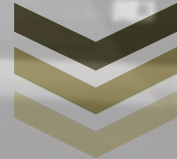


# **ANNUAL COMPLIANCE REPORT FOR 2023 -**

**Regulatory Monitor and  
Compliance Officer –  
Ottawa Light Rail Transit**



**Prepared by Sam Berrada  
For City of Ottawa**

**SAB Vanguard Consulting Inc.**

**March 4<sup>th</sup>, 2024**

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## **1. Executive Summary:**

In accordance with the Delegation Agreement signed between the City of Ottawa and the Minister of Transport in 2011, the City appointed the Regulatory Monitor and Compliance Officer (RMCO) in 2018 to perform regulatory compliance monitoring for the Confederation Line following revenue service inception.

The specific duties and responsibilities established by the City for the RMCO are provided in Annexes 2 and 3, while the regulatory context is provided in Annex 9. As such, the RMCO is responsible to monitor compliance relative to City LRT Regulations (refer to Annex 4) which identify the following responsibilities for OC Transpo:

- Adopt and Implement designated 'OCT Programs';
- Provide Direction and Oversight to OC Transpo employees and contractors;
- Maintain Program related Records;
- Require contractors to Implement and follow substantially consistent Programs.

Following revenue service inception in September 2019, the RMCO has been performing regulatory monitoring activities using a risk-based approach.

In 2023, the RMCO monitored the following areas:

- 1) Inspections of tunnels;
- 2) Inspections of Communications Based Train Control (CBTC).

The above areas were selected for monitoring using a risk-based approach and represent the eighth and ninth areas to be monitored by the RMCO since revenue service inception (refer to Annex 6 for the areas monitored by the RMCO since RSA).

This document constitutes the fifth RMCO Annual Compliance Report which describes the specific areas monitored during 2023, including the work that was undertaken to verify compliance, as well as the compliance assessment findings for each area monitored.

The monitoring Findings for 2023 are provided in Sections 5 and 6 of this Report. In summary, the monitoring activities identified strong compliance results for OC Transpo with some opportunity to strengthen Oversight relative to contractors. The RMCO's monitoring of contractors identified conformant findings for Direction and Oversight, while the execution of inspections was mostly conformant and employee training was partially conformant.

This Annual Compliance Report will be submitted for review at the Transit Commission meeting scheduled on April 11, 2024 and will be in the agenda of the City Council meeting scheduled on April 17, 2024.

## **2. Background:**

On July 14, 2011, Ottawa City Council approved the implementation of the Ottawa Light Rail Transit (OLRT) project which is considered in law to be a federal rail transportation undertaking.

Since federal legislation was not developed for application to municipal light rail systems, the City of Ottawa was provided with the authority to regulate its light rail transit system. This was formalized with an agreement between the Minister of Transport and the City of Ottawa on October 1, 2011, known as the 'Delegation Agreement'.

In accordance with the Delegation Agreement, and By-Law No. 2015 – 301, the position of 'Light Rail Regulatory Monitor and Compliance Officer' (i.e. 'Regulatory Monitor and Compliance Officer – RMCO') was created to monitor and report on compliance with the OLRT Regulations (i.e. City LRT Regulations). Further details on the background are provided in Annex 1.

The RMCO is tasked with performing regulatory compliance monitoring post-revenue service; specific duties and responsibilities are provided in Annexes 2 and 3, while the regulatory context is provided in Annex 9.

Below are some important elements relative to the RMCO duties and responsibilities:

- The RMCO is responsible for regulatory compliance monitoring for the Confederation Line (i.e. does not include Trillium line, bus transit or other OC Transpo operations);
- The compliance monitoring relates primarily to City LRT Regulations and the designated 'OCT Programs' relating to safety and security;
- The RMCO was not involved in the construction, implementation or revenue service availability activities for the Confederation Line;
- The RMCO regulatory monitoring activities started after revenue service;
- The RMCO performs monitoring on an ongoing basis and provides quarterly updates to the City Manager as well as annual reports to the Transit Commission and City Council;
- The RMCO does not have the authority or duty to assess the adequacy, sufficiency, or effectiveness of City LRT Regulations, Programs or the Confederation Line infrastructure / equipment / technology.

One of the early RMCO responsibilities consisted of developing a multi-year Work Plan for carrying out compliance monitoring relative to City LRT Regulations – this was submitted to City Council and approved on September 12, 2018.

Subsequently, following revenue service inception in September 2019, the RMCO started to perform regulatory monitoring activities which have been carried out annually since that date. The areas monitored by the RMCO since revenue service inception are shown in Annex 6.

In early 2021 the RMCO monitoring process was further aligned with City LRT Regulations which were formalized through the document entitled ‘City Manager Designation – Light Rail Regulations’ dated 12 February 2021; a relevant excerpt is provided in Annex 4.

On April 26<sup>th</sup>, 2023 City Council renewed the RMCO’s mandate for a five year term, following which the RMCO proceeded to monitor the following areas during 2023:

- 1) Inspections of tunnels;
- 2) Inspections of Communications Based Train Control (CBTC).

As mentioned above, RMCO responsibilities require the preparation of an Annual Compliance Report which describes regulatory monitoring activities undertaken as well as findings identified – this document constitutes the fifth Annual Compliance Report which presents monitoring activities performed in 2023 as well as the corresponding findings.

Sections 3 and 8 of this Report provides information on the RMCO monitoring approach, which is based on City LRT Regulations and monitoring experience to date, thus supplementing the information provided in the Work Plan.

To further assist readers with a proper review of this Report, please refer to Annex 9, which provides the regulatory context, including the limits on the scope of the RMCO’s monitoring work; the monitoring and oversight work carried out and confirmed by others; and the coordinated interplay between these various oversight functions.

### **3. Regulatory Monitoring Approach:**

#### **3.1 Summary - Process for RMCO Regulatory Monitoring:**

The RMCO monitoring process is designed to perform monitoring activities in an objective manner while engaging stakeholders such that they understand the process and have the time and opportunity to provide the necessary information and resources.

Monitoring is carried out using a fact and evidence-based approach, coupled with principles of transparency, structure and engagement.

Moreover, the monitoring approach is anchored on the following principles:

- A risk-based approach is used to select the regulatory areas / Programs to be monitored on the basis of several inputs / considerations which are described in Subsections 3.2 - 3.4 of this Report;
- To maintain a structured and consistent approach for monitoring, specific procedures are developed for each area to be monitored, thus providing clear expectations for all stakeholders;
- Monitoring procedures are designed to obtain objective evidence to enable the assessment of regulatory compliance using a fact and evidence-based approach. Objective evidence is gathered through the review / analysis of documents and records, as well as interviews and field observations;
- As explained in Section 2 of this Report, the RMCO monitoring process is aligned with City LRT Regulations (i.e. 'City Manager Designation'). The City LRT Regulations (specifically Appendix B Section 1) reaffirm the responsibility for OC Transpo to Adopt and Implement specific Programs, including providing Direction and Oversight, and maintaining Records. With respect to contractors, their obligations are based on contractual agreements as well as OC Transpo Direction – this includes the need for contractors to Adopt and Implement substantially consistent Programs (to the extent applicable – refer to Annex 4) relative to the 'OCT Programs' identified in the City LRT Regulations.

