided by a Project Co Trainer.

**Corrective Maintenance** means the repair of failed E&M and/or Vehicles or the repair of any portion of the fixed facilities to restore normal operating condition to a state in accordance with the Standard and includes the repair or replacement of a failed system or subsystem through actions such as:

- investigation, localization and isolation of faults (troubleshooting);
- disassembly, reassembly, repair or replacement of the affected part or parts;
- retesting of the repaired system or subsystem; and
- correcting Defects.

**Corrective Maintenance Plan** means the plan establishing the general policies, procedures and methodology which Project Co shall apply to perform Corrective Maintenance, including without limitation to identify and analyze existing and anticipated Deficiencies, including inspection and testing, and which shall be employed by Project Co to affect the Repairs and Correction of Deficiencies when they occur during the Maintenance Period.

**Cost Recovery** means total actual net cost to Project Co based on an open book system.

**Crime Prevention through Environmental Design** means the design, maintenance, and use of the built environment in order to reduce both the incidence and fear of crime. It involves the application of these three core principles: natural surveillance, natural access control, and territorial reinforcement.

**Crossing Agreements** means [REDACTED] and [REDACTED].

**Critical** means failure conditions which could result in significant system damage or adverse effects on one or more occupants (including fatal injury).

**Culvert** means a structure that forms an opening through soil to allow the passage of surface water, livestock or pedestrians under a Roadway, railway or roadside entrance.

**Custodial Maintenance** means all forms of cleaning and clearance of unwanted items from New System Infrastructure including clearance of snow, ice, debris, garbage, trash, litter, stickers, gum and graffiti to restore the normal operating condition to meet the Standard.

**Custodial Maintenance Areas** means those areas and elements of the System included in Schedule 15-3 – Maintenance and Rehabilitation Requirements and identified therein as the responsibility of Project Co with respect to Custodial Maintenance, and for further certainty, includes Vehicles, the New Walkley Yard, the alignment, the Tracks and, to the extent identified in Schedule 15-3 – Maintenance and Rehabilitation Requirements, the Stations.

**Daily Lane Closure Report** has the meaning given in Schedule 15-2, Part 7, Appendix D.

**Daily Traffic Management Site Record** has the meaning given in Schedule 15-2, Part 7, Appendix C.

**Daily Traffic Monitoring Report** has the meaning given in Schedule 15-2, Part 7, Appendix D.

**Defect** means the condition of any part of the work which does not meet the contract document requirements; cause a train or a portion of the Work to cease operating or operate in a degraded mode; or inflicts damage or harm on any other portion of a train or the Work.

**Deficiency** means any condition which exists with respect to any aspect of the System and which requires Maintenance, including without limitation any failure of the System to meet the Standard, other than a Non Maintenance Repair.

**Design Criteria** means established parameters used during design.

**Design Life** means the period of time specified by the Owner during which an asset is intended to remain in service.

**Design Safety** means safety achieved by the integration of safety features into the system design characteristics to prevent or minimize the probability of operation in an unsafe manner.

**Developer’s Guide** has the meaning given in Schedule 15-2, Part 1, Article 9 – Future Adjacent Construction Requirements.

**Disposed, Disposed of or Disposal** means disposal as identified in the “Waste and Excess Materials Management for Maintenance (MTO)” operational specification.

**Documentation Plan** has the meaning given in Schedule 15-2, Part 3, Article 1 – Introduction.

**Drainage** means the interception and removal of surface water or groundwater by constructed or natural means.

**Dwell Time** means the amount of time a Train resides at a Station.

**Elements of Continuity** has the meaning given in Schedule 15-2 Part 4, Section 2.3(c).

**Elements of Variability** has the meaning given in Schedule 15-2 Part 4, Section 2.3(c).

**Elevated Guideway** means a Guideway elevated above grade by means of a Structure.

**Emergency Costs** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Emergency Guard Rail** (Steel Inner) is intended to contain and guard a derailed truck, keeping the Vehicle upright and on the Track structure.

**Emergency Traffic Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Employee Security Standard** means the security clearance and identification procedures and requirements mandated by the hiring policies, practices and standards of the City’s Human Resources Department, as may be amended from time to time.

**Epidemic Defect** shall be deemed to have occurred at any time during the Maintenance Period when the Failure Rate within a Population of a component, subsystem or system exceeds the Constant Failure Rate by [REDACTED] measured over the time period in which the constant Failure rate is expressed but, for the avoidance of doubt, an Epidemic Defect shall exclude any Defect which arises:

- as a result of the failure by the Operator to operate the System in accordance with the Operation Requirements;
- out of the replacement or repair of any component, subsystem or system where such replacement or repair is the responsibility of the Operator or the City;
- out of the replacement or repair of any component, subsystem or system by the Maintenance and Rehabilitation Contractor where such replacement or repair is a product of the Design Life and Constant Failure Rate of the applicable component, subsystem or system; and/or
- any Defect which occurs after the expiration of the Design Life of such component, subsystem or system.

For the purposes hereof, the “**Population**” of a component, subsystem or system means the total number of identical line replaceable units (as identified in the Response) of a distinct type and function, whether the line replaceable unit consists of individual components, subassemblies or unit assemblies, incorporated in the fleet of Vehicles provided as part of the Project.

**Erosion and Sediment Control Plan** means the approach, techniques and measures used to prevent erosion during the construction process, to deal with suspended sediment at the source and minimize sediment transport from leaving the Construction site.

**Existing Adjacent Structures** means Adjacent Structures and other structures that are susceptible to ground movements caused by construction activities.

**Existing Vehicle Fleet** means the six Alstom 41m long DMUs in service on the Expanded Trillium Line.

**Existing Trillium Line ROW** means those Lands where the Existing Trillium Line operates subject to federal rail regulations apply.

**Existing Walkley Yard** is the existing Capital Railway facility east of Albion Road used for the maintenance and service of the Existing Vehicle Fleet.

**Facilities** means the above-grade structures, at-grade structures, below-grade structures, mechanical elements, electrical elements, interior areas, and exterior areas described in Schedule 15-2, Part 4 – Stations and Schedule 15-2, Part 5 – New Walkley Yard, including but not limited to: Stations, New Walkley Yard, and Ancillary Facilities.

**Failure** means the event, or inoperable state, in which any item or part of an item does not, or would not perform as previously specified, regardless of the operational state of the subsystem.

**Failure Mode, Effects and Criticality Analysis** outlines the Failure cases and assesses the impact on the System. It has the meaning defined in Schedule 15-2, Part 1, Article 7 – System Safety Certification. Reference MIL-STD 1629A or EN 60812.

**Failure Review Board** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Fail Safe (Safety)** A characteristic of a system which insures that any and all failure modes result in the system defaulting to a safe mode in regard to Passengers, personnel, Track, wayside and Vehicle.

**Fail Safe Principle** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Fare Paid Zone** means the area within transit stations in which Passengers shall have paid a fare and allows customers to transfer between modes of transit without passing through fare control barriers, revalidating fare payment on either the bus or when entering a train station, or passing in and out of a proof of payment zone.

**Fault Tree Analysis** means a systematic analysis of single and multiple events used for identifying the probability of occurrence of an undesired event using AND gates, OR gates, and Boolean algebra. FTA's produce graphic representations of failures and events which may result in a pre-selected top-level event to occur.

**Federal Lands** mean all lands owned and managed by all federal government departments.

**Federally Mandated Stations** means those stations within the project that are subject to Federal Land Use Agreement letters.

**Final Safety Certificate** is a certificate provided by Project Co signifying that the System Safety elements have been fulfilled and the System is safe for Revenue Service.

**Fire Life Safety** means those aspects of safety specifically related to the prevention, detection and response to fire, smoke and toxicity hazards.

**Fire Life Safety and Security Committee** means the committee that acts as a review board of the activities, analyses, and reports generated on fire/life safety and security issues.

**Fire/Life Safety System** means: (a) emergency exit buildings, emergency pathways, emergency walkways, tunnel cross passages, emergency stairs, emergency doors and emergency way-finding signage any other elements provided for the purposes of emergency egress; and (b) fire alarms, fire sprinkler systems, fire extinguishers, fire standpipe, emergency ventilation systems, fire fighter telephones, emergency lighting, emergency and standby power sources, and emergency response vehicles; and (c) any other assets provided for the purposes of fire/life safety and evacuation.

**Fitups** means infrastructure required to operate a bus stop or a bus station, such as, but not limited to, shelters, benches, signage, garbage cans, lighting, PIDS, and power and communications necessary to support the elements.

**Fixed Component Availability Standard** has the meaning given in Schedule 15-3 - Maintenance and Rehabilitation Requirements, as applicable to Attachments 3, 4, 8 and 9.

**Foundation** means a Structure that transfers loads to the earth.

**General Traffic** when used in Table 7-1.3 of Part 7 – Traffic and Transit Management and Construction Access, means Roadways that are not part of the City's Truck Route Network and accommodate no scheduled transit routes.

**Geotechnical Instrumentation and Monitoring Plan** has the meaning given in Schedule 15-2 Part 2 - Article 7, Geotechnical Design Criteria and Requirements.

**Greenfield** has the meaning given in the City of Ottawa Sewer Design Guidelines.

**Guideway** means the part of a passenger rail transit System on which the Trackwork is located, with a boundary marked by ROW fences, curbs and parapets or in a Tunnel.

**Handover Maintenance** means the testing, disassembly, refurbishment, rebuilding and/or repair of any components of the System to be completed by Project Co within the last 60 months of the Maintenance Period and prior to the expiry of the Maintenance Period in accordance with the requirements contained in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Handover Maintenance Period** means the last 60 calendar months of the Maintenance Period.

**Handover Maintenance Plan** means the documented plan for the performance of the Handover Maintenance in compliance with the requirements of Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**HASTUS** means a software package by GIRO used by Public Transit. The HASTUS software solution includes a suite of integrated modules for improved planning, scheduling, operations, passenger information, and analysis.

**Hazard** means any real or potential condition that can cause injury, death, or damage to or loss of equipment or property.

**Hazard Analysis** means any analysis performed to identify hazardous conditions for the purpose of their elimination or control.

**Hazard Log** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Hazard Resolution** means the analysis and subsequent actions taken to reduce, to the lowest level practical, the risk associated with an identified Hazard.

**Headway** means the time separation between two Trains, both traveling in the same direction on the same Track. It is measured from the time the head end of the leading Train passes a given reference point to the time the head end of the Train immediately following passes the same reference point.

**Immediate** or **Immediately** means the initiation of an activity as soon as possible after Detection or being Made Aware and no later than two hours from the time of Detection or being Made Aware. If more than one activity requires immediate action at the same time, Project Co shall give priority to the highest degree of Hazard.

**Infill** has the meaning given in the City of Ottawa Sewer Design Guidelines.

**Initial Works** means the Works undertaken by Project Co in the first 120 days following Commercial Close.

**ISO 9001:2008** means the quality management system so designated and established by the International Organization for Standardization.

**Landscape Plan** means a plan that specifies the hard and soft landscape material.

**Lane Closure Measurement and Verification Plan** has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Lane Shift** means a transfer of traffic along lane(s) of the same route and which, using existing Roadway lanes or surfaces, guides traffic around the work zone.

**Legal Survey** means a survey that is prepared by an Ontario Land Surveyor for the Registration or Deposit in the Provincial Land Registry Office to facilitate a conveyance by providing a Registerable description, effect an expropriation or to confirm the location of a property boundary.

**Leitrim Service Road** has the meaning given to it in Schedule 15-2, Part 2 – Civil and Guideway.

**Level of Service**, when used with respect to Roadway operation, has the meaning as described in the City of Ottawa's Transportation Impact Assessment Guidelines.

**Line Replaceable Unit** means components that are replaceable on the Vehicle.

**Low Impact Development** means a SWM strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible.

**Lowest Line Replaceable Unit** means the lowest level assembly of components or piece parts to which a failure can be isolated and that can be readily replaced in its field application.

**Mainline Track** has the meaning given in Schedule 15-2, Part 2, Article 3 – Trackwork.

**Mainline Storage Track or Storage Track** has the meaning given in Schedule 15-2, Part 2, Article 3 – Trackwork.

**Maintain** means to perform the Maintenance, as required in accordance with the Project Agreement including the Maintenance and Rehabilitation Requirements, and “**Maintained**” shall have a corresponding meaning.

**Maintainability** means the quality of the combined features of equipment design and installation that facilitates the accomplishment of inspection, test, checkout, servicing, repair, and overhaul with a minimum of time, skill, and resources in the planned maintenance environments.

**Maintenance** means Preventive Maintenance, Corrective Maintenance, Custodial Maintenance and Handover Maintenance.

**Maintenance and Rehabilitation Plan** means the documented plan for the performance of the Maintenance and Rehabilitation Services, provided to the City and with respect to which the City has no material objection at the time of the Final Design Submittal as contemplated in the RFP, which shall thereupon be attached as Appendix A Attachment 1, as revised from time to time in accordance with the Project Agreement.

**Maintenance and Rehabilitation Services** means Maintenance to be provided by Project Co to the City in accordance with Schedule 15-3 – Maintenance and Rehabilitation Requirements and the other terms of the Project Agreement and shall also include the supply, operation and maintenance of any vehicle and or equipment used to provide Maintenance.