Further details are provided in the following Subsections.

### **3.2 Monitoring Focus on City LRT Regulations:**

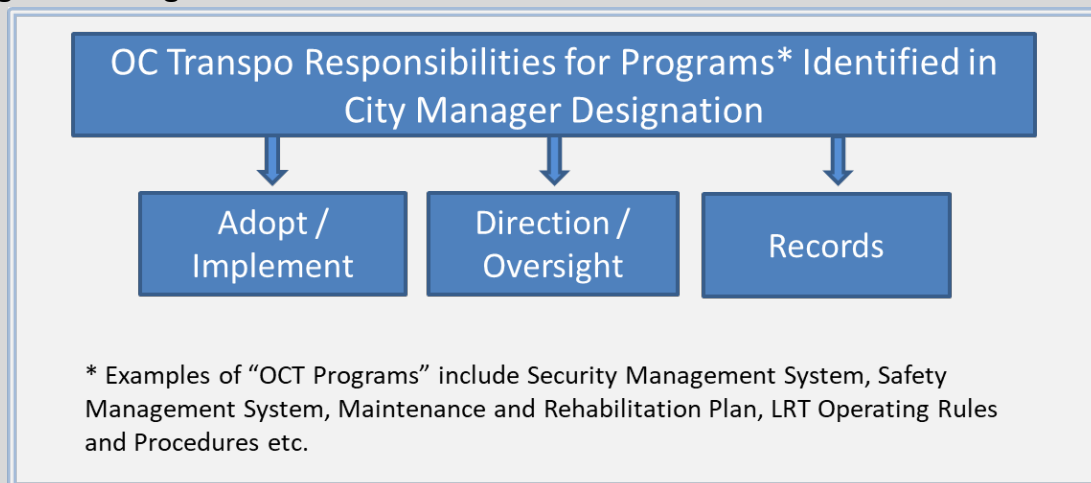
As explained in Section 2 of this Report, the RMCO monitoring approach is aligned with City LRT Regulations.

Specifically, the City LRT Regulations identify the following key responsibilities for OC Transpo (refer to Annex 4):

- Adopt and Implement designated ‘OCT Programs’ (identified in Appendix B Part 1.3 of the City Manager Designation);
- Provide Direction and Oversight to OC Transpo employees and contractors;
- Monitor, maintain Program-related Records and provide access to these Records;
- Require contractors to Implement and follow substantially consistent Programs – to the extent relevant to their assigned work.

Therefore, RMCO monitoring activities focus primarily on assessing compliance relative to the above noted OC Transpo responsibilities – this is outlined in the Figure below. Further, the RMCO’s mandate is focused on OCT Programs relating to safety and security.

**Figure 1 – Overview of OC Transpo Regulatory Responsibilities Relative to Designated Programs**



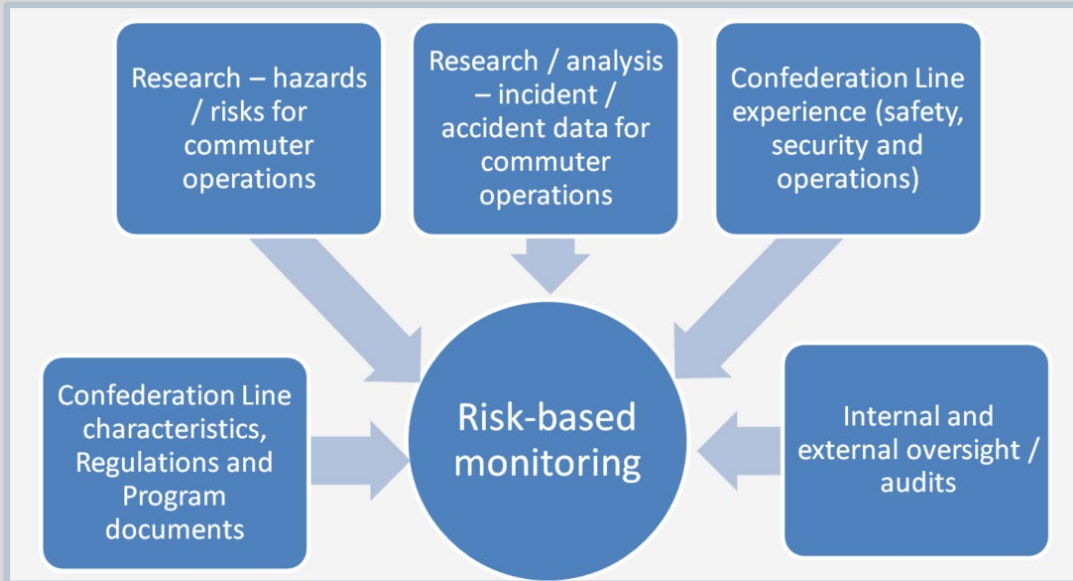
As such, RMCO monitoring activities encompass both OC Transpo and contractors. The reason that contractor activities are monitored is to assess Program implementation which is largely performed by contractors, and to cross-check and assess whether OC Transpo has provided appropriate Direction and Oversight to the contractors regarding these Programs; and that appropriate Program-related Records are being maintained. This inherently provides an understanding of whether contractors are conforming to contractual requirements for the areas monitored.

Moreover, it is important to clarify that the responsibilities identified in the LRT Regulations apply to OC Transpo, whereas contractor obligations are associated with their contractual agreements.

### **3.3 Risk-Based Monitoring:**

In accordance with the multi-year Work Plan, a risk-based approach is used to select regulatory Programs / areas to be monitored – this approach uses the inputs shown in the Figure below:

**Figure 2 – Inputs for Risk-Based Analysis:**



The risk-based approach uses the following key inputs:

- 1) Research relative to hazards and risks for commuter operations;
- 2) Research and analysis relative to incident / accident data for commuter operations;
- 3) Consideration for Confederation Line characteristics (e.g. technology and infrastructure) as well as Regulations and Programs;
- 4) Consideration for Confederation Line experience (e.g. incidents / accidents, service issues etc.);
- 5) Consideration for internal and external oversight / monitoring activities and their respective findings (e.g. RMCO monitoring, OC Transpo oversight) as well as audits and investigations.

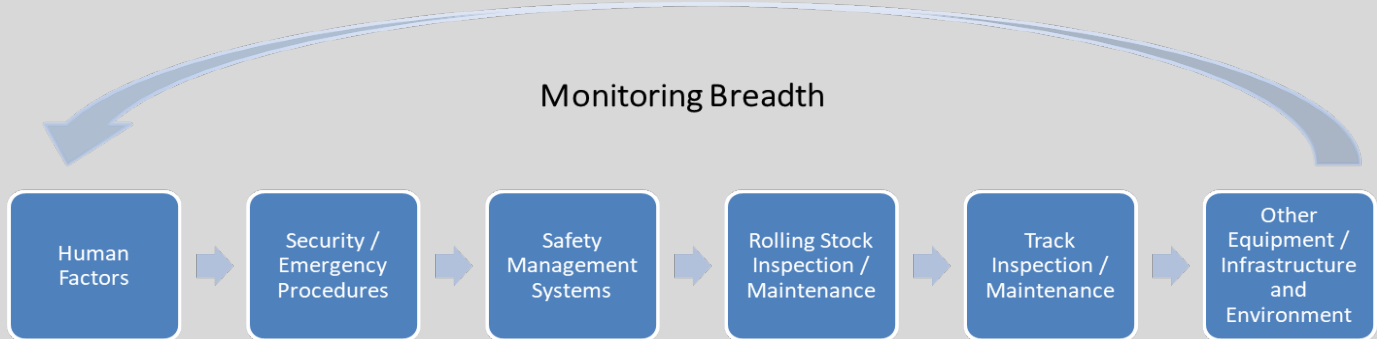
The consideration of multiple inputs, as outlined above, contributes to the selection of regulatory Programs / areas for monitoring which have the greatest potential impact on safety and security, thus complementing the City's efforts to achieve the highest possible level of safety and security.