**Maintenance Dispute** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Maintenance Dispute Resolution Procedure** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Maintenance Emergency** means any Emergency which is caused by, or which arises as a result of:

- Project Co’s performance of, or failure to perform, the Maintenance and Rehabilitation Services;
- a Defect or Deficiency of the fixed equipment, Vehicles or fixed facilities;
- any act or omission of Project Co or any employee or officer, agent or contractor of Project Co; or

except to the extent that such Emergency is not caused by or does not arise as a result of any of subparagraphs (a), (b) and (c) above, and except to the extent that such Emergency is caused by or arises as a result of a Force Majeure.

**Maintenance Management System** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Maintenance Responsibility Table** means the table set out in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Maintenance Vehicles** means vehicles that are capable of being rail-mounted and used by staff in the performance of maintenance duties on the System Infrastructure.

**Major Maintenance Shutdown Period** means any period of time during the Maintenance Period during which Project Co is permitted to partially or fully shut down the System during Revenue Service Hours without deductions under the Payment Mechanism, compliance with Section 1.5 of Schedule 15-3 – Maintenance and Rehabilitation Requirements, in order to carry out major maintenance works.

**Major Municipal Roads** means a City freeway, Arterial Roadway or Major Collector Road as defined in the City of Ottawa Transportation Master Plan.

**Master Test Plan** is as defined in Schedule 15-2, Part 8 – Vehicles.

**Maximum Day Demand** is as defined in Schedule 15-2, Part 2, Article 8 – Utility Design Criteria.

**Mean Distance Between Failure** means the average number of kilometres traveled between independent component malfunctions or failures, regardless of time or status of Train.

**Mean Time Between Failure** means the average equipment operating time per independent equipment failure. MTBF is the reciprocal of failure rate and is expressed mathematically as:  $MTBF = (\text{Equipment Operating Time} / \text{Independent Failures})$

**Mean Time to Repair** means the mean elapsed time required to perform the task of isolating an independent failure to the LLRU to remove and replace the malfunctioned LLRU and to verify proper equipment function. It is expressed in hours.

**Minor Municipal Roads** means a Collector Road or Local Road as defined in the latest City of Ottawa Transportation Master Plan.

**Monthly Activity Report** has the meaning given in Schedule 15-3, Appendix A, Article 1.8 – Records and Reporting.

**Multi-Use Path** means a formalized travel surface intended for a wide variety of non-motorized travelers that is physically separated from motorized vehicular traffic, with the exception of bridges, sidewalks and walkways.

**Network Management System** means a management software package that collects and manages information about the CTS network equipment including switches, routers, servers, etc. The NMS provides a browser interface to allow operators, administrators and network engineers an easy to understand manner to help them quickly identify and correct network problems with the CTS.

**New Vehicle Fleet** means the new Vehicles being procured for service on the Expanded Trillium Line.

**New Walkley Yard** means the proposed Capital Railway facility located west of Albion Road to be used for the maintenance and service of the Revenue Vehicles.

**Night Period** means the period of time between 22:00 and 5:00 hrs, when used in Schedule 15-2, Part 7 – Traffic and Transit Management Requirements.

**Noise and Vibration Control Plan** has the meaning given in Schedule 17 – Environmental Obligations.

**Non Maintenance Emergency** means an Emergency that is not a Maintenance Emergency.

**Non-Revenue Vehicles** means vehicles that are used by staff in the performance of maintenance and operational duties on the Existing Trillium Line and its related facilities.

**North Prescott Spur** is an existing freight rail line that extends southward from Greenboro Station (Existing Trillium Line) to the NRC Facility, and is to be part of the Trillium Line Extension.

**Not Shared** when used in Table 7-1.3 of Part 7 – Traffic and Transit Management and Construction Access, means a lane intended for use by vehicles only (usually the median lane on a multi-lane highway).

**NRC 6 Month Shutdown Period** is as defined in the Rail Car Transfer Agreement.

**NRC 7 Day Freight Access Periods** is as defined in the Rail Car Transfer Agreement.

**NRC Facility** means the NRC Automotive and Surface Transportation site located at 2320 Lester Road.

**Obstacle Limitation Surfaces** means a surface that establishes the limit to which objects may project into the airspace associated with an aerodrome consisting of the following; a takeoff surface, an approach surface, a transitional surface and an outer surface.

**OC Transpo Trainer(s)** means City employee(s) or contractor who has been trained and certified to instruct OC Transpo employees in certain classifications who are assigned to or have any duties and responsibilities on the System. These classifications include but are not limited to Operator, Station Attendant, Customer Service Staff, Controllers, Supervisors and Superintendents, and security personnel.

**Off Peak Period** means any period of time which is not a Peak Period or Night Period, when used in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Off Peak Period** means any period of time during Revenue Service Hours which is not a Peak Period, when used in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Open Process Control** means a software interface standard that allows Windows programs to communicate with industrial hardware devices.

**Operation(s)** means operation of the System commencing upon the Revenue Service Commencement in accordance with Schedule 15-3 – Maintenance and Rehabilitation Requirements, and shall specifically exclude Maintenance.

**Operations Crew Facility** means the space within the New Walkley Yard occupied and used by the City for purposes of the operation of the System, including dispatching of Operators and Trains, lunch rooms and locker rooms, training centre, and reception area for Operators and supervisors.

**Operations Service Plan** means the operations schedule as outlined in Schedule 15-3 – Maintenance and Rehabilitation Requirements, and includes Train movements in support of Revenue Service.

**Operator** means the driver of a Revenue Vehicle, which is a City employee who has been trained and certified by an OC Transpo Trainer to operate on the Trillium Line.

**Operator Training** means a program of training a City employee must attend prior to becoming a certified Operator.

**O-Train** means the rail system operated by OC Transpo, including both the Confederation Line and the Expanded Trillium Line.

**Over-Dimensional Vehicle** is as defined under the City of Ottawa By-law No. 2003-497.

**Overhead** means a Structure where a roadway goes over the railway when used in Schedule 15-2, Part 2, Article 4 – Structural Design Criteria and Requirements.

**Overhead Contact System** sometimes referred to as **Overhead Catenary System** means a system that distributes DC power from the traction power System to the Vehicle via a pantograph on the Vehicle. The OCS consists of a conductive messenger wire suspending a contact wire between poles and/or attachments to provide the DC propulsion power requirements of the Vehicle to the Train consist maintaining continuous contact between the pantograph and the contact wire.

**Overpass** means a structure where the major road goes over a lower category road when used in Schedule 15-2, Part 2, Article 4 – Structural Design Criteria and Requirements.

**Park and Ride** means parking lots located adjacent to Transitway Stations or important transit nodes that are readily accessible by the public from the nearest major Roadway.

**Passenger Pick-Up and Drop-Off** means a designated pick-up and drop-off area for Passengers from private vehicles adjacent to a Station.

**Passing Siding** means an auxiliary Track to the mainline for meeting or passing Trains which is also operated by one or more methods of control (i.e. Train Control System).

**Pavement** means all structural elements or layers including granular, above the subgrade of a road and shoulders, such as a road, shoulder, sidewalk, plaza or other artificially-covered thoroughfare.

**Peak Period** means the AM and PM periods each weekday as determined by the City, which encompasses 6:30 to 9:30 hrs and 15:00 to 18:30 hrs, when used in Schedule 15-2, Part 7 – Traffic and Transit Management Requirements.

**Peak Period** means the AM and PM periods each weekday as defined in the Operations Service Plan or otherwise determined by the City in its discretion by written notice to Project Co, when used in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Pedestrian Access Plan** means a plan that outlines and shows the pedestrian flow, directions, route, volumes to, from and around all facilities, Guideway and Stations.

**Permit to Take Water** is required for any taking of more than a total of 50,000 litres of water in a day under the *Ontario Water Resources Act*.

**Permitted Periods for Closures** means the periods during which Project Co may implement closures, full closures, detour routes, Lane Shifts and diversions in respect of the various Roadways, as set forth in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Physical Constraints** means existing Structures (Bridges, Tunnels, buildings, retaining walls), existing Stations, environmentally protected elements (water bodies, SAR, archeological sites, etc.) and the Lands. Physical Constraints shall be at the sole discretion of the City.

**Platform** means that portion of the Station where Trains and or buses stop to load and unload Passengers. There are two basic types of O-Train Platform configurations: centre loading which has the Platform located between each set of Tracks, and side loading, which has the Platforms located on the outside of each set of Tracks. Both Platform types are in use on the System.

**Platform Level** means the level of a Station with Platform(s) used by Passengers to board and alight from Trains.

**Pre-Handover Inspection** has the meaning given in Schedule 15-3, Appendix C, Article 3.0 – General Requirements.

**Preventive Maintenance** means any action that is performed at scheduled intervals in accordance with the Maintenance and Rehabilitation Plan or as otherwise required to maintain the System at a constant level of performance to comply with the Maintenance and Rehabilitation Requirements and ensuring that the Maintenance of the System is sufficient to permit the Operation of the System in accordance with the Operation Requirements and Specifications (and, for further certainty, to meet or exceed the Maintenance Service

Requirements), including the detection and correction of deviations from normal operation before a major system or subsystem failure occurs, periodic inspections and testing, condition monitoring, critical item replacement, lubrication, adjustment, cleaning and calibration.

**Preventive Maintenance Plan** means the plan establishing the Preventive Maintenance which Project Co is required to perform, which plan forms part of the Maintenance and Rehabilitation Plan.

**Private Approach Permit** has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Project** means the Trillium Line Extension Project, which consists of the design and construction Works and the Maintenance for the System, including the extension to the Existing Trillium Line.

**Project Co Operator** means a Project Co employee or contractor who is trained and certified to operate a Revenue Vehicle without passengers on the Trillium Line.

**Project Co Operator Training** means a program of training a Project Co employee or contractor must attend prior to being allowed to operate an out of service Revenue Vehicle anywhere on the alignment or in the New Walkley Yard. The program is provided by a Project Co Trainer.

**Project Co Trainer** means a Project Co employee or contractor who is assigned the task of instructing and certifying a Project Co employee, Contractor or a City employee in a specific classification.

**Property Access and Business Continuity Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Quality Performance Criteria** means the qualitative standards of service and the performance criteria set out in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Quarterly Performance Report** has the meaning given in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Quarterly Performance Review** has the meaning given in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Radio System Supplier** means the City corporate radio nominated manufacturer determined by an external radio contract issued by the City.

**Rail Transfer Agreement** means the agreement between the City of Ottawa and the National Research Council of Canada as represented by its Centre for Surface Transportation Technology. The Rail Transfer Agreement sets out, among other things, terms and conditions on which the Transfer Segment can be used to provide the NRC the service of moving rail cars over the

Transfer Segment between the Siding and the Connecting Track before, during and after the O-Train Expansion and maintenance requirements in respect of the Transfer Segment.

**Railway Bridge Engineer** means a City team member with the responsibilities outlined in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Railway Operating Certificate** means an official document issued by Transport Canada that authorizes a federal railway company or a local railway company to operate in Canada.

**Railway Works** means a line work or any part thereof, a crossing work or any part thereof, or any combination of the foregoing.

**Reference Concept** means the plans, drawings, reports and other information prepared during the preliminary design for the Project and which reside in the Data Room.

**Reference Documents** means the references, codes, standards, specifications, guidelines, policies, reports, publications, manuals, bulletins and other such documents listed throughout the Output Specification.

**Reference Plan** is defined in Ontario Regulation 43/96 Part I as a plan deposited under section 150 of the Land Titles Act or section 80 or 81 of the Registry Act and includes any other plan deposited as a reference plan. Part IV describes the requirements, contents, and procedures to be followed for a reference plan.

**Reliability** means the probability that the system or subsystem will perform satisfactorily for a given period of time when used under stated conditions.

**Reliability/Availability Program Plan** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Reliability Block Diagram** means a diagrammatical representation of Systems elements in a series and/or parallel configuration to represent the reliability impact of complete System. Refer to IEC 61078.

**Remedial Action Notice** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Replacement-In-Kind** means replacement of identical or similar nature that satisfies the original design specification.

**Replacement Parts** has the meaning given to it in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Requirements Management Plan** has the meaning given in Schedule 15-2, Part 3, Article 1 - Introduction.

**Response Action Plan** has the meaning given in Schedule 15-2, Part 2, Article 9 – Protection of Existing Adjacent Structures.

**Restraining Rail** is an additional rail installed alongside of the gauge side of the low (inner) rail of a sharp radius curve which share with the running rails the lateral forces generated while the Train is traversing the curve. Restraining rail is to enhance safety by providing additional Vehicle truck guidance, divide lateral wheel forces between two rails, reducing forces on the rail fastening system and divide rail wear over two rail surfaces increasing the time between running rail replacements.

**Revenue Service** means the carriage of paying Passengers on the System.

**Revenue Service Hours** means the hours during which Revenue Service is provided on the System as set out in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Revenue Service Vehicle Kilometres** means the distance travelled by Vehicles while in Revenue Service, measured in kilometres.

**Revenue Vehicles** or **Vehicles** means the diesel multiple unit passenger cars. Revenue Vehicles includes the Existing Vehicle Fleet in service as well the New Vehicle Fleet currently being procured.

**Review Level** has the meaning given in Schedule 15-2, Part 2, Article 9 – Protection of Existing Adjacent Structures.

**Risk Assessment** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Risk Log** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Road Close Permit** has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Road Safety Design Reviews** means Design safety reviews that are to be carried out in accordance with Schedule 15-2, Part 2, Article 6 – Roadways, Bus Terminals and Lay-bys.

**Road Safety Audit** means an audit carried out in accordance Schedule 15-2, Part 2, Article 6 – Roadways, Bus Terminals and Lay-bys.

**Road Safety Audit Team** means a group of individuals appointed by Project Co from time to time to carry out Road Safety Audits in respect of the Works.

**Road Safety Auditor** has the meaning given in Schedule 15-2, Part 2, Article 6 – Roadways, Bus Terminals and Lay-bys.

**Road Safety Audit Certificates** has the meaning given in Schedule 15-2, Part 2, Article 6 – Roadways, Bus Terminals and Lay-bys.

**Roadway** means the driving surfaces including travelled lanes, shoulders and shoulder rounding.

**Roadway Works** is defined as the design and construction of all temporary or permanent Roadway modifications, improvements or new construction of municipal and federal Roadway infrastructure, including but not limited to travelled lanes, auxiliary lanes, bike lanes, shoulders, boulevards, accesses, intersections, interchanges and the associated ramps, related to the scope of the Stage 2 Project.

**Room Data Sheets** means the room data sheets in Schedule 15-2, Part 5 – New Walkley Yard, Appendix A.

**Safety** means freedom from harm resulting from unintentional acts or circumstances.

**Safety Certification** means the process of verifying compliance with a set of formal safety requirements. The requirements are defined by a safety certification plan, design criteria and technical specifications and applicable codes and industry standards. Specifically, certifiable elements need to be identified, verification activities need to be performed and documented, and certificates of conformance need to be signed and issued by the responsible and accountable parties as described in Schedule 15-2, Part 1, Article 7 - System Safety Certification.

**Safety Certification Program** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Safety and Security Certification Review Team** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Safety and Security Operations Review Committee** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Safety Audit** means an inspection by the City of the System, the books and records and/or procedures of Project Co relating to the Safety Standards, and includes an inspection of the Safety Management System and the Safety Case.

**Safety Case** means the submission of Safety evidence at prescribed intervals in the Project lifecycle. It has the meaning outlined in EN 50129.

**Safety Certification Report** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Safety Critical** means a designation placed on a system, subsystem, element, component, device or function denoting that satisfactory operation of such is mandatory to safety assurance of patrons, personnel, equipment, or facilities. Such a designation dictates incorporation of special safety design features.

**Safety Integrity Level** means a relative level of risk-reduction provided by a safety function, or to specify a target level of risk reduction. The requirements for a given SIL are not consistent among all of the functional safety standards. In the functional safety standards based on the IEC 61508 standard, four SILs are defined, with SIL 4 the most dependable and SIL 1 the least. A SIL is determined based on a number of quantitative factors in combination with qualitative factors such as development process and safety life cycle management.

**Safety Management System** means the Safety protocol (including without limitation the activities, resources, procedures, methodologies, responsibilities and organizational structure) which Project Co shall assist Capital Railway in updating, taking into account the Design and Construction Specifications and is implemented to ensure the Safety of the System and compliance with the Safety Standards, and which is authorized by the City Manager and filed with the City Manager, adherence to which Safety protocol shall be mandatory in all Operations and Maintenance activities, and which shall without limitation include the Capital Railway rules and the Standard Operating Procedures.

**Safety Requirements Traceability Matrix** is a means of tracking all Project Safety requirements identified by the PA or Project Co to ensure Safety elements are captured and fulfilled for the System with a direct link to the source of the Safety requirement.

**Safety Standards** means all mandatory Safety standards for the System, being the requirements of Law relating to health and Safety matters respecting the Design, Construction, Maintenance and Operation of the System, including all such Safety standards established by Project Co, in conjunction with the City, taking into account Comparable LRT Safety Standards, the Safety Case, and all Safety standards established by the Design and Construction Performance Requirements.

**Safety Verification Matrix** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Scheduled Revenue Service Vehicles** has the meaning given in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**Seasonal Load Restriction** regulations are applicable to commercial vehicles or trailers with a gross vehicle weight in excess of 5 tonnes or 11,000 lbs per axle that are prohibited on roads where restriction signage is posted or on all truck routes identified on the most current City of Ottawa Urban and Rural Truck Route Maps.

**Security** means freedom from harm resulting from intentional acts or circumstances.

**Security and Emergency Preparedness Plans** means plans that outline Security and Emergency procedures and activities that will occur in response to a Security or Emergency incident.

**Security Certification** means the process of verifying compliance with a set of formal security requirements. The requirements are defined by a security certification plan, design criteria and

technical specifications and applicable codes and industry standards. Specifically, certifiable elements need to be identified, verification activities need to be performed and documented, and certificates of conformance need to be signed and issued by the responsible and accountable parties as described in Schedule 15-2, Part 1, Article 8 - Security and Emergency Management.

**Security Certification Checklists** means checklists that are used to validate the design and implementation of Security equipment and processes to verify compliance with a set of formal Security requirements.

**Security Certification Program** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Security Management System** means the Security protocol (including, without limitation, the activities, resources, procedures, methodologies, responsibilities and organizational structure), which Project Co shall assist Capital Rail in updating, taking into account the Design and Construction Specifications and the initial Threat and Vulnerability Assessment, and implement to ensure the Security of the System and compliance with the Safety Standards, and which is authorized by the City Manager and filed with the City Manager, adherence to which Security protocol shall be mandatory in all Operations and Maintenance activities, and which shall without limitation include the Capital Railway rules and the Standard Operating Procedures.

**Security Requirements Traceability Matrix** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management. For clarity, the Security Requirement Traceability Matrix is a matrix format document used to verify and certify that the Security requirements have been incorporated in the design and certify that all Security requirements of the design are constructed and/or installed in accordance with the Project Agreement.

**Security Standard** means all mandatory Security standards for the System, being the requirements of Law relating to Public and Security matters respecting the Design, Construction, Maintenance and Operation of the System, including all such Security standards established by Project Co, in consultation with the City, taking into account all Security standards established by the Design and Construction Specifications and the initial TVA, as approved and amended from time to time by the City, identifying the mandatory Security Standards to be followed by the City and Project Co (including personnel employed in the performance of Operations and Maintenance), including in response to conditions, events, or Deficiencies which cause interruption to or interference with the Operation of the System.

**Security Verification Matrix** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Service Change** means a modification to the Operations Service Plan whereby the then-prevailing Operations Service Plan is replaced by one of the other Service Levels identified in Schedule 15-3 Appendix A – Attachment 2.

**Service Level** means the sets of operational parameters set out by the City in the Operations Service Plan in Schedule 15-3 Appendix A – Attachment 2 and labeled as Service Levels 1 to 4,

describing the , headways, consist sizes, hours of operation, and other key parameters to be attained by the System in each case, which Project Co's provision of the Maintenance and Rehabilitation Services must accommodate, and the term also includes any additional or modified operational parameters which may be developed and agreed by the City and Project Co from time to time.

**Service Level Decrease** means a requirement by the City for Project Co to provide a Service Level with a lower revenue train kilometres as compared to the then-prevailing Service Level.

**Service Level Increase** means a requirement by the City for Project Co to provide a Service Level with a greater revenue train kilometres as compared to the then-prevailing Service Level.

**Service Proven Vehicle** means a Vehicle that is substantially compliant with the following characteristics:

- The major Vehicle sub systems (including bogies, braking systems, diesel engines, etc.) have been integrated in a comparable Vehicle currently in Revenue Service.
- A minimum of 10 of these Vehicles have been in Revenue Service on a comparable-Design based system for a minimum of two years.

**Service Reliability Standard** has the meaning given in Schedule 15-2, Part 1, Article 3 – Operational Performance Requirements.

**Shared Lane** when used in Table 7-1.3 of Part 7 – Traffic and Transit Management and Construction Access, means a lane intended for shared use between vehicles and cyclists. Such lanes may be marked by a “sharrow” pavement marking.

**Shutdown Period** means the period during which the City will cease operations of the Existing Trillium Line in order to facilitate the implementation of the Project. The Shutdown Period will commence on May 3, 2020 and will cease at Revenue Service Availability.

**Signalling and Train Control System** has the meaning given in Schedule 15-2, Part 3 – Systems.

**Site Office** has the meaning given in Schedule 15-2, Part 1, Article 9 – Project Office.

**Special Constables Unit** means sworn-in Peace Officers who have the powers of a Police Officer to enforce the Criminal Code of Canada, the Controlled Drugs and Substances Act, the Liquor License Act, Trespass to Property Act, and the Safe Streets Act on all transit vehicles and properties.

**Special Trackwork** refers to all rail installations where Tracks converge, diverge or cross. Standard Trackwork is made simply from rolled rails of a constant cross-section, while rails in several special Trackwork components are cast or machined and have cross-sections that vary along their length.

**Spur Track** has the meaning given in Schedule 15-2, Part 2, Article 3 – Trackwork.

**the Standard(s)** means a standard of Maintenance which complies with all of the standards and terms set out in Schedule 15-3, Appendix A, Article 2 – Maintenance and Performance Standards and described in the Attachments to Schedule 15-3, Appendix A.

**Standard Operating Procedures** means the standard operating procedures which Project Co shall assist Capital Railway in updating, taking into account the Design and Construction Specifications, Maintenance and Rehabilitation Services, Operation of the System, and Good Industry Practice, as approved and amended from time to time by the City, identifying any new mandatory procedures to be followed by the City and Project Co (including personnel employed in the performance of Operations and Maintenance), including in response to conditions, events, or Deficiencies which cause interruption to or interference with the Operation of the System. The Standard Operating Procedures shall incorporate as required the provisions of the Safety Management System, Security Management System, Capital Railway rules, and regulations governing the Operation and Maintenance of the System.

**Station** means a Facility where Trains and or buses stop to pick up or drop off customers. The Station primarily consists of Platform areas for Passenger loading/unloading, fare control equipment, and passenger information. Other related components include: service rooms, stairs, ramps, escalators, elevators, advertising, public art, and Train and bus Operator support Facilities, customer amenities, etc. On the Ottawa System, O-Train stations are classified as follows:

- **At Grade Station:** A Station at which the platform is at grade, above grade, below grade, and meets the criteria for an open station as defined in NFPA 130
- **Transfer Station:** A Station with the incorporation of Facilities to support the transfer of passengers between modes of transportation or between the O-Train Lines, within a fare paid area.
- **Terminal Station:** A Station that is located at the terminus of a line.
- **Line Station:** A Station that is located along the alignment providing service in both directions of the line.

**Station Plaza** means a plaza at a Station.

**Storage Yard** means the outdoor areas located within the New Walkley Yard, not including the Maintenance Building or the Operations Crew Facility, but including the open space, parking areas, Track area, storage of Maintenance of Way equipment and supplies (unless incorporated within Maintenance Building), outdoor storage (ties, Track, poles, etc.) and Vehicle storage.

**Stormwater Management** means the integrated process of capturing, treating and/or controlling of stormwater runoff to maintain the natural hydrologic cycle, prevent undesirable stream erosion, prevent an increased risk of flooding, and protect water quality of receiving waters.

**Stormwater Management Practice** means the combination of strategies, techniques and measures used on or off-site for Stormwater Management or a document containing the combination of strategies, techniques and measures used on or off-site for Stormwater Management.

**Structure** means any building, Bridge, Tunnel, structural Culvert, or retaining wall.

**Supervisory Control and Data Acquisition** means the system that allows the supervision and control of wayside and Station equipment and devices from TOCC. SCADA collects alarm and indication functions for transmission and implements control commands initiated from TOCC and other control locations. The SCADA functions are an addition to local control, alarm, and indications associated with each equipment or system.

**Supply Point** is defined in [REDACTED].

**Surplus Vehicle Fleet** means, following a Service Level Decrease, any vehicles which are in excess of:

- the maximum fleet required to provide the service plan;
- the number of Vehicle required to maintain Project Co's spare Vehicle ratio; and,
- the quantity of Non-Revenue Vehicles called for by Project Co's maintenance plans.

**System Element** has the meaning given in Schedule 15-3 – Maintenance and Rehabilitation Requirements.

**System Engineering Management Plan** has the meaning given in Schedule 15-2, Part 3, Article 1 - Introduction.

**System Safety** means the application of operating, technical, and management techniques and principles to the safety aspects of a system throughout its life to reduce hazards to the lowest practical level through the most effective use of available resources.

**System Safety and Assurance Plan** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**System Security Certification** means the process of verifying compliance with a set of formal Security requirements. The requirements are defined by a System Security Certification Plan, design criteria and technical specifications and applicable codes and industry standards. Specifically, certifiable elements need to be identified, verification activities need to be performed and documented, and certificates of conformance need to be signed and issued by the responsible and accountable parties as described in Schedule 15-2, Part 1, Article 8 - Security and Emergency Management.

**System Security Certification Plan** means a detailed plan used to verify compliance with a set of formal security requirements as outlined in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Systems Integration Verifier** is a key member of the overall Expanded Trillium Line's project team. The Systems Integration Verifier will review and provide confirmation of the successful completion of the systems integration work related to the communication integration at the TOCC, BCC and at Bayview Station. The Systems Integration Verifier will also act as adjudicator in a fast track dispute resolution procedure to resolve any disputes as to the source of the inability to successfully complete integration of the communication system at the TOCC, BCC and Bayview Station. The Systems Integration Verifier will review and comment on the Expanded Trillium Line's Systems integration design for the communications system and associated integration documents. During the installation, testing, and commissioning phases, the Systems Integration Verifier will review and comment on the communications, integration, test and commissioning plans, traceability documents, and test procedures.