### **3.4 Monitoring Breadth:**

In accordance with the RMCO duties and responsibilities provided by the City (refer to Annexes 2 and 3), regulatory Programs relating to safety and security are monitored on an ongoing basis using a risk-based approach. The following risk areas are considered in the selection process of regulatory Programs to be monitored:

**Figure 3 – Key Risk Areas Considered for Monitoring:**



In order to maintain a broad perspective in the selection of regulatory Programs to monitor, the RMCO considers the hazard / risk areas identified in the Work Plan (refer to the above Figure and Annex 5 of this Report) to progressively monitor Programs in each of these categories thereby obtaining a broad understanding of compliance over time.

In light of the nature of City LRT Regulations, it is to be noted that each risk area identified in the above Figure corresponds to specific OCT Programs referenced in the City LRT Regulations. Further, each risk area may contain different OCT Programs and associated documents which require progressive monitoring over several segments. For example, the Human Factors risk area inherently encompasses OCT Programs and associated materials such as 'LRT Operating Rules and Procedures', 'Safety Management System' and 'Standard Operating Procedures' etc. Thus, the segment monitored during Q4 2019 relates to one such subcategory (i.e. Training related to 'LRT Operating Rules and Procedures'), within the broader human factors category, while the 'Safety Management System' and 'Standard Operating Rules' were monitored in subsequent years.

This approach provides compliance assessment knowledge which increases incrementally as monitoring progresses, and represents a practical approach to achieving broad monitoring breadth over time.

It is important to recognize that this progressive monitoring and compliance assessment approach used by the RMCO is to be distinguished from audits in the following respects:

- Audits typically encompass both compliance monitoring as well as the identification / assessment of risks, adequacy of controls, governance etc., whereas the RMCO mandate consists primarily of monitoring compliance relative to City LRT Regulations and designated Programs;
- As stated in Section 2, as well as Annexes 2 and 3 of this Report, the RMCO mandate does not encompass the assessment of the adequacy, sufficiency, or effectiveness of City LRT Regulations;

As such, the RMCO scope does not include conducting audits.

## **4. Regulatory Monitoring Overview for 2023:**

As explained in Section 3 of this Report, the selection of regulatory Programs / areas to be monitored is based on two key considerations:

- a) Risk-based analysis is performed using the key inputs identified in Subsection 3.3;
- b) Monitoring is distributed over the six key risk areas identified in Subsection 3.4 to achieve adequate coverage over time.

This approach ensures that RMCO monitoring activities are prioritized in a manner which corresponds to potential risks relating to safety and security, while progressively monitoring all six key areas to achieve the full risk breadth and to provide the City with knowledge relative to regulatory compliance for all such areas and associated regulatory Programs.

Thus, in the second quarter of 2023, the following areas were identified for monitoring using a risk-based approach:

- 1) Tunnel inspections (monitoring performed Q2 - Q3 2023);
- 2) Communications-Based Train Control (CBTC) inspections (monitoring performed Q3 - Q4 2023).

The above areas had not been previously monitored by the RMCO following revenue service inception (refer to Annex 6 for the areas monitored by the RMCO thus far).

The next Sections of this Report describe the monitoring process and Findings for the two areas monitored in 2023.

## 5. Monitoring - Inspections of Tunnels:

### 5.1 Background on Inspections of Tunnels:

Prior to describing the monitoring process, it is important to provide background and context relative to the inspections of tunnels.

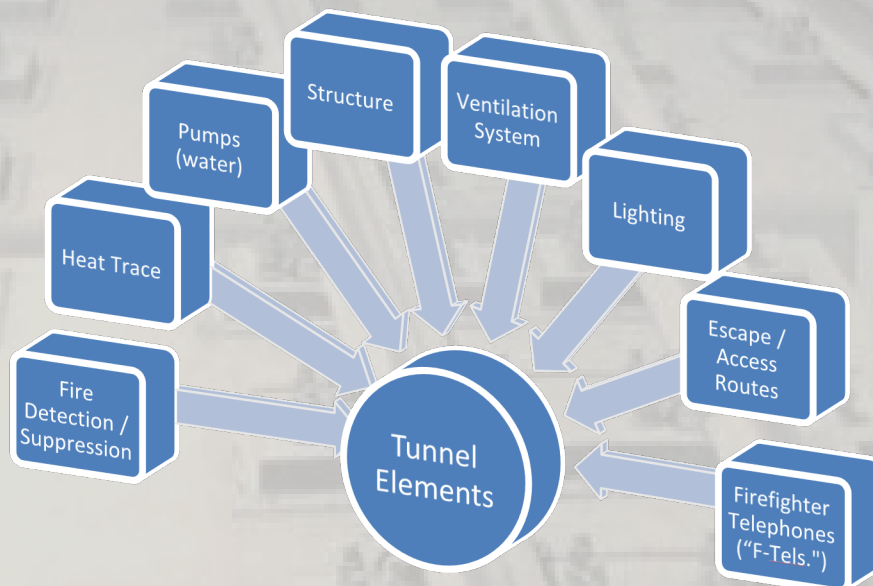
#### 5.1.1 Rationale for Monitoring and Scope:

As explained in Subsection 3.3 a risk-based approach is used to determine the areas to monitor on the basis of multiple inputs. Further, Subsection 3.4 identifies six key risk areas which are monitored over time to provide visibility on compliance of Programs which have a bearing on safety and security. As such, the risk-based analysis performed in the second quarter of 2023 identified tunnels as an important area to monitor for the following reasons:

- 1) The confederation line encompasses three tunnels, of which the largest one is the downtown tunnel which has a length of 2.5 kilometers under part of the downtown central business district as well as the Rideau Canal;
- 2) Tunnels require the proper functioning of multiple elements (refer to Figure below) to enable the safe and reliable operation of trains. Such requirements are identified in the P.A., as well as the relevant Program and technical documents.
- 3) Tunnels had not been previously monitored by the RMCO following revenue service inception (refer to Annex 6 for the areas monitored by the RMCO since RSA).

In order to provide a broad view of compliance for tunnels, eight tunnel-related elements were included in the monitoring scope as shown in the Figure below:

**Figure 4 – Tunnel Elements Monitored**



Each of these elements constitutes an important part of the tunnel functionality which enables trains to operate safely and efficiently.