**Tail Track** has the meaning given in Schedule 15-2, Part 2, Article 3 – Trackwork.

**Threat and Vulnerability Assessment** has the meaning given in Schedule 15-2, Part 1, Article 7 – System Safety Certification.

**Threat Log** has the meaning given in Schedule 15-2, Part 1, Article 8 – Security and Emergency Management.

**Ticket Machine** means a piece of City supplied and installed equipment where customers purchase a fare for OCT services.

**Tolerable Hazard Rate** has the meaning given in EN 50129.

**Track** means the system of ballast, rails, ties and fastenings composing the Track structure.

**Trackwork** means all work related to the construction of a complete rail passenger system Track structure from subgrade to top of rail including the design, supply, installation and Quality Control of ballast and sub-ballast, ballast curbs, ties, rails, guardrails, fastenings, subdrains, Special Trackwork, end of Track devices, Track drains, rail welds, rail insulated joints, direct-fixation baseplates as well as concrete slab inserts, and other Track materials.

**Trackwork Design and Construction Test Plan** has the meaning given in Schedule 15-2, Part 2 – Civil and Guideway.

**Traffic Advisory Temporary Signage Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic and Transit Management Communications Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic and Transit Management Monitoring Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic and Transit Management Plan** means a written plan, and a series of sub-plans, describing all direct and indirect impacts on all road users, including pedestrians, cyclists, transit vehicles and private vehicles of all types, at each stage of Project Co's construction sequencing plan, and outlining Project Co's measures and strategies to manage the impacts on road user traffic, parking, access for Emergency Services , as well as access to businesses and properties during construction. A Traffic and Transit Management Plan shall comply with the relevant standards, guidelines, policies and procedures of the City, OC Transpo, NCC and MTO as applicable. Further requirements are found in Schedule 15-2, Part 7, Article 6 – Traffic and Transit Management Plan.

**Traffic Control Device(s)** is a term used to describe any person, sign, signal, marking or device placed upon, over or adjacent to a roadway by or at the direction of a Relevant Authority or their designate, for the purpose of regulating, warning, guiding or informing a vehicle operator or pedestrian of an existing condition or hazard.

**Traffic Control Persons/Personnel** means a person duly trained and authorized to direct traffic at a Work zone through the use of the Traffic Control Sign (STOP/SLOW Paddle).

**Traffic Control Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Control Supervisor(s)** has the meaning given in has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Engineer** has the meaning given in has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Incident Management Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Management Committee** has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Management Implementation Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Management Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Manager** has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Traffic Risk Assessment Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Train** means a consist of one or two Vehicles.

**Train Control** or **Train Control System** means a safety critical computer based control system for Vehicle identification, Vehicle location control and monitoring, maintaining safe headway between Vehicles, Vehicle speed control, maintaining safe brake rates, Vehicle route selection and fleet management, interlocking control and power consumption optimization.

**Train Structures** means any structures (excluding Tunnels) that support any form of Train loading including but not limited to grade-supported slabs, elevated Train supports, foundations supporting Train loads, retaining walls supporting Train surcharges and other similar Structures.

**Train the Trainer** means the training program conducted by a Project Co employee(s) or contractor(s) that trains and certifies a City employee to serve as an OC Transpo Trainer.

**Transfer Segment** has the meaning given in the Rail Transfer Agreement.

**Transit Information Panel** has the meaning given in Schedule 15-2, Part 4 – Stations.

**Transit Management Plan** is a sub-plan of the TTMP and has the meaning given in Schedule 15-2, Part 7 – Traffic and Transit Management and Construction Access.

**Transit Operations Control Centre** means the facility that is located at 875 Belfast Road, in the City of Ottawa and provides the primary operation and control center for Revenue Service of the Confederation Line. It also operates and controls the mainline Guideway during maintenance hours, which typically occur overnight. The TOCC integrates all the LRT systems to allow operation of the scheduling, command and control, supervision & data acquisition, communications, surveillance, power and Emergency responses for the Confederation Line.

**Transit Priority Lanes** is as defined by the City of Ottawa.

**Transition and Maintenance Plan** has the meaning given in Schedule 10 – Review Procedure.

**Transit Operating in Lane** when used in Table 7-1.3 of Part 7 – Traffic and Transit Management and Construction Access, means lanes that will not have transit operating in them.

**Transitway** is a dedicated road network system that is open only to OC Transpo and Emergency vehicles, which includes physically separated ROW from mixed traffic and on-street bus lanes.

**Tree Mitigation Plan** means a plan to audit, monitor, protect, and preserve trees to comply with City regulations.

**Trial Running** means a 21 consecutive day period that may commence upon the successful completion of testing and commissioning. Upon successful completion of trial running, the integrated system will be ready for revenue service.

**Tunnel** means Structures located below finished grade containing the Guideway.

**Tunnel Equipment and Systems** has the meaning provided in Table 4.2 of Schedule 15-3, Appendix B.

**Underground Structures** means Tunnels excluding buried pipes and utilities, Bridge foundations and above ground Station foundations and including existing Tunnels.

**Underpass** means a structure where the major road goes under the lower category road when used in Schedule 15-2, Part 2, Article 4 – Structural Design Criteria and Requirements.

**Universal Design** means the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

**Utility Infrastructure Relocation Plan** has the meaning given in Schedule 15-2 Part 2 Article 8 (Utility Infrastructure Design Criteria)

**Vital Microprocessor Interlocking System** means a vital microprocessor based system for controlling switches and signals at an interlocking. This system may also be known as a CBI controller.

**Voice and Data Radio System** has the meaning given in Schedule 15-2, Part 3, Article 5.

**Walkley Diamond** means the at grade rail Track intersection of the Ellwood Subdivision at Mileage 0.18 (KM 0.29) and the [REDACTED] Walkley Line at Mileage 4.1.

**Weekend Period(s)** means the period of time from a Saturday at 0:00 hrs to Sunday at 23:59 hrs.

**Yard Limits** means a point designated by a yard limit sign which separates the mainline from the yard and the demarcation point for management of train operations. Yard Limits are typically located at the governing signal protecting movement of trains onto the mainline.

**Yard Track** has the meaning given in Schedule 15-2, Part 2, Article 3 – Trackwork.

**Zone of Influence** means the area within the subsurface and surface boundaries where Ground Movement arising from Project Co construction activities is expected to occur.

## ARTICLE 2            ACRONYMS

**AABC** means Associated Air Balance Council.

**AAMA** means American Architectural Manufacturers Association.

**AAR** means Association of American Railroads.

**AASHTO** means American Association of State Highway and Transportation Officials.

**ABS** means absolute block signal.

**AC** means alternating current.

**ACGIH** means American Conference of Governmental Industrial Hygienists.

**ACI** means American Concrete Institute.

**ACP** means access control panels.

**ADA** means *Americans with Disabilities Act*.

**AED** means automated external defibrillator.

**AESS** means Architecturally Exposed Structural Steel.

**AHJ** means Authorities Having Jurisdiction.

**AHRI** means Air-conditioning, Heating, and Refrigeration Institute

**AIC** means Amp Interrupting Capacity.

**AISC** means American Institute of Steel Construction.

**AISI** means American Iron and Steel Institute.

**ALCTV** means Automotive Lifts – Safety Requirements for Construction, Testing and Validation.

**ALI** means Automotive Lift Institute.

**AMCA** means Air Movement and Control Association.

**AMS** means Aerospace Material Specifications.

**ANSI** means American National Standards Institute.

**AODA** means *Accessibility for Ontarians with Disabilities Act*.

**APC** means automatic passenger counting.

**APPM** means Asset Preservation Performance Measures.

**APTA** means American Public Transportation Association.

**AREMA** means American Railway Engineering Maintenance-of-Way Association.

**ARBE** means Appointed Railway Bridge Engineer.

**ASCE** means American Society of Civil Engineers.

**ASHRAE** means American Society of Heating, Refrigerating and Air-Conditioning Engineers.

**ASME** means American Society of Mechanical Engineers.

**ASPE** means American Society of Plumbing Engineers.

**ASSE** means American Society of Safety Engineers.

**ASTM** means American Society for Testing and Materials.

**ATC** means automatic Train Control.

**ATIS** means automated traveler information system.

**ATP** means automatic Train protection.

**ATS** means Automatic Train supervision or automatic transfer switch.

**AWMAC** means Architectural Woodwork Manufacturers Association of Canada.

**AWS** means American Welding Society.

**AWS BRH** means American Welding Society Brazing Handbook.

**AWS WHB** means American Welding Society Welding Handbook.

**AWWA** means American Water Works Association.

**AZR** means Airport Zone Regulations.

**BAS** means Building Automation System.

**BCC** means Back-up Control Centre.

**BCI** means bridge condition index, in accordance with MTO's bridge condition rating procedure.

**BIA** means business improvement association.

**BMS** means Building Management System.

**BSMP** means Bridge Safety Management Plan.

**BSS** means British Standards Society.

**CADD** means computer aided design and drafting.

**CaGBC** means Canada Green Building Council.

**CALA** means Canadian Association for Laboratory Accreditation.

**CATSA** means the Canadian Air Transport Security Authority.

**CB** means Certification Body Scheme (for “Scheme of the IECCE for Mutual Recognition of Test Certificates for Electrical Equipment”).

**CBI** means Computer Based Interlocking.

**CCIL** means Canadian Council of Independent Laboratories.

**CCIP** means Cement and Concrete Industry Publications.

**CCOHS** means Canadian Centre for Occupational Health and Safety.

**CCTV** means Closed Circuit Television.

**CE** means Conformité Européene / European Conformity or consumer electronics.

**CEAA** means Canadian Environmental Assessment Agency.

**CEC** means Canadian Electrical Code.

**CEL** means Certifiable Elements List

**CEM** means crash energy management

**CFAA** means Canadian Fire Alarm Association.

**CFC** means chlorofluorocarbon.

**CFD** means computational fluid dynamics.

**CFEM** means Canadian Foundation Engineering Manual.

**CFR** means Code of Federal Regulations.

**CGC** means Canadian Gypsum Company.

**CGSB** means Canadian General Standards Board.

**CHBDC** means Canadian Highway Bridge Design Code.

**CIAR** means Construction Impact Assessment Report.

**CIAR-1** means Level 1 Construction Impact Assessment Report.

**CIAR-2** means Level 2 Construction Impact Assessment Report.

**CIH** means Central Instrument Houses.

**CISC** means Canadian Institute of Steel Construction.

**CMAA** means Crane Manufacturers Association of America.

**CMMS** means Computerized Maintenance Management System.

**[REDACTED]**

**CNLA** means Canadian Nursery Landscape Association.

**COADS** means City of Ottawa Accessibility Design Standards.

**CPCI** means Canadian Precast/Prestressed Concrete Institute.

**CPR** means Cardiopulmonary Resuscitation.

**CPTED** means Crime Prevention through Environmental Design.

**[REDACTED]**

**CPE** means City provided equipment

**CPU** means central processing unit.

**CRCA** means Canadian Roofing Contractors Association.

**CRI** means colour rendering index.

**CROR** means Canadian Rail Operation Rules.

**CSA** means Canadian Standards Association.

**CSMP** means Construction Safety Management Plan.

**CSP** means corrugated steel pipe.

**CSRS** means Canadian Spatial Reference System.

**CSSBI** means Canadian Sheet Steel Building Institute.

**CSV** means Comma Separated Value (type of software file format).

**CTA** means Canada Transportation Act/Agency

**CTS** means communications transmission system.

**CWB** means Canadian Welding Bureau.

**CWDS** means crossing warning device system.

**CWR** means continuous welded rail.

**DAQ** means delivered audio quality.

**DC** means direct current.

**DDU** means driver's display unit

**DF(F)** means direct fixation (fastener).

**DFO** means Department of Fisheries and Oceans (Canada).

**DLA** means dynamic load allowance.

**DMP** means Data Management Protocol.

**DMU** means diesel multiple unit.

**DOB** means Daily Operating Bulletin (from Transport Canada).

**DOT** means U.S. Department of Transportation.

**DOUDS** means Downtown Ottawa Urban Design Strategy.

**DSD** means Decision Sight Distance.

**DSP** means digital signal processor.

**DSS** means designated substance survey.

**DVD** means digital versatile disk.

**E&M** means Electrical and Mechanical.

**EA** means Environmental Assessment.

**EAS** means Emergency Alarm Station or Existing Adjacent Structure(s).

**ECA** means Environmental Compliance Approval

**EEMAC** means Electrical Equipment Manufacturers Association of Canada.

**EGFP** means equipment ground fault protection.

**EMC** means electromagnetic compatibility.

**EMI** means electromagnetic interference.

**EN** means European Norms.

**EPROM** means erasable, programmable read-only memory.

**ERP** means Emergency Response Plan.

**ESA** means Electrical Standards Association or Electrical Safety Authority.

**ESC** means Erosion and Sediment Control (part of Erosion and Sediment Control Plan).

**ESP** means emergency service providers.

**ETEL** means Emergency Telephone.

**FACP** means fire alarm control panel.

**FAI** means First Article Inspection.

**FBCU** means friction brake control unit.

**FCC** means Federal Communications Commission.

**FEA** means Finite Element Analysis.

**FHWA** means Federal Highway Administration.

**FLS** means Fire Life Safety and fatigue limit states.

**FLSSC** means Fire Life Safety and Security Committee.

**FLUDTA** means Federal Land Use, Design and Transaction Approval

**FMEA** means Failure Mode and Effects Analysis.

**FMECA** means Failure Mode, Effect, and Criticality Analysis.

**FRA** means Federal Railroad Administration.

**FRACAS** means Failure Reporting and Corrective Action System

**FRP** means fibre reinforced plastic.

**FTA** means Federal Transit Administration or Fault Tree Analysis.

**FTEL** means Tunnel phones

**GANA** means Glass Association of North America.

**GBC** means Green Building Council.

**GBO** means General Bulletin Order (from Transport Canada).

**GDSOH** means Geometric Design Standards for Ontario Highways (Ministry of Transportation).

**GDGCR** means Geometric Design Guide for Canadian Roads (Transportation Association of Canada).

**GFCI** means ground fault circuit interrupter.

**GFI** means Ground Fault Interrupter.

**GFRP** means glass fibre reinforced polymer.

**GIDS** means guideway intrusion detection system.

**GIMP** means Geotechnical Instrumentation and Monitoring Plan.

**GIS** means geographic information system.

**GPS** means global positioning system.

**GSC** means geological survey of Canada.

**GUI** means graphic user interface.

**HCFC** means hydrochlorofluorocarbon.

**HINT** means Elevator Help Intercoms

**HFI** means Yard Intercoms

**HGCWD** means Highway-Rail Grade Crossing Warning and Detection System.

**HMI** means Hoist Manufacturers Institute or Human Machine Interface

**[REDACTED]**

**[REDACTED]**

**HPPL** means High Performance Photo Luminescent.

**HSDR** means High Speed Data Radio.

**HTM** means Hazard Tracking Matrix.

**HVAC** means heating, ventilation and air conditioning system.

**IAC** means Intrusion Access Control.

**ICD** means interface control documents.

**ICES** means Interference-Causing Equipment Standards (Industry Canada).

**ICNIRP** means International Commission on Non-Ionizing Radiation Protection.

**ICP** means Incident Command Post.

**IDC** means initiation device circuits.

**IEC** means International Electrotechnical Commission.

**IEEE** means Institute of Electrical and Electronics Engineers or International Electrotechnical Commission for Electrical Equipment.

**IES** and **IESNA** mean Illuminating Engineering Society of North America.

**IP** means internet protocol.

**ISD** means Intersection Sight Distance.

**ISFP** means City of Ottawa Integrated Street Furniture Policy and Design Guidelines.

**ISO** means International Standards Organization.

**ITA** means International Tunnelling Association.

**ITEL** means Passenger Assistance Information Telephones

**JHSC** means joint health and safety committee.

**LAN** means local area network.

**LCD** means liquid-crystal display.

**LCU** means local control unit.

**LED** means light emitting diode.

**LEED** means Leadership in Energy and Environmental Design.

**LID** means Low Impact Development.

**LKI** means landmark kilometre inventory.

**LLEPM** means Low Location (or level – in vehicles) Exit Path Marking.

**LLRU** means Lowest Line Replaceable Unit

**LOS** means Level of Service.

**LRT** means Light Rail Transit.

**LRU** means Line Replaceable Unit.

**LRV** means light rail vehicle.

**LSD** means limits state design.

**LV** means low voltage.

**LVC** means length of vertical curve.

**LVPS** means low voltage power supply.

**M&R** means Maintenance and Rehabilitation.

**MDBF** means Mean Distance Between Failure

**MDE** means Maximum Design Earthquake.

**MERV** means Minimum Efficiency Reporting Value.

**MEMS** means micro-electro-mechanical systems.

**MFIPPA** means the Municipal Freedom of Information and Protection of Privacy Act.

**MHIA** means Materials Handling Industry of America.

**MIL** means U.S Military Standard.

**MNECB** means Model National Energy Code for Buildings.

**MOECC** means Ontario Ministry of the Environment and Climate Change.

**MOL** means Ministry of Labour.

**MOW** means maintenance-of-way.

**MSE** means mechanically stabilized earth.

**MTBF** means Mean Time Between Failures.

**MTBSAF** means mean time between service affecting failures.

**MTEL** means Maintenance Telephones.

**MTM** means Modified Transverse Mercator.

**MTO** means Ontario Ministry of Transportation.

**MTTR** means Mean Time To Repair.

**MUP** means Multi-Use Pathway.

**MUTCD** means Manual for Uniform Traffic Control Device.

**MV** means medium voltage.

**NAC** means notification appliance circuits.

**NACE** means National Association of Corrosion Engineers.

**NAD** means North American Datum.

**NB** means northbound.

**NBCC** means National Building Code of Canada.

**NCC** means National Capital Commission.

**NCMA** means National Concrete Masonry Association.

**NEB** means National Energy Board

**NEBB** means National Environmental Balancing Bureau.

**NECB** means National Energy Code (of Canada) for Buildings.

**NEMA** means National Electrical Manufacturer's Association.

**NESC** means National Electrical and Safety Code.

**NFCC** means National Fire Code of Canada.

**NFPA** means National Fire Protection Association.

**NFRC** means National Fenestration Rating Council.

**NHI** means National Highway Institute.

**NMI** means New Municipal Infrastructure.

**NMS** means Network Management System

**NPCC** means National Plumbing Code of Canada.

**NRC** means the National Research Council.

**NRCA** means National Roofing Contractors Association.

**NSF** means National Sanitation Foundation.

**NTD** means note to draft.

**NVR** means network video recorder.

**OBC** means Ontario Building Code.

**OCS** means Overhead Catenary System.

**ODE** means Operating Design Earthquake.

**ODV** means over-dimensional vehicle.

**OESC** means Ontario Electrical Safety Code.

**OFC** means Ontario Fire Code.

**OGS** means oil/grit separators

**OHA** means operating hazard analysis.

**OHSA** means the *Occupational Health and Safety Act* (Ontario).

**O&M** means Operations and Maintenance.

**OMCIA** means the Ottawa Macdonald Cartier International Airport.

**OMCIAA** means the Ottawa Macdonald Cartier International Airport Authority.

**OMNR** means Ontario Ministry of Natural Resources.

**OPP** means Ontario Provincial Police.

**OPS** means Ontario Provincial Standard or Ottawa Police Services.

**OPSD** means Ontario Provincial Standard Drawings.

**OPSS** means Ontario Provincial Standard Specifications.

**OSCE** means Ontario Electrical Safety Code.

**OSIM** means Ontario Structure Inspection Manual.

**OSIMS** means Ontario Structure Inspection Management Systems.

**OSTC** means Ottawa Seniors Transportation Committee.

**OTM** means Ontario Traffic Manual.

**OWS** means Operation Work Station.

**PA** means public address.

**PBD** means performance based design.

**PABX** means private automated branch exchange.

**PCB** means polychlorinated biphenyl.

**PDI** means Plumbing and Drainage Institute.

**PEI** means Passenger Emergency intercom.

**PEO** means Professional Engineers of Ontario.

**PERP** means Ontario Provincial Emergency Response Plan.

**PGFP** means personal ground fault protection.

**PHA** means Preliminary Hazard Analysis.

**PHL** means Preliminary Hazard List.

**PID(S)** means Passenger information display (systems).

**PIS** means public information system.

**PLC** means Programmable Logic Controller.

**PPE** means personal protective equipment.

**PPHPD** means passenger per hour per direction.

**PPUDO** means Passenger Pick-Up and Drop-Off.

**PROM** means programmable read-only memory.

**PRP** means Property Request Plan.

**PSPC** means Public Services and Procurement Canada.

**PTI** means Post-Tensioning Institute.

**PTTW** means Permit to Take Water.

**PTU** means portable test unit.

**PTZ** means pan tilt zoom.

**PVB** means polyvinyl butyral.

**PVC** means polyvinyl chloride.

**PVDF** means polyvinylidene fluoride.

**PVMS** means portable variable-message signs.

**PXO** means pedestrian crossover(s).

**RAMS** means reliability, availability, maintainability and safety.

**RBE** means Railway Bridge Engineer.

**RBM** means rail bound manganese.

**RCMP** means Royal Canadian Mounted Police.

**RCP** means reinforced concrete pipe.

**RETC** means Rapid Excavation and Tunneling Conference.

**RH** means relative humidity.

**RMA** means Roadway Modification Approval.

**RMP** means Requirements Management Plan.

**ROM** means read-only memory.

**ROW** means right-of-way.

**RRFB** means rectangular rapid flashing beacon.

**RRTS** means Rules Respecting Track Safety (TC).

**RSA** means Railway Safety Act.

**RSS** means radio standards specification in Schedule 15-2, Part 3 - Systems.

**RSS** means Retained Soil System in Schedule 15-2, Part 2 – Civil and Guideway.

**RTU** means remote terminal units.

**RVCA** means Rideau Valley Conservation Authority.

**S&TC(S)** means Signalling and Train Control (System).

**SAE** means Society of Automotive Engineers.

**SAP** means System Assurance Program.

**SAR** means Species-at-Risk.

**SAT** means System Acceptance Test(ing)

**SB** means southbound.

**SCADA** means Supervisory Control and Data Acquisition.

**SCIL** means safety critical items list.

**SCM** means Safety Certification Manager.

**SeCM** means Security Certification Manager.

**SEMP** means System Engineering Management Plan.

**SeRTM** means Security Requirement Traceability Matrix.

**SES** means “Subway Environment Simulation” software, originally referenced in the “Subway Environmental Design Handbook” (US Department of Transportation, Washington, DC, USA).

**SeVM** means Security Verification Matrix.

**SI** means System Infrastructure.

**SIL** means Safety Integrity Level.

**SIMP** means systems integration management plan.

**SINAD** means signal-to-noise and distortion ratio.

**SIT** means Systems Integration Test as defined in Schedule 14 – Testing and Commissioning.

**SLC** means subscriber line carrier.

**SLR** means Seasonal Load Restrictions.

**SLS** means Serviceability Limit State.

**SMACNA** means Sheet Metal and Air-conditioning Contractors' National Association.

**SNCA** means South Nation Conservation Authority.

**SOP** means Standard Operating Practice/Procedure.

**SPL** means sound pressure level.

**SRTM** means Safety Requirement Traceability Matrix.

**SSAP** means System Safety Assurance Plan.

**SSCP** means System Safety Certification Plan.

**SSCRT** means Safety and Security Certification Review Team.

**SSD** means Stopping Sight Distance.

**SSeAP** means System Security Assurance Plan.

**SSeCP** means System Security Certification Plan.

**SSePP** means System Security Program Plan.

**SSHL** means Subsystem Hazard List.

**SSORC** means Safety and Security Operations Review Committee.

**SSPC** means Society for Protective Coatings.

**SSPP** means System Safety Program Plan.

**SSRTM** means System Safety Requirement Traceability Matrix.

**SSVM** means System Safety Verification Matrix.

**SVM** means Safety Verification Matrix.

**STEL** means Staff Telephones

**STO** means Société de transport de l'Outaouais.

**SWM** means stormwater management.

**SWMP** means Stormwater Management Practice.

**T&DI** means Transportation and Development Institute.

**TAB** means testing, adjusting and balancing.

**TAC** means Transportation Association of Canada.

**TC** means Transport Canada.

**TCD** means Traffic Control Device.

**TCP** means Traffic Control Plan or Transmission Control Protocol.

**TCRP** means Transit Cooperative Research Program.

**TCS** means Train Control System.

**TCU** means Traction Control Unit.

**THR** means Tolerable Hazard Rate.

**TIA** means Telecommunications Industry Association or Transportation Impact Assessment (City of Ottawa).

**TIAC** means Thermal Insulation Association of Canada.

**TIMP** means Traffic Incident Management Plan.

**TIP** means Transit Information Panel.

**T&I** means Telephones and Intercoms.

**TLV** means Threshold Limit Value.

**TMIP** means Traffic Management Implementation Plan.

**TNPI** means [REDACTED].

**TOCC** means Transit Operations Control Centre.

**TOD** means Transit-Oriented Development.

**TOR** means top of rail.

**TSA** means transsecure area.

**TSB** means Transportation Safety Board (of Canada).

**TSS** means total suspended solids.

**TSSA** means Technical Standards & Safety Authority.

**TTEL** means Tunnel Telephones.

**TTMP** means Traffic and Transit Management Plan.

**TVA** means Threat and Vulnerability Analysis.

**TVS** means Tunnel ventilation system.

**TVSS** means transient voltage surge suppressor.

**TWSI** means tactile walking strip indicators.

**UIC** means Union International Des Chemin de Fer

**UL** means Underwriter's Laboratories.

**ULC** means Underwriter's Laboratories of Canada.

**ULS** means Ultimate Limit State.

**UPS** means uninterruptible power supply.

**UV** means ultraviolet (solar radiation).

**VAC** means volts alternating current.

**VISSIM** means the microscopic multi-modal traffic flow simulation software package used to develop traffic models.

**VL** means vulnerability log.

**VLAN** means virtual local area network.

**VLS** means Vehicle Location System.

**VMIS** means Vital Microprocessor Interlocking System.

**VMS** means Vehicle Monitoring System.

**VOC** means volatile organic compound.

**VoIP** means voice over internet protocol.

**WAN** means wide area network.

**WHMIS** means Health Canada's Workplace Hazardous Materials Information System.

**WNC** means the West Nepean Collector.

**WSD** means Working Stress Design.

**WSIB** means Workplace Safety and Insurance Board.

**YCC** means yard control centre.

**YCS** means yard control system.

**ZOI** means Zone of Influence.

## ARTICLE 3 REFERENCE DOCUMENTS

### 1.1 General

- (a) Codes, standards, manuals, installation, application and maintenance instructions, and other reference documents referred to in the Output Specifications, unless otherwise specified and unless otherwise stated in governing legislation, shall be the latest published editions at the date of Commercial Close.
- (b) Project Co shall conform to codes, standards, manuals, installation, application and maintenance instructions, and other Reference Documents referred to in the Output Specification.
- (c) If there is a question regarding whether any product, material, component, assembly or system is in conformance with applicable requirements, the City reserves the right to have such products, materials, components, assemblies or systems tested at Project Co's cost to prove or disprove conformance. The cost for testing will be borne by the City in the event of conformance with the Output Specification, or by Project Co in the event of non-conformance.
- (d) Refer to the Project Agreement and the Ontario Building Code for definitions applicable to the Project.