Further, the monitoring encompassed the three tunnels found in the Confederation Line, as shown in the Figure below:

**Figure 5 – Tunnels Monitored**



**5.1.2 Program / Technical Documents:**

The key ‘OCT Program’ document identified in the City LRT Regulations which specifies requirements for the inspections of tunnels is the ‘Maintenance and Rehabilitation Plan’ (RTM-MC-PLN-042). This Program document is consistent with the P.A. and is supplemented by a number of technical documents which provide further detail on inspection requirements as well as procedures for such inspections – the key technical documents provided to the RMCO are as follows:

- a) Alstom Asset Management Plan (ENG-SV-OTT-PRO-001) - Appendix B-8 (entitled ‘Maintenance for Tunnel System’);
- b) Specific procedures (i.e. ‘WMS’ procedures) developed by Alstom to systematically inspect the above tunnel elements in accordance with manufacturer recommendations and good industry practice. As an example, procedures “OTT-TUN-MTN-WMS-003, 006, 011, 018 and 019” were developed by Alstom in accordance with Zitron’s (i.e. manufacturer of the tunnel ventilation system) maintenance manual.

Furthermore, the Project Agreement (P.A.) includes specific requirements for contractors relative to the inspections of tunnels, such as Schedule 15-3 (Appendix A – Attachment 8 entitled “Tunnel Maintenance Services”). The P.A. is the basis for the contractual agreement between the City of Ottawa and RTG relative to the Confederation Line.

## **5.2 Roles and Responsibilities:**

This Subsection provides perspective by explaining the roles and responsibilities of the different parties involved in these monitoring segments as well as how they relate to City LRT Regulations – this is summarized below:

### **1) OC Transpo:**

- ✓ OC Transpo is the public transit agency for the City of Ottawa;
- ✓ The City LRT Regulations (i.e. City Manager Designation Appendix B Part 1) reaffirm specific responsibilities for OC Transpo relative to the implementation of designated Programs. This includes the Adoption, Implementation, Direction, Oversight and Records for such Programs. As well, it is required that the Direction and Oversight performed by OC Transpo encompass both the City's internal operation as well as contractors;
- ✓ City LRT Regulations identify specific 'OCT Programs' in Appendix B part 1.3 – the 'Maintenance and Rehabilitation Plan' is one such Program;
- ✓ The inspection of tunnels was contracted by the City to RTG through the Project Agreement.

### **2) RTG (Rideau Transit Group) and RTM (Rideau Transit Maintenance):**

- ✓ RTG is the top concessionaire contractor which signed the 30 year Project Agreement (i.e. Contract) for the Confederation Line with the City of Ottawa;
- ✓ RTG is a General Partnership Firm of ACS Infrastructure Canada, SNC-Lavalin, and Ellis Don;
- ✓ It is the RMCO's understanding that RTG dropped-down the maintenance obligations set-out in the P.A. to RTM;
- ✓ RTM subcontracted to Alstom much of the inspection / maintenance activities for key elements of the Confederation Line – this includes the inspection of tunnels and associated elements;
- ✓ The Project Agreement as well as the regulatory Program entitled 'Maintenance and Rehabilitation Plan' (RTM-MC-PLN-042) contain requirements for contractors relative to the inspections of tunnels. These requirements are further detailed in documents and procedures developed by Alstom to reflect the maintenance manuals of component manufacturers (i.e. 'OEM').

In summary, the City LRT Regulations contain regulatory responsibilities which apply to OC Transpo for designated Programs, which include the 'Maintenance and Rehabilitation Plan'. Moreover, although contractors are not directly regulated by City LRT Regulations, they are subject to their contractual responsibilities which require them to implement specific Programs which are aligned with 'OCT Programs'.

### **5.3 Monitoring Procedure:**

As explained in the previous Subsection, procedures are developed to monitor regulatory compliance relative to ‘OCT Program’ requirements identified in City LRT Regulations. As such, specific procedures were developed to monitor the inspections of tunnels and their associated elements identified in Subsection 5.1.1.

#### **5.3.1 Monitoring Approach and Timeline:**

As explained in Section 3, the monitoring is performed using a fact and evidence-based approach consisting of the following:

1. Review and analysis of Program-related documents and records;
2. Interviews;
3. Field observations.

As such, the monitoring was performed in 2 segments, as summarized below:

- Segment 1 involved OC Transpo with the objective to monitor their regulatory responsibilities which include Program Adoption, Implementation, Direction, Oversight and Records;
- Segment 2 involved contractors, with the objective to monitor their implementation of the relevant Programs, as well as the applicable Direction and Oversight provided by OC Transpo. In this instance, the monitoring engaged RTM and Alstom since their personnel and subcontractors perform the tunnel inspections which were monitored.

Annex 7 provides a flowchart summarizing the monitoring approach with activities performed during each monitoring segment.

#### **Period Monitored:**

Since each tunnel element has its regime of specific inspection requirements, records were requested for the full year 2022 as well as the first quarter of 2023. The rationale for this time window is to encompass records for inspections which may be required at short time intervals (e.g. weekly or monthly) as well as longer time intervals (e.g. annually).

#### **Monitoring Timeline:**

The timeline for these monitoring segments is summarized below:

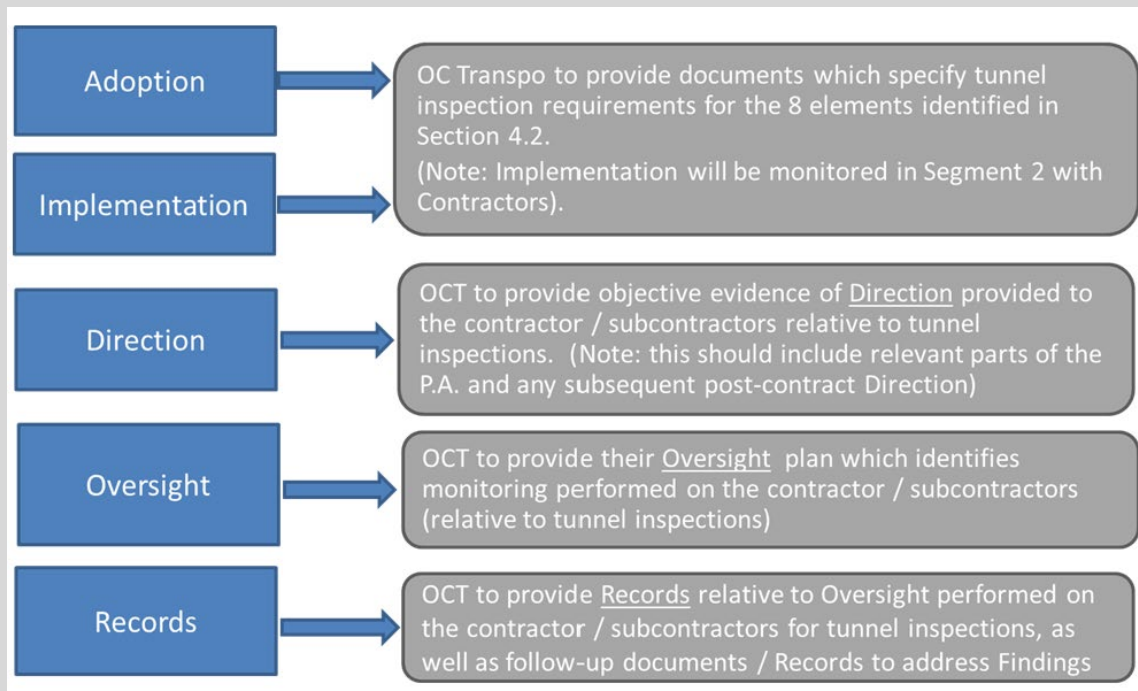
- 1) Inception of segment 1 (OC Transpo): May 23, 2023
- 2) Inception of segment 2 (RTM / Alstom): June 8, 2023
- 3) Interviews: OCT July 24, RTM August 15, 2023
- 4) Field visit / observations: August 21, 2023
- 5) Completion of both segments: Sept. 5, 2023

The following Subsections provide further detail on the monitoring process and findings.