### 1.2 Reference Documents

#### Reference Documents in Schedule 15

#### Description of Reference Documents

14 CFR 25.853	Code of Federal Regulations, Title 14: Aeronautics and Space; Part 25.853 – Compartment Interiors
29 CFR 1910.19	Code of Federal Regulations, Title 29: Labor; Part 1910.19 – Special Provisions for Air Contaminants
40 CFR 82	Code of Federal Regulations, Title 40: Protection of Environment; Part 82 – Protection of Stratosphere Ozone
49 CFR 223	Code of Federal Regulations, Title 49: Transportation; Part 223 – Safety Glazing Standards - Locomotives, Passenger Cars and Cabooses
49 CFR Part 238	Code of Federal Regulations, Title 49: Transportation; Part 238 – Passenger Equipment Safety Standards

**Reference Documents in Schedule 15**

**Description of Reference Documents**

AAMA 611	AAMA 611 Voluntary Specification for Anodized Architectural Aluminum
AAMA 620	AAMA 620 Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum
AAMA Aluminum Curtain Wall Design Guide Manual (CW-DG-1-96)	American Architectural Manufacturers Association (AAMA)
AAR M-101	AAR M-101 Carbon Steel Axles
AAR Manual of Standards and Recommended Practices	Association of American Railroads (AAR)
AAR RP-585	AAR RP-585 Wiring and Cable Specification
AAR S-501	AAR S-501 Specification for Wire and Cables
AASHTO Guide for the Design of Pavement Structures	American Association of State Highway and Transportation Officials (AASHTO), 1993
AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges	
AASHTO Guide Specifications for Horizontally Curved Highway Bridges	
AASHTO Guide Specifications for Strength Evaluation of Existing Steel and Concrete Bridges	
AASHTO Guide Specifications for Structural Design of Sound Barriers	
AASHTO Guide Specifications – Thermal Effects in Concrete Bridge Structures	
AASHTO Manual for Condition Evaluation of Bridges	
ACI 201.2R	ACI 201.2R Guide to Durable Concrete
ACI 347.3R	ACI 347.3R Guide to Formed Concrete Surfaces
ACI 358.1	ACI 358.1 Analysis and Design of Reinforced and Prestressed – Concrete Guideway Structures
ACI 360R	ACI 360R Design of Slabs on Grade

**Reference Documents in Schedule 15**

**Description of Reference Documents**

ACI 365	ACI 365 Service Life Prediction
ACI Publication 201.2R	ACI Publication 201.2R Guide to Durable Concrete
ACI Publication 222R	ACI Publication 222R Protection of Metals in Concrete Against Corrosion
ACI Publication 506.2	ACI Publication 506.2 Below Grade Shotcrete Used as Permanent Support
ACI Publication SP-77	ACI Publication SP-77 Sulphate Resistance of Concrete
Accessibility for Ontarians with Disabilities Act (AODA)	
AESS Supplement	Modern Steel Construction, May 2003
AISC Code of Standard Practice for Steel Buildings and Bridges	American Institute of Steel Construction (AISC), March 2005
AISC Design Guide Series 9	AISC Design Guide Series 9 – Torsional Analysis of Structural Steel Members
AISI/ASTM A167	AISI/ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
Alberta Transportation Highway Geometric Design Guide	Alberta Transportation Highway Geometric Design Guide, January 2004
Americans with Disabilities Act (ADA)	
AMCA Standard 210	Air Movement and Control Association International (AMCA) Standard 210, “Laboratory Methods of Testing Fans for Rating Purposes”
AMCA Standard 300	AMCA Standard 300, “Test Code for Sound Rating Air Moving Devices”
AMCA Standard 301	AMCA Standard 301, “Methods for Calculating Fan Sound Ratings from Laboratory Test Data”
AMCA Standard 500-L	AMCA Standard 500-L Laboratory Methods of Testing Louvers for Rating
AMS 5050 E	AMS 5050 E Steel Tubing, Seamless, 0.15 Carbon, Maximum, Annealed
ANSI/ALI ALCTV-2006	ANSI/ALI ALCTV-2006 Safety Requirements for the Installation and Service of Automotive

**Reference Documents in Schedule 15**

**Description of Reference Documents**

<b>Reference Documents in Schedule 15</b>	<b>Description of Reference Documents</b>
	Lifts
ANSI/ASCE/T&DI 21	ANSI/ASCE/T&DI 21 Automated People Mover Standards – Parts 1-4
ANSI/ASHRAE 135	ANSI/ASHRAE 135 BACnet A Data Communication Protocol for Building Automation and Control Networks
ANSI/AWWA C105	ANSI/AWWA C105 Polyethylene Encasement for Ductile-Iron Pipe Systems
ANSI/IEEE 515.1	ANSI/IEEE 515.1 Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Commercial Applications
ANSI/IESNA RP-22	ANSI/IESNA RP-22 Tunnel Lighting
ANSI/SIA A92	ANSI/SIA A92 Elevating and Vehicle Lift Devices
ANSI B1.20.1	ANSI B1.20.1 Pipe Threads, General Purpose (Inch)
ANSI C34.2	ANSI C34.2 Semiconductor Power Rectifiers
ANSI C37	ANSI C37 Low Voltage Power Circuit Breaker
ANSI C57	ANSI C57 Power Transformers
ANSI Z26.1	ANSI Z26.1 Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways
ANSI Z97.1	ANSI Z97.1 Safety Glazing Materials Used in Buildings
ANSI Z358.1	ANSI Z358.1 Emergency Eyewash and Shower Equipment
An Urban Design Strategy for Sussex Dr., Rideau St. and Colonel By	
APTA Guidelines for the Design of Rapid Transit Facilities	American Public Transportation Association, 1981
APTA Heavy Duty Escalator Design Guideline	American Public Transportation Association (APTA)
APTA Manual for the Development of System Safety Program Plans for Commuter Railroads	American Public Transportation Association; Commuter Rail Safety Management Program, May 2006

**Reference Documents in Schedule 15**

**Description of Reference Documents**

APTA RP-E-002	APTA RP-E-002 Wiring of Passenger Equipment
APTA RP-E-004	APTA RP-E-004 Gap and Creepage Distance
APTA RP-E-007	APTA RP-E-007 Storage Batteries and Battery Compartments
APTA RP-E-009	APTA RP-E-009
APTA RP-M-001	APTA RP-M-001 Air Connections, Location and Configuration of, for Passenger Cars Equipped with AAR Long Shank Tight Lock or Similar Long Shank Type Couplers
APTA RP-M-009	APTA RP-M-009 New Truck Design
APTA SS-C&S-004	APTA SS-C&S-004 Austenitic Stainless Steel for Railroad Passenger Equipment
APTA SS-C&S-015	APTA SS-C&S-015 Aluminum and Aluminum Alloys for Passenger Equipment Car Body Construction
APTA SS-E-005	APTA SS-E-005 Grounding and Bonding
APTA SS-E-013	APTA SS-E-013 Emergency Lighting System Design for Passenger Cars
APTA SS-M-015-06	APTA SS-M-015-06 Wheel Flange Angle for Passenger Equipment
APTA SS-PS-004	APTA SS-PS-004 Low-Location Exit Path Marking
AREMA Communications and Signal Manual	AREMA
AREMA Manual For Railway Engineering, Volume 2, Chapter 28, Temporary Structure for Construction	AREMA
ASCE Guidelines for Tunnel Lining Design,	ASCE Technical Committee on Tunnel Lining Design, edited by T. O'Rourke, 1984
ASHRAE 52.2	ASHRAE 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
ASHRAE 55	ASHRAE 55 – Thermal Environmental Conditions for Human Occupancy, 2010 Edition.

**Reference Documents in Schedule 15**

**Description of Reference Documents**

ASHRAE 62.1	ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality
ASHRAE 90.1	ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings – permitted for construction after December 31, 2011
ASHRAE 189.1	ASHRAE 189.1 – Design of High-Performance, Green Buildings
ASHRAE Handbook	HVAC Applications, Division 13, “Enclosed Vehicular Facilities”, 2007
ASME/ANSI B16.3	ASME/ANSI B16.3 Malleable Iron Threaded Fittings
ASME/ANSI B16.5	ASME/ANSI B16.5 Pipe Flanges and Flanged Fittings
ASME/ANSI B16.22	ASME/ANSI B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME A17.1	ASME A17.1 Safety Code for Elevators and Escalators
ASME A112.19.2 / CSA B45.1	ASME A112.19.2 / CSA B45.1 Ceramic Plumbing Fixtures
ASME B30.2	ASME B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
ASME B30.10	ASME B30.10 Hooks
ASME 30.11	ASME 30.11 Monorails and Underhung Cranes
ASME B30.16	ASME B30.16 Overhead Joists (Underhung)
ASME B31.1	ASME B31.1 Power Piping
ASME B31.5	ASME B31.5 Refrigeration Piping and Heat Transfer Components
ASME RT-1	ASME RT-1 Safety Standard for Structural Requirements for Light Rail Vehicles
ASSE 1052	ASSE 1052 Performance Requirements for Hose Connection Backflow Preventers
ASTM A1	ASTM A1 Carbon Steel Tee Rails

**Reference Documents in Schedule 15**

**Description of Reference Documents**

ASTM A6	ASTM A6 General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling
ASTM A53	ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A82 / A82M	ASTM A82 / A82M Steel Wire, Plain for Concrete Reinforcement
ASTM A105	ASTM A105 Carbon Steel Forgings for Piping Applications
ASTM A106	ASTM A106 Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A123	ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153M-03e	ASTM A153M-00 Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A167	ASTM A167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A185	ASTM A185 Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A193	ASTM A193 Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A197	ASTM A197 Cupola Malleable Iron
ASTM A234	ASTM A234 Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
ASTM A240	ASTM A240 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications
ASTM A269	ASTM A269 Seamless and Welded Austenitic Stainless steel Tubing for General Service
ASTM A276-04	ASTM A276-04 Stainless Steel Bars and Shapes
ASTM A307	ASTM A307 Carbon Steel Bolts and Studs
ASTM A325M	ASTM A325M Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

**Reference Documents in Schedule 15**

**Description of Reference Documents**

ASTM A416/416M-06	ASTM A416/416M-06 Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
ASTM A421/421M-05	ASTM A421/421M-05 Uncoated Stress-Relieved Steel Wire for Prestressed Concrete
ASTM A496/A496M	ASTM A496/A496M Steel Wire, Deformed for Concrete Reinforcement
ASTM A497/A497M	ASTM A497/A497M Steel Welded Wire Reinforcement, Deformed, for Concrete
ASTM A515	ASTM A515 Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
ASTM A516	ASTM A516 Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower Temperature Service
ASTM A563	ASTM A563 Carbon and Alloy Steel Nuts
ASTM A568	ASTM A568 General Requirements for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled
ASTM A588	ASTM A588 High-Strength Low-Alloy Structural Steel
ASTM A606	ASTM A606 Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A653/A653M	ASTM A653/A653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A666	ASTM A666 Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
ASTM A775/A775M	ASTM A775/A775M Epoxy Coated Reinforcing Steel Bars
ASTM B33	ASTM B33 Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM B209	ASTM B209 Aluminum and Aluminum Alloy Sheet and Plate

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ASTM B221	ASTM B221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles and Tubes
ASTM B280	ASTM B280 Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
ASTM B584	ASTM B584 Copper Alloy Sand Castings for General Applications
ASTM C67	ASTM C67 Sampling and Testing Brick and Structural Clay Tile
ASTM C260	ASTM C260 Air-Entraining Admixtures for Concrete
ASTM C452-75	ASTM C452-75 Potential Expansion of Portland-Cement Mortars Exposed to Sulfate
ASTM C494/C494M	ASTM C494/C494M Standard Specification for Chemical Admixtures for Concrete
ASTM C507-95a	ASTM C507-95a Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C534	ASTM C534 Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
ASTM C542	ASTM C542 Lock-Strip Gaskets
ASTM C547	ASTM C547 Mineral Fiber Pipe Insulation
ASTM C553	ASTM C553 Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C568	ASTM C568 Limestone Dimension Stone
ASTM C612	ASTM C612 Mineral Fiber Block and Board Thermal Insulation
ASTM C615	ASTM C615 Granite Dimension Stone
ASTM C716	ASTM C716 Installing Lock-Strip Gaskets and Infill Glazing Materials
ASTM C864	ASTM C864 Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers
ASTM C881/C881M	ASTM C881/C881M Epoxy-Resin-Base Bonding Systems for Concrete