### 5.3.2 Monitoring Process – OC Transpo:

In order to evaluate objectively compliance relative to OC Transpo’s regulatory responsibilities, the monitoring process was initiated with a request for documents and records associated with the Program being monitored. As such, the monitoring notification was communicated to OC Transpo on May 23<sup>rd</sup> with the monitoring procedure and a request for Program-related documents and records summarized in the Figure below:

**Figure 6 - Documents / Records Requested from OC Transpo (excerpt from monitoring procedure P4001):**



In accordance with the procedure, monitoring activities included the review / analysis of documents and records, as well as meetings with OC Transpo, interviews, and field observations.



### 5.3.3 Monitoring Process - Contractors:

As indicated earlier, contractors were included in monitoring activities to verify the execution of required tunnel inspections, and to assess whether OC Transpo provided appropriate Direction and Oversight to the contractors as required by City LRT Regulations.

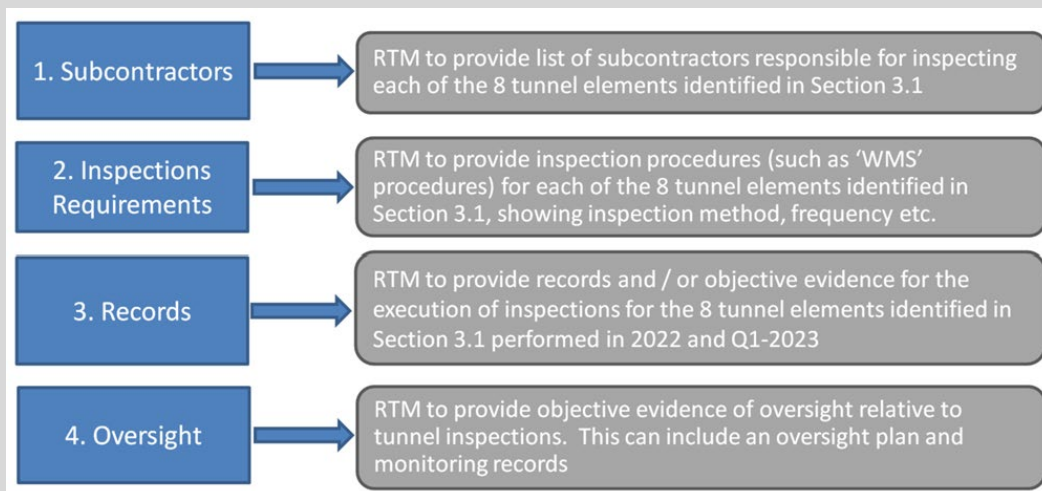
Since Alstom is responsible to perform the great majority of tunnel inspections, the monitoring activities engaged both RTM (i.e. primary contractor), as well as Alstom (subcontractor).

The inspection frequencies required for the 8 tunnel elements monitored are summarized below:

- a) Structure: Two year structural inspections (Ministry of Transportation of Ontario (MTO) requirement);
- b) Ventilation: 6 inspection types ranging from frequencies of 2 weeks to 1 year;
- c) Lighting: 2 inspection types with frequencies of 6 months and 1 year;
- d) Pumps: 2 inspection types with frequencies of 1 month and 6 months;
- e) Escape / Access routes: 1 inspection type every 6 months;
- f) Fire detection / suppression equipment (FDAS): 5 inspection types ranging from frequencies of 1 month to 1 year, as well as specialized inspections by external contractor (i.e. Vipond);
- g) Heat trace equipment: 2 inspections per year (fall and spring);
- h) Firefighter telephone system (also known as “F-tel.”): 2 inspection types with frequencies of 1 month and 1 year.

In accordance with the above, the monitoring procedure requested documents and records from RTM / Alstom as summarized in the Figure below:

**Figure 7 - Documents / Records Requested from RTM / Alstom (excerpt from monitoring procedure P4002):**



The following Subsections describe the monitoring findings.

## **5.4 Monitoring Findings – Inspections of Tunnels:**

### **5.4.1 Findings for OC Transpo – Inspections of Tunnels:**

Regulatory monitoring activities involved the review / analysis of documents and records which were provided as objective evidence relevant to regulatory responsibilities. This was coupled with meetings, interviews and field observations.

The following Figure provides a compliance assessment summary for OC Transpo on the basis of the objective evidence collected during monitoring activities.

#### **Compliance Findings for OC Transpo:**

The Tables below show compliant Findings for all OC Transpo regulatory responsibilities, as follows:

- Adoption;
- Implementation;
- Direction;
- Oversight;
- Records.

Please note that Figure 8 includes two Tables which are presented in the next pages:

**Figure 8 - Monitoring Findings for OC Transpo – Inspections of Tunnels:**

ITEM	REFERENCE	ELEMENT	OC TRANSPO	NOTES
1A	PROGRAM ADOPTION	PROGRAM DEVELOPED / ADOPTED	COMPLIANT	REGULATORY PROGRAM DOCUMENTS ADOPTED ARE IDENTIFIED IN CITY MANAGER DESIGNATION (ie MAINTENANCE AND REHAB PLAN) AND SUPPLEMENTARY DOCUMENTS (e.g. ALSTOM ASSET MANAGEMENT PLAN, WMS PROCEDURES etc.).
2A	PROGRAM IMPLEMENTATION	IMPLEMENTATION	COMPLIANT	<p>1) IMPLEMENTATION OF TUNNEL INSPECTIONS IS PERFORMED MOSTLY BY RTG / RTM AND SUBCONTRACTORS.</p> <p>2) THE CITY CONVEYED REQUIREMENTS THROUGH THE PROJECT AGREEMENT, REGULATORY PROGRAM DOCUMENT (ie MAINTENANCE AND REHAB PLAN) AND ASSOCIATED DOCUMENTS (e.g. ALSTOM ASSET MANAGEMENT PLAN, WMS PROCEDURES etc.).</p> <p>3) OC TRANPO IS MONITORING THE WORK DONE IN THE FIELD THROUGH THEIR OVERSIGHT TEAM AS WELL AS EXPERTS</p> <p>1) THE PROJECT AGREEMENT REQUIRES THAT OC TRANSPO PERFORM STRUCTURAL INSPECTIONS OF THE ST-LAURENT TUNNEL (SCHED. 15-3 MAINTENANCE RESPONSIBILITY TABLE).</p> <p>2) THE "2 YEAR OSIM STRUCTURAL INSPECTION" FOR THE ST-LAURENT TUNNEL WAS PERFORMED IN 2020, BUT WAS NOT PERFORMED IN 2022; HOWEVER THE OBJECTIVE EVIDENCE PROVIDED INDICATES THAT OC TRANSPO FOLLOWED THE MINISTRY OF TRANSPORTATION OF ONTARIO'S (MTO) GUIDANCE TO DEFER THE INSPECTION (AS PER MOT LETTER DATED 2009 - SEE BELOW);</p> <p>A) THE MTO ISSUED A LETTER WHICH PROVIDES GUIDANCE IN WHICH AN ORGANIZATION'S HEAD OF STRUCTURES CAN MAKE A DECISION TO DEFER A "2 YEAR OSIM STRUCTURAL INSPECTION" WHEN REHABILITATION WORK IS ONGOING IN AN EXISTING STRUCTURE (MTO LETTER DATED JAN 21, 2009 - REFER TO ANNUAL COMPLIANCE REPORT).</p> <p>B) SEVERAL ELEMENTS OF OBJECTIVE EVIDENCE WERE PROVIDED TO CORROBORATE THAT THE CITY FOLLOWED THE MOT PROCESS; THIS INCLUDES: i) A RECORD FROM THE CITY'S "ASSET MANAGEMENT" INFORMATION SYSTEM WHICH INDICATES THAT THE "2 YEAR OSIM STRUCTURAL INSPECTION" FOR THE ST-LAURENT TUNNEL WAS DEFERRED IN 2022; ii) A LETTER FROM THE CITY'S SENIOR ENGINEER OF STRUCTURES STATES THAT HIS OFFICE MADE THE DECISION TO DEFER THE INSPECTION DUE TO THE REHABILITATION WORK IN THE ST-LAURENT TUNNEL.</p>

3A	PROGRAM DIRECTION	DIRECTION	COMPLIANT	<p>1) DIRECTION RELATIVE TO TUNNEL INSPECTIONS WAS PROVIDED TO CONTRACTORS THROUGH THE PROJECT AGREEMENT;</p> <p>2) P.A. SCHED 15-3, APPDX A, ATTACHMENT 8 IDENTIFIES SPECIFIC REQUIREMENTS FOR TUNNELS</p> <p>3) CITY DESIGNATED PROGRAM DOCUMENTS (MAINTENANCE &amp; REHAB. PLAN RTM-MC-PLN-042) AND SUPPLEMENTARY DOCUMENTS (e.g. ASSET MANAGEMENT PLAN, WMS PROCEDURES) PROVIDE INSPECTION REQUIREMENTS FOR TUNNELS AND ASSOCIATED ELEMENTS (e.g. VENTILATION).</p>
4A	PROGRAM OVERSIGHT	MONITORING PLAN / PROCESS AVAILABLE	COMPLIANT	<p>1) OC TRANSP0 HAS A SUBSTANTIVE OVERSIGHT PLAN ("LINE 1 OVERSIGHT PLAN 2023") WHICH IS UPDATED ANNUALLY. DETAILED TABLES ARE DEVELOPED EACH YEAR TO IDENTIFY MONITORING ACTIVITIES SCHEDULED;</p> <p>2) OC TRANSP0 HAS DEDICATED OVERSIGHT RESOURCES FOCUSED ON MONITORING - THIS INCLUDES THE INSPECTION OF TUNNELS AND THEIR RELEVANT COMPONENTS.</p> <p>3) A REVIEW OF OC TRANSP0'S OVERSIGHT RECORDS INDICATES THAT FINDINGS ARE BEING IDENTIFIED, ACTIONED WITH CONTRACTOR(S) AND FOLLOWED-UP.</p>
		OVERSIGHT FIELD	COMPLIANT	SPECIFIC OVERSIGHT SCHEDULES ARE PREPARED ANNUALLY. THIS CONTAINS MONITORING OF FIELD ACTIVITIES, REVIEW OF RECORDS ETC.. OVERSIGHT DOCUMENTS PROVIDED BY OC TRANSP0 SHOW SPECIFIC FOCUS IN 10 AREAS WHICH RELATE TO TUNNELS (eg: STRUCTURE, DRAINAGE, LIGHTS etc.).
4B		OVERSIGHT RECORDS	COMPLIANT	OC TRANSP0 OVERSIGHT PLAN / ACTIVITIES ENCOMPASS THE REVIEW OF RECORDS WHICH ARE REQUESTED AS PART OF MONITORING ACTIVITIES.
5A	PROGRAM RECORDS	RECORDS	COMPLIANT	OC TRANSP0 PROVIDED RECORDS RELATIVE TO PROGRAM DOCUMENTS, PROCEDURES AND OVERSIGHT ACTIVITIES.

<b>COMPLIANCE SCALE:</b>	<b>C = COMPLIANT</b>	<b>Compliant</b> means that monitoring activities have identified compliant results in accordance with regulatory requirements and Program documents.
	<b>MC = MOSTLY COMPLIANT</b>	<b>Mostly Compliant</b> means that monitoring activities have identified a limited number of relatively minor non-compliances which can be remedied easily in normal course.
	<b>PC = PARTIALLY COMPLIANT</b>	<b>Partially Compliant</b> means that monitoring activities have identified more regular and/or serious non-compliances that require timely action.
	<b>NC = NOT COMPLIANT</b>	<b>Not Compliant</b> means that either full or serious non-compliance were identified, or many non-compliances at the same time or on a repeated or unrectified basis.
<b>NOTE:</b> Refer to Annexes 2,3 and 9 for RMCO Scope and Regulatory / Legal context.		

## **Comments Relative to Monitoring Findings for OC Transpo:**

### **Oversight:**

As indicated in the Table above, OC Transpo has a substantive oversight program which includes the following:

- a) A document entitled “Line 1 Oversight Plan” which describes the oversight processes used by OC Transpo. This document, which is reviewed and updated annually, was developed *“using industry best practices and standards, and with input from industry expertise in transit management, oversight, safety, quality and operations”*;
- b) A specific ‘Oversight Schedule’ is developed at the beginning of each year to identify the areas to be monitored with the associated timelines. OC Transpo’s oversight group leader ensures that the ‘Oversight Schedule’ is implemented, updated as required and monitored throughout the year;
- c) OC Transpo has an oversight group with approximately 12 full time equivalent resources performing oversight and monitoring activities in the Confederation Line;
- d) OC Transpo uses an information system (i.e. “CleverCad”) to maintain records of oversight activities.

OC Transpo provided records for oversight activities performed in 2022 and 2023 relative to tunnels. This included the following:

- a) An audit report relative to the tunnel ventilation system performed jointly by OC Transpo and STV Inc. during October 2022;
- b) Oversight records from OC Transpo’s information system which show focus on 10 areas which relate to tunnels – this includes the structure, pumps / drainage, lighting, fire detection / suppression system etc.

### **St-Laurent Tunnel Structural Inspections:**

In accordance with the Project Agreement, all tunnel structural inspections fall under the responsibility of RTG / RTM, with the exception of the St-Laurent tunnel which is under the City’s responsibility. Specifically, Schedule 15-3 (“Table of Maintenance Responsibilities”) of the Project Agreement requires the City to perform structural inspections for the St-Laurent tunnel – the rationale is that there was a pre-existing structure at this location which includes a major bus terminal constructed in the mid 1980’s.