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ASTM C936	ASTM C936 Solid Concrete Interlocking Paving Units
ASTM C1017/C1017M	ASTM C1017/C1017M Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1026	ASTM C1026 Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling
ASTM C1036	ASTM C1036 Flat Glass
ASTM C1048	ASTM C1048 Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass
ASTM C1059/C1059M	ASTM C1059/C1059M Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C1166	ASTM C1166 Lock-Strip Gaskets
ASTM C1172	ASTM C1172 Laminated Architectural Flat Glass
ASTM C1184	ASTM C1184 Structural Silicone Sealants
ASTM C1242	ASTM C1242 Selection, Design and Installation of Dimension Stone Attachment Systems
ASTM D395	ASTM D395 Rubber Property – Compression Set
ASTM D422-63	ASTM D422-63 Particle-Size Analysis of Soils
ASTM D516	ASTM D516 Sulfate Ion in Water
ASTM D695	ASTM D695 Compressive Properties of Rigid Plastics
ASTM D790	ASTM D790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D2240	ASTM D2240 Rubber Property – Durometer Hardness
ASTM D2850-95	ASTM D2850-95 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
ASTM D2922	ASTM D2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D3222	ASTM D3222 Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and

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<b>Reference Documents in Schedule 15</b>	<b>Description of Reference Documents</b>
	Coating Materials
ASTM D3675	ASTM D3675 Surface Flammability of Flexible Cellular Materials Using a Radiant Heat Energy Source
ASTM D4976	ASTM D4976 Polyethylene Plastics Molding and Extrusion Materials
ASTM D5856-95	ASTM D5856-95 Water in Petroleum Products and Bituminous Materials by Distillation
ASTM E84	ASTM E84 Surface Burning Characteristics of Building Materials
ASTM E90	ASTM E90 Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E119	ASTM E119 Fire Tests of Building Construction and Materials
ASTM E162	ASTM E162 Surface Flammability of Materials Using a Radiant Heat Energy Source
ASTM E283-04	ASTM E283-04 Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E330	ASTM E330 Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls
ASTM E331	ASTM E331 Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E648	ASTM E648 Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM E662	ASTM E662 Specific Optical Density of Smoke Generated by Solid Material
ASTM E1332	ASTM E1332 Rating Outdoor-Indoor Sound Attenuation
ASTM F436	ASTM F436 Standard Specification for Hardened Steel Washers
ASTM F519	ASTM F519 Mechanical Hydrogen

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	Embrittlement Evaluation of Plating/Coating Processes and Service Environments
ASTM F593	ASTM F593 Stainless Steel Bolts, Hex Cap Screws and Studs
ASTM F738M	ASTM F738M Stainless Steel Metric Bolts, Screws, and Studs
ASTM F836M	ASTM F836M Style 1 Stainless Steel Metric Nuts
ASTM G51	ASTM G51 Measuring pH of Soil for Use in Corrosion Testing
ASTM G57	ASTM G57 Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method
AWMAC	Quality Standards for Architectural Woodwork
AWS A5.0	AWS A5.0 Filter Metal Procurement Guidelines
AWS BRH	AWS BRH American Welding Society Brazing Handbook
AWS C1.1	AWS C1.1 Resistance Welding
AWS D1.1	AWS D1.1 Structural Welding Code – Steel
AWS D1.2	AWS D1.2 Structural Welding Code – Aluminum
AWS D1.3	AWS D1.3 Structural Welding Code – Sheet Steel
AWS D1.6	AWS D1.6 Structural Welding Code – Stainless Steel
AWS D14.1	AWS D14.1 Welding of Industrial and Mill Cranes and Other Material Handling Equipment
AWS D15.1	AWS D15.1 Railroad Welding Specification – Cars and Locomotives
AWS WHB	AWS WHB American Welding Society Welding Handbook
Bayview/Somerset Area Secondary Plan BSS-7239	BSS-7239 Test Method for Toxic Gas Generation by Materials on Combustion

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**Description of Reference Documents**

Canada's Capital Core Area Sector Plan

Canada Labour Code (1985)

SOR/87-104 - On Board Trains Occupational Safety and Health Regulations (made pursuant to the Canada Labour Code, Part II)

Safety and Health Committees and Representatives Regulations (made pursuant to the Canada Labour Code, Part II)

Canadian Conservation Institute

Industry best practice for art handling and conservation in locations with existing artwork, as available on the Canadian Conservation Institute website

Canadian Environmental Protection Act (R.S. 1999, c. 33)

Canadian Rail Operating Rules

Transport Canada, 2016

Canada Transportation Act (CTA)

Canadian Transportation Accident Investigation and Safety Board Act (R.S. 1989, c. C-23.4)

Canadian Transportation Agency

Code of Practice, Passenger Terminal Accessibility

Canadian Transportation Agency

Code of Practice, Passenger Rail Car Accessibility and Terms and Conditions of Carriage by Rail of Persons with Disabilities

Canadian Transportation Agency

Code of Practice, Removing Communication Barriers for Travelers with Disabilities

Canadian Transportation Agency

Code of Practice, Intercity Bus

CAN/CGSB 1.181

CAN/CGSB 1.181 Ready-Mixed Organic Zinc-Rich Coating

CAN/CGSB 12.1-M

CAN/CGSB 12.1-M, Tempered or Laminated Safety Glass

CAN/CGSB 12.11-M

CAN/CGSB 12.11-M Wired Safety Glass

CAN/CGSB 12.20-M

CAN/CGSB 12.20-M Structural Design of Glass for Buildings

CAN/CGSB 12.3-M

CAN/CGSB 12.3-M Flat, Clear Float Glass

CAN/CGSB 12.8-M

CAN/CGSB 12.8-M Insulating Glass Units

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CAN/CGSB 75.1-M	CAN/CGSB 75.1-M Tile, Ceramic
CAN/CGSB 85.100	CAN/CGSB 85.100 Painting
CAN/CGSB-109.4	CAN/CGSB-109.4-2000, Passenger Information Symbols Standard
CAN/CSA A5	CAN/CSA A5 Portland Cement
CAN/CSA A16	CAN/CSA A16 Design of Steel Structures
CAN/CSA A23.1	CAN/CSA A23.1 Concrete Materials and Methods of Concrete Construction
CAN/CSA A23.2	CAN/CSA A23.2 Methods of Testing for Concrete
CAN/CSA A23.3	CAN/CSA A23.3 Design of Concrete Structures
CAN/CSA A23.4	CAN/CSA A23.4 Precast Concrete - Materials and Construction
CAN/CSA A23.5	CAN/CSA A23.5 Supplementary Cementing Materials
CAN/CSA A165	CAN/CSA A165 Concrete Masonry Units
CAN/CSA A179	CAN/CSA A179 Mortar and Grout for Unit Masonry
CAN/CSA A251	CAN/CSA A251 Qualification Code for Architectural and Structural Precast Concrete
CAN/CSA A370	CAN/CSA A370 Connectors for Masonry
CAN/CSA A371	CAN/CSA A371 Masonry Construction for Buildings
CAN/CSA A440	CAN/CSA A440 Window, Door, and Skylight Installation
CAN/CSA A3000	CAN/CSA A3000 Cementitious Materials Compendium
CAN/CSA B44	CAN/CSA B44 Safety Code for Elevators
CAN/CSA B45	CAN/CSA B45 Plumbing Fixtures
CAN/CSA B52	CAN/CSA B52 Mechanical Refrigeration Code
CAN/CSA B139	CAN/CSA B139 Installation Code for Oil Burning Equipment
CAN/CSA B167-96	CAN/CSA B167-96 Maintenance and Inspection

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	of Overhead Cranes, Gantry Cranes, Monorails, Hoists and Trolleys
CAN/CSA B651-04	CAN/CSA B651-04 Accessible Design for the Built Environment
CAN/CSA C22.1-09	CAN/CSA C22.1-09 Canadian Electrical Code, Part I – Safety Standard for Electrical Installations
CAN/CSA C22.2-09	CAN/CSA C22.2-09 Canadian Electrical Code, Part II – General Requirements
CAN/CSA C22.2 No. 94	CAN/CSA C22.2 No. 94 Electrical Enclosures
CAN/CSA C22.3 No. 1 & 8	CAN/CSA C22.3 No. 1 & 8 Overhead Systems
CAN/CSA C22.3 No. 4	CAN/CSA C22.3 No. 4-1974(R1995) Control of Electromechanical Corrosion of Underground Metallic Structures
CAN/CSA C390-10	CAN/CSA C390-10 Energy Efficiency Test Methods for Three-Phase Induction Motors
CAN/CSA G30.5	CAN/CSA G30.5 Welded Steel Wire Fabric for Concrete Reinforcement
CAN/CSA G30.18	CAN/CSA G30.18 Grade 400W, Billet-steel Bars, Deformed
CAN/CSA G40.20	CAN/CSA G40.20 General Requirements for Rolled or Welded Structural Quality Steel
CAN/CSA G40.21	CAN/CSA G40.21 Structural Quality Steels
CAN/CSA-G164-M	CAN/CSA-G164-M Hot Dip Galvanizing of Irregularly Shaped Articles
CAN/CSA O86	CAN/CSA O86 Engineering Design in Wood
CAN/CSA Q396	CAN/CSA Q396 Software Quality Assurance Standards
CAN/CSA Q632-90	CAN/CSA Q632-90 Reliability and Maintainability Management Guidelines
CAN/CSA S6	CAN/CSA S6 Canadian Highway Bridge Design Code (CHBDC)
CAN/CSA S16	CAN/CSA S16 Limit States Design of Steel Structures
CAN/CSA S136-M	CAN/CSA S136-M Design of Cold-Formed

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	Steel Structural Members
CAN/CSA S304.1	CAN/CSA S304.1 Design of Masonry Structures
CAN/CSA S413	CAN/CSA S413 Parking Structures
CAN/CSA S478	CAN/CSA S478 Guideline on Durability in Buildings
CAN/CSA S448.1	CAN/CSA S448.1 Repair of Reinforced Concrete in Buildings and Parking Structures
CAN/CSA W47.1	CAN/CSA W47.1 Certification for Companies for Fusion Welding of Steel Structures
CAN/CSA W59	CAN/CSA W59 Welded Steel Construction (Metal Arc Welding)
CAN/CSA W186-M	CAN/CSA W186-M Welding of Reinforcing Bars in Reinforced Concrete Construction
CAN/CSA Z259.1	CAN/CSA Z259.1 Fall-Arresting Safety Belts and Lanyards for the Construction and Mining Industries
CAN/CSA Z259.2-M	CAN/CSA Z259.2-M Fall-Arresting Devices, Personal Lowering Devices and Life Lines
CAN/CSA Z259.3-M	CAN/CSA Z259.3-M Lineman’s Body Belt and Lineman’s Safety Strap
CAN/CSA Z462	CAN/CSA Z462 Workplace Electrical Safety
CAN/ULC-S701	CAN/ULC-S701 Thermal Insulation, Polystyrene, Boards and Pipe Covering
CAN3 S157-M	CAN3 S157-M Strength Design in Aluminum
Canadian Artists’ Representation / Le Front des artistes canadiens (CARFAC)	Guidance on economic and legal rights for artists engaged in visual arts, as available on the CARCC website
Canadian Conservation Institute	Industry best practice for art handling and conservation in locations with existing artwork
Canadian Electrical Code	Canadian Electrical Code (CEC), 21 <sup>st</sup> Edition
Canadian Foundation Engineering Manual	Canadian Foundation Engineering Manual, 3 <sup>rd</sup> & 4 <sup>th</sup> Editions
Canadian Motor Vehicle Safety Regulations, Technical Standard 108	

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Canadian Portland Cement Association's  
Simplified Design Procedure

Canadian Standards for Nursery Stock

Most recent addition

Capital Railway – Diesel Multiple Units  
Inspection and Safety Rules

Capital Railway LINT Diesel Multiple Units  
Inspection and Safety Rules

Capital Railway – Railway Equipment  
Reflectorization Rules

Capital Railway Rules and Regulations

Certificate of Fitness No. 00002-2  
(Canadian Transportation Agency)

CGC Steel Framed Drywall Systems, 09250-  
1 E

CGC Steel Framed Drywall Systems, 09250-1 E

CISC Guide for the Design of Crane-  
Supporting Steel Structures

Canadian Institute of Steel Construction (CISC)

City of Ottawa Area Traffic Management  
Principles and Guidelines

City of Ottawa CADD Standards Manual

City of Ottawa CADD standards for project and  
as-built drawings

City of Ottawa Data Handbook

City of Ottawa Emergency Management Plan

City of Ottawa Green Space Master Plan

City of Ottawa Integrated Street Furniture  
Policy and Design Guidelines

City of Ottawa Integrated Street Furniture Policy  
and Design Guidelines, August 2009 (ISFP)

City of Ottawa Interior Planning Standards

City of Ottawa, Real Property and Assets  
Management, July 2002

City of Ottawa ISD Project Delivery Manual

City of Ottawa standards for project planning,  
design and construction

City of Ottawa Municipal Accessibility Plan  
(COMAP) Accessibility and Design  
Guidelines for the Visually Impaired

City of Ottawa Municipal Accessibility Plan  
(COMAP) Accessibility and Design Guidelines  
for the Visually Impaired

City of Ottawa Operational Policy,  
Procedures and Guidelines

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City of Ottawa Right of Way Lighting Policy