The Ontario Structure Inspection Manual (OSIM) requires that tunnel structural inspections be performed every 2 years (i.e. “2 year OSIM structural inspection”). However, the Ministry of Transportation of Ontario (MTO) allows for such inspections to be deferred when there are circumstances such as major rehabilitation work in existing structures (refer to letter in Annex 8 Part 1). The MTO letter allows an organization’s Head of Structures to defer a “2 year OSIM structural inspection” which is due and to schedule it within 2 years of completion of the rehabilitation work, or at the time that the next scheduled inspection is due, whichever is earlier.

There are four distinct structures which make-up the St-Laurent tunnel. The City informed the RMCO that due to the major rehabilitation work which was in-progress in the St-Laurent bus terminal and structure during 2022, the City performed the “2 year OSIM structural inspection” on one structure, but deferred the structural inspections for the three remaining structures to 2024 in accordance with the MTO letter. All four structures received structural inspections in 2020.

The following elements of objective evidence were provided to corroborate the City’s use of the process described in the MTO letter:

- a) A letter from the MTO dated January 21, 2009 entitled “Inspection of Newly Constructed Structures and Rehabilitated Structures” (refer to Annex 8 Part 1) which outlines the process to be used to defer a structural inspection;
- b) A confirmation that the last “2 year OSIM structural inspections” for the three structures in the St-Laurent tunnel were performed in 2020;
- c) A record from the City’s “Asset Management” information system which indicates that the “2 year OSIM structural inspections” for the three structures in the St-Laurent tunnel were deferred in 2022;
- d) A letter from the City’s Senior Engineer of Structures was provided to confirm that the decision to defer the structural inspections was made by his office due to the ongoing rehabilitation work;
- e) A confirmation that the next “2 year OSIM structural inspections” for the three structures in the St-Laurent tunnel are scheduled in 2024.

The above objective evidence supports the notion that the City followed the MTO process to defer the “2 year OSIM structural inspections” for the three structures in the St-Laurent tunnel.

Further to the above, it should be noted that the RMCO's monitoring process includes field observations - as such, the RMCO performed a walk-through of the St-Laurent tunnel and station. It is important to note that this tunnel walk-through was undertaken at a high level and consisted of qualitative observations, rather than a technical or structural inspection. The walk-through indicated that there were no evident issues such as water infiltration (refer to Annex 8 Part 2 for pictures).

Following the completion of this monitoring segment, an incident occurred on January 2<sup>nd</sup>, 2024 during which concrete debris fell near LRT tracks in the St-Laurent tunnel, resulting in the temporary interruption of service between Hurdman and Blair stations. This is covered in Annex 8 Part 3.

### 5.4.2 Monitoring Findings for RTM – Inspections of Tunnels:

Regulatory monitoring activities relative to RTM / Alstom involved the review / analysis of more than 800 documents and records which were provided as objective evidence relative to the execution of inspections for the 8 tunnel elements monitored. This was coupled with meetings, interviews involving both RTM and Alstom, as well as field observations.

The monitoring segment was completed successfully with good collaboration from RTM and Alstom.

The following Figure summarizes monitoring Findings for RTM on the basis of the objective evidence collected during monitoring activities. Please note that Figure 9 includes two Tables which are presented below:

**Figure 9 - Monitoring Findings for RTM – Inspections of Tunnels:**

ITEM	REFERENCE	ELEMENT	RTM	COMMENTS
1A	DIRECTION	PROCEDURES FOR PERFORMING INSPECTIONS	CONFORMANT	PROCEDURES PROVIDED FOR ALL 8 TUNNEL ELEMENTS MONITORED.

CONFORMANCE SCALE:	
<b>CONFORMANT</b>	<b>Conformant:</b> means that monitoring activities have <b>not</b> identified any non-conformances relative to Program requirements by Contractor.
<b>MOSTLY CONFORMANT</b>	<b>Mostly Conformant:</b> means that monitoring activities have only identified a limited number of relatively minor non-conformances capable of being easily remedied in normal course.
<b>PARTIALLY CONFORMANT</b>	<b>Partially Conformant:</b> means that monitoring activities have identified more regular and/or more serious non-conformances that require timely attention.
<b>NOT CONFORMANT</b>	<b>Not Conformant:</b> means that monitoring activities have identified either full or serious non-conformance, or many non-conformances at the same time or on a repeated or unrectified basis.
<b>NOTE:</b> Refer to Annexes 2,3 and 9 for RMCO Scope and Regulatory / Legal context.	

Note: The term ‘conformant’ is used for contractors, rather than ‘compliant’, since findings relate to contractual requirements (i.e. Project Agreement) and Direction from OC Transpo, rather than City LRT Regulations.



2A	IMPLEMENTATION	INSPECTION OF TUNNEL STRUCTURES	CONFORMANT	OSIM' STRUCTURAL INSPECTION REPORTS PROVIDED FOR DOWNTOWN TUNNEL AND CONNECTOR TUNNEL APPEAR TO BE CONFORMANT.
2B		INSPECTION OF FDAS	MOSTLY CONFORMANT	1) VIPOND INSPECTIONS / PROCEDURES = CONFORMANT; 2) OTT-TUN-MTN10-WMS-001 = MOSTLY CONFORMANT (1 MONTH INSPECTIONS); 3) WMS-004 = NOT CONFORMANT (3 MONTHS); 4) WMS-007 = CONFORMANT (1 YEAR); 5) WMS-014 = MOSTLY CONFORMANT (2 MONTHS); 6) WMS-015 = PARTIALLY CONFORMANT (6 MONTHS)
2C		INSPECTION OF PUMPS	MOSTLY CONFORMANT	1) OTT-TUN-MTN10-WMS-002 = MOSTLY CONFORMANT (1 MONTH); 2) OTT-TUN-MTN10-WMS-016 = MOSTLY CONFORMANT (6 MONTHS).
2D		INSPECTION OF TUNNEL VENTILATION SYSTEM	MOSTLY CONFORMANT	1) OTT-TUN-MTN10-WMS-003 = MOSTLY CONFORMANT (1 MONTH INSPECTIONS); 2) WMS-006 = MOSTLY CONFORMANT (6 MONTHS); 3) WMS-011 = MOSTLY CONFORMANT (1 YEAR); 4) WMS-018 = CONFORMANT (WINTER MONTHLY); 5) WMS-019 = CONFORMANT (6 MONTHS TCIP); 6) WMS-017 = CONFORMANT (2W SHAFT ROTATION)
2E		INSPECTION OF HEAT TRACE	CONFORMANT	HEAT TRACE INSPECTIONS (WMS-012) CONFORMANT.
2F		INSPECTION OF F-TELS	MOSTLY CONFORMANT	1) F-TEL MONTHLY INSPECTION RECORDS (WMS-008) MOSTLY CONFORMANT. 2) F-TEL ANNUAL INSPECTIONS (WMS-013) CONFORMANT
2G		LIGHTING	MOSTLY CONFORMANT	1) OTT-TUN-MTN10-WMS-005 = MOSTLY CONFORMANT (6 MONTHS); 2) OTT-TUN-MTN10-WMS-009 = MOSTLY CONFORMANT (1 YEAR)
2H		ESCAPE ROUTES	CONFORMANT	WMS-010 INSPECTIONS (6 MONTHS) ARE CONFORMANT (ASSESSMENT INCLUDES ADDITIONAL RECORD PROVIDED SEPT. 8, 2023).
3A	OVERSIGHT	RECORDS	CONFORMANT	1) RTM USING STRUCTURED AUDIT PROCESS (RTM-QMS-FRM-681) 2) 6 QMS AUDIT REPORTS PROVIDED FOR THE PERIOD MONITORED. AUDITS COVER FDAS, STRUCTURES, AND OTHER ELEMENTS SUCH AS PUMPS, VENTILATION, EXTINGUISHERS 3) AUDIT REPORTS CONTAIN SUBSTANTIVE FINDINGS INCLUDING NON-CONFORMANCES AND OPPORTUNITIES FOR IMPROVEMENT. AUDIT SCOPE ENCOMPASSES THE COMPLETENESS OF INSPECTIONS, WMS ALIGNMENT / COMPLETENESS, TRAINING OF EMPLOYEES etc. 4) AUDIT REPORTS IDENTIFY PREVIOUS FINDINGS AND ONGOING DOCUMENTED ACTIONS TO RESOLVE FINDINGS