City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors

City of Ottawa Sewer Design Guidelines

City of Ottawa Sewer Use By-law  
No. 2003-514

City of Ottawa Slope Stability Guidelines for Development Applications

City of Ottawa Standard Tender Documents for Unit Price Contracts, Volume 1 and 2

City of Ottawa Traffic and Parking By-Laws

City of Ottawa Transit Technology Choice Report

City of Ottawa Trillium Line Public Art Plan

City of Ottawa Urban and Rural Truck Routes

City of Ottawa Water Design Guidelines

CMAA No. 70

CMAA No.74

CN Guidelines for Design of Railway Structures

CPCI Design Manual Precast Prestressed Concrete

*Contraventions Act (S.C. 1992, c. 47)*

CRCA Specifications Manual

CSSBI 101 M

City of Ottawa Road Corridor Planning & Design Guidelines, Urban & Village Collectors / Rural Arterials & Collectors

City of Ottawa Sewer Design Guidelines

Public Art Plan developed by the City of Ottawa for Stage 2 Light Rail Transit

CMAA No. 70 Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes

CMAA No.74 Top Running and Under Running Single Girder Electric Traveling Cranes Utilizing Under Running Trolley Hoist

CN, 2006

Canadian Roofing Contractors Association (CRCA)

CSSBI 101 M Zinc Coated Structural Quality Steel Sheet for Steel

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DOT-FTA-MA-26-5005-00-01 Hazard Analysis Guidelines for Transit Projects

U.S. Department of Transportation, Federal Transit Administration (January 2000)

DOT, “Recommended Emergency Preparedness Guidelines for Rail Transit Systems”

Department of Transportation (DOT), “Recommended Emergency Preparedness Guidelines for Rail Transit Systems”

Downtown Ottawa Urban Design Strategy

Downtown Ottawa Urban Design Strategy (DOUDS)

*Drainage Act*

*Drainage Act, 1990 (Ontario)*

*Electricity Act*

*Electricity Act, 1998*

*Elevating Devices Act* and Ontario Regulation 229/81

Elevators and Fixed Conveyance Act

EN 13272

EN 13272 Railway applications – Electrical Lighting for Rolling Stock in Public Transport Systems

EN 50121-1

EN 50121-1 Railway Applications – Electromagnetic Compatibility – Part 1: General

EN 50121-2

EN 50121-2 Railway Applications – Electromagnetic Compatibility – Part 2: Emissions of the Whole Railway System to the Outside World

EN 50121-3-1

EN 50121-3-1 Railway Applications, EMC – Rolling Stock – Train and Complete Vehicle

EN 50121-3-2

EN 50121-3-2 Railway Applications, EMC – Rolling Stock – Apparatus

EN 50121-4

EN 50121-4 Railway Applications, EMC – Emission and Immunity of the Signaling and Telecommunications Apparatus

EN 50121-5

EN 50121-5 Railway Applications, EMC – Emissions and Immunity of Fixed Power Supply Installations and Apparatus

EN 50126

EN 50126 Railway Applications – The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS)

EN 50128

EN 50128 Railway Applications – Communication, Signalling, and Processing

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	Systems - Software for Railway Control and Protection Systems
EN 50129	EN 50129 Railway Applications – Communication, Signalling and Processing Systems - Safety Related Electronic for Signalling
EN 50155	EN 50155 Railway Applications – Electronic Equipment Used on Rolling Stock
EN 50159-2	EN 50159-2 Railway Applications – Communication, Signalling and Processing Systems – Part 2: Safety Related Communication in Open Transmission Systems
EN 50162	EN 50162 Protection Against Corrosion By DC Track Stray Currents
Engineering Standards for “Walk Light” Grade Crossing Warning Systems	Transport Canada, TC-39
Federal Highway Administration (FHWA) FHWA-NHI-00-043	Federal Highway Administration (FHWA) FHWA-NHI-00-043 Mechanically stabilized earth walls and reinforced soil slopes design & construction guidelines
Federal Highway Administration (FHWA) Post Tensioning Tendon Installation and Grouting Manual	
<i>Fisheries Act</i>	<i>Fisheries Act, 1985</i>
FM 1-28	FM 1-28 Design Wind Loads
FM 4450	FM 4450 Approval Standards for Class 1 Insulated Steel Roof Decks
FM 4470	FM 4470 Approval Standard for Class 1 Roof Covers
GANA Glazing Manual	Glass Association of North America (GANA)
GANA Laminated Glazing Reference Manual	GANA
<i>General Order O-10</i>	<i>Railway Safety Appliance Standards Regulations</i>
Geometric Design Guide for Canadian Roads	Geometric Design Guide for Canadian Roads (TAC, 1999)

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Geometric Design Standards for Ontario Highways	Geometric Design Standards for Ontario Highways (MTO)
Grade Crossing Regulations (pursuant to the Railway Safety Act)	SOR/2014-275
<i>Grade Crossing Standards</i>	<i>Transport Canada (2014)</i>
<i>Green Energy Act, 2009</i>	
A Guide on the Development and Implementation of Railway Safety Management Systems	Transport Canada, 2010
Guideline for Professional Engineers Providing Geotechnical Engineering Services, published by Professional Engineers of Ontario (PEO)	GUIDELINE, Professional Engineers Providing Geotechnical Engineering Services, Revised 11/15/98
Guideline No. 1 – Procedure and Conditions for Eliminating Whistling at Public Crossings	
HMI 100	HMI 100 Electrical Wire Rope Hoists
IEC/ISO 27000	IEC/ISO 27000 Information Security Management Systems Standards
IEC 1000-5-2	IEC 1000-5-2 EMC Cabling Guidelines
IEC 15288	IEC 15288 Systems Engineering
IEC 60077-1	IEC 60077-1 Railway Applications – Electric Equipment for Rolling Stock - Part 1: General Service Conditions and General Rules
IEC 60077-3	IEC 60077-3 Railway Applications – Electric Equipment for Rolling Stock. Electrotechnical Components. Rules for D.C. Circuit-Breakers
IEC 60322	IEC 60322 Railway Applications – Electric Equipment for Rolling Stock – Rules for Power Resistors of Open Construction
IEC 60349-2	IEC 60349-2 Electric Traction – Rotating Electrical Machines for rail and Road Vehicles – Part 2: Electronic Converter-fed Alternating Current Motors
IEC 60529	IEC 60529 Degrees of Protection Provided by Enclosures (IP Code)

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IEC 60623	IEC 60623 Secondary Cells and Batteries Containing Alkaline or Other Non-acid Electrolytes – Vented Nickel-cadmium Prismatic Rechargeable Single Cells
IEC 61000-2008	IEC 61000-2008 Electromagnetic Compatibility (EMC), Testing and Measurement Techniques
IEC 61071	IEC 61071 Capacitors for Power Electronics
IEC 61133	IEC 61133 Railway Applications – Rolling Stock – Testing of Rolling Stock on Completion of Construction and Before Entry Into Service
IEC 61287-1	IEC 61287-1 Railway Applications – Power Convertors Installed on Board Rolling Stock – Part 1: Characteristics and Test Methods
IEC 61508	IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems
IEEE 11	IEEE 11 Rotating Electric Machinery for Rail and Road Vehicles
IEEE 16	IEEE 16 Electrical and Electronic Control Apparatus on Rail Vehicles
IEEE 80	IEEE 80 Safety in AC Substation Grounding
IEEE 383	IEEE 383 Qualifying Class 1E Electric Cables and Field Splices for Nuclear Power Generating Stations
IEEE 497	IEEE 497 Accident Monitoring Instrumentation for Nuclear Power Generating Stations
IEEE 519	IEEE 519 Harmonic Limits
IEEE 1473	IEEE 1473 Communications Protocol Aboard Passenger Trains
IEEE 1474.1	IEEE 1474.1 Communications-Based Train Control (CBTC) Performance and Functional Requirements
IEEE 1474.2	IEEE 1474.2 Functioning of and Interfaces Among Propulsion, Friction Brake and Train-borne Master Control on Rail Rapid Transit Vehicles

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IEEE 1474.3	IEEE 1474.3 Recommended Practice for Communications-Based Train Control (CBTC) System Design and Functional Allocations
IEEE 1477	IEEE 1477 Passenger Information System for Rail Transit Vehicles
IEEE 1482	IEEE 1482 Rail Transit Vehicle Event Recorders
IEEE 1483	IEEE 1483 Verification of Vital Functions in Processor-Based Systems Used in Rail Transit Control
IEEE 1584	IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations
IEEE 1635.2	IEEE 1635.2 Draft Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications
IEEE C37-13	IEEE C37-13 Low-Voltage AC Power Circuit Breakers Used in Enclosures
IEEE C37-14	IEEE C37-14 Low-Voltage DC Power Circuit Breakers Used in Enclosures
IEEE C95.1	IEEE C95.1 Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 3 to 300 GHz
IEEE C95.6	IEEE C95.6 Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0 to 3 kHz
IESNA Lighting Handbook	Illuminating Engineering Society of North America (IESNA), Lighting Handbook
IESNA TM-11-2006	IESNA TM-11-2006 Technical Memorandum on Light Trespass
ISO 2631	ISO 2631 Mechanical Vibration and Shock
ISO 9000 Series	ISO 9000 Series – Quality Management
ISO 14224	ISO 14224 Petroleum, Petrochemical and Natural Gas Industries – Collection and Exchange of Reliability and Maintenance Data for Equipment
ITA Fire Guidelines	

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Lebreton Flats South Development Memorandum of Understanding – Railway Security (Railway Association of Canada) MHIA: MH 30.1	MHIA: MH 30.1 Specification for Dock Leveling Devices
MIL-STD-882	MIL-STD-882 System Safety
Model National Energy Code for Buildings	Model National Energy Code for Buildings (MNECB), 1997
MOE Design Guidelines for Drinking-Water Systems	Ontario Ministry of the Environment (MOE), 2008
MOE Design Guidelines for Sewage Works	MOE, 2008
MOE Stormwater Management Planning and Design Guidelines	MOE, 2003
MTO/DFO/OMNR Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings	MTO/DFO/OMNR
MTO/DFO/OMNR Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings – User Field Guide	MTO/DFO/OMNR
MTO/MOE Memorandum of Understanding on Permits-To-Take-Water	MTO/MOE, 2007
MTO/MOE Protocol for the Management of Excess Materials in Road Construction and Maintenance	MTO/MOE, 1994
MTO Aesthetic Guidelines for Bridges	MTO, 2004
MTO Bailey Bridge Manual	MTO, 1990
MTO Cathodic Protection Manual for Concrete Bridges	MTO, 1993
MTO Class Environmental Assessment for Provincial Transportation Facilities	MTO, 2000
MTO Concrete Culvert Design and Detailing Manual	MTO, 1988
MTO Construction Manual	MTO

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MTO Drainage Management Manual	MTO, 1997
MTO Electrical Engineering Manual	MTO
MTO Environmental Guide for Contaminated Property Identification and Management	MTO, 2006
MTO Environmental Guidelines for Structural Steel Coating	MTO, 1996
MTO Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance	MTO, 2006
MTO Formwork and Falsework Manual	MTO, 1997
MTO Geometric Design Standards for Ontario Highways Manual	MTO
MTO Gravity Pipe Design Guidelines for Circular Culverts and Storm Sewers	MTO, 2007
MTO Guide for Preparing Hydrology Reports for Water Crossings	MTO
MTO Guide to the Design of Post-Tensioned Decks	MTO, 1997
MTO Highway Drainage Design Standards	MTO, 2008
MTO Integral Abutment Bridge	MTO, 1996
MTO King’s Highway Guide Signing Policy Manual	MTO
MTO Lab Testing Manual	MTO, 2006
MTO Ontario Heritage Bridge Guidelines for Provincially Owned Bridges	MTO, 2008
MTO Ontario Structure Inspection Manual (OSIM)	MTO, 2008
MTO Ontario Structures Inspection Management Systems (OSIMS) User’s Guide	MTO
MTO Overcoating – Technical Assessment of Existing Coatings of Steel Bridges for Overcoating	MTO

Reference Documents in Schedule 15	Description of Reference Documents
MTO Pavement Design and Rehabilitation Manual (SDO-09-01)	MTO, 1990
MTO Performance of Integral Abutment Bridges Report	MTO, 2000
MTO Pile Load and Extraction Tests	MTO
MTO Pre-stressed Concrete Manual for Quality Assurance of Bridges During Construction	MTO
MTO RSS Guidelines	MTO, 2007
MTO Seismic Design Guidelines	MTO
MTO Semi-Integral Abutment Bridges Manual	MTO
MTO Sign Support Manual	MTO
MTO Structural Manual	MTO
MTO Structural Steel Coating Manual	MTO
MTO Structural Rehabilitation Manual	MTO, 2004
NACE Standard SP0169	NACE Standard SP0169 Control of External Corrosion on Underground and Submerged Metallic Piping Systems
<i>National Capital Act, 1985</i>	U.S., 1985
National Electrical and Safety Code (NESC)	
NBCC 2010	National Building Code of Canada (NBCC 2010)
NCC Pathway for Canada's Capital Region Strategic Plan	
NCMA Segmental Retaining Wall Design Manual	
NFPA 10	NFPA 10 Portable Fire Extinguishers
NFPA 13	NFPA 13 Installation of Sprinkler Systems
NFPA 14	NFPA 14 Installation of Standpipe, Private Hydrants, and Hose Systems
NFPA 20	NFPA 20 Installation of Stationary Pumps
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