## Monitoring Findings for RTM – Overview:

Overall, the monitoring activities reviewed 3 major areas relating to Direction, Implementation and Oversight. The monitoring Findings are summarized below:

- 1) With respect to **Direction**, there are detailed inspection procedures for all the tunnel elements monitored – this enables for a consistent and systematic approach to the execution of such inspections - as such this area is conformant;
- 2) With respect to **Oversight**, RTM provided reports substantiating their audit process where the execution of inspections is assessed and gaps are addressed with their subcontractors and monitored in subsequent audits - as such this area is conformant;
- 3) With respect to **Implementation**, the execution of inspections for 8 tunnel elements was assessed by reviewing inspection records and determining whether these were performed in accordance with requirements. As indicated in the Table above, the analysis of records shows that the execution of inspections for each element ranges from mostly conformant to conformant. Below is a summary of the Findings for each tunnel element:
  - i) **Structural inspections**: conformant;
  - ii) **Pumps**: on an aggregate basis this element is mostly conformant - there are 2 types of inspections which are both mostly conformant;
  - iii) **Tunnel ventilation system**: on an aggregate basis, this element is mostly conformant - there are 6 types of inspections, of which 3 are conformant and 3 are mostly conformant;
  - iv) **Heat trace**: conformant,
  - v) **Fire fighter telephones**: on an aggregate basis, this element is mostly conformant - there are 2 types of inspections, of which 1 is conformant and 1 is mostly conformant;
  - vi) **Lighting**: the aggregate conformance for this element is mostly conformant - there are 2 types of inspections which are both mostly conformant;
  - vii) **Fire detection and Suppression**: on an aggregate basis, this element is mostly conformant - there are 5 types of inspections, of which 1 is conformant, 2 are mostly conformant, 1 is partially conformant and 1 is not conformant;
  - viii) **Escape routes**: conformant.

To further explain the above Findings relative to Implementation, it is important to note the following:

- Conformance for inspections is based on two criteria:
  - There must be inspection records which substantiate the execution of inspections;
  - The dates on the inspection records must be consistent with the specified inspection intervals as well as the allowable time tolerances.
- The monitoring is performed using a fact and evidence-based approach – as such:
  - Any missing records, relative to requirements, are tabulated as inspections which are not performed, thereby affecting conformance;
  - Any Inspections which are performed later than specified time tolerances are tabulated as inspections which are not performed on-time, thereby affecting conformance (refer to part below under “Opportunities”).

### **5.4.3 Opportunities:**

In addition to the Findings identified in the previous Subsection, the monitoring activities identified ‘opportunities’ which do not relate directly to regulatory compliance\*. Such opportunities represent possibilities to make improvements, and / or could potentially have an effect on service and / or safety. The following ‘opportunities’ were identified:

#### **Time Tolerances for Inspections**

Each tunnel element monitored has specific inspection requirements which are time-based (refer to Subsection 5.3.3). In addition, there are time tolerances for each type of inspection – for instance there is a time tolerance of 14 days for annual inspections of the tunnel ventilation system.

The monitoring activities identified certain tunnel elements (i.e. lighting, egress signs, heat trace) for which no time tolerances were specifically provided in the Alstom “Asset Management Plan”. This issue was addressed by RTM and Alstom on August 17 where they provided the missing time tolerances and committed to add these in the next document updates.

*\* RMCO mandate is focused on monitoring regulatory compliance but does not formally include the assessment of Program adequacy or sufficiency, improvement opportunities etc.*

### **Cross-Verification of Inspection Procedures**

In general terms, the limited verifications performed by the RMCO indicate that Alstom’s inspection procedures (i.e. WMS procedures) are consistent with manufacturer (i.e. OEM) maintenance manuals. However, there were some instances where OC Transpo and RTM Oversight records indicated that certain areas were not fully aligned with OEM requirements, or did not fully identify the equipment in the field. As a further example, the audit performed jointly by OC Transpo and STV Inc. during October 2022 found that *“6M Inspections are not aligned with the OEM Manuals (CAR-2023-021)”*.

As such, the RMCO identified an opportunity for RTM and Alstom to perform cross-verifications of Alstom’s inspection procedures (i.e. WMS procedures) to confirm alignment with OEM maintenance manuals, as well as the identification of all equipment in the field which requires inspections to ensure the systematic execution of inspections.

### **Downtown Tunnel Water Infiltration**

The tunnel walk-through performed by the RMCO identified certain areas (e.g. immediately east of Rideau station) which showed substantial water infiltration. Although there were visual signs that repair work had been performed, the water infiltration in such areas appeared to persist thereby affecting elements such as the escape routes (i.e. slippery), rail (i.e. corrosion), and pipes / cables (i.e. precipitate deposits) – refer to Annex 9 for pictures. Although there are employees passing through these areas regularly for various work activities, there did not appear to be an established process to monitor and mitigate this issue in such locations, other than the inspection procedure for egress signs (i.e. MTN10-WMS-010) which is performed at 6 month intervals. As such, the RMCO identified an opportunity for RTM and Alstom to identify such areas and to determine appropriate criteria and time intervals for monitoring and mitigating the condition.

#### **5.4.4 Actions Taken Relative to Findings and Opportunities:**

The above Findings have been the subject of meetings engaging OC Transpo, RTM, Alstom and the RMCO. OC Transpo has formally requested corrective action plans from RTG / RTM for each Finding. Findings and remedial actions are the subject of regular meetings with stakeholders and are tracked formally by OC Transpo and the RMCO in a tracking table (refer to Annex 10). Further details on the remedial actions process are provided in Section 7.

With respect to the Opportunities identified, these are also the subject of ongoing reviews by OC Transpo and the RMCO including periodic meetings held with RTM. Progress is reviewed periodically in order to ensure that the opportunities are addressed / mitigated.

## 6. Monitoring - Inspections of Communications-Based Train Control (CBTC) System:

### 6.1 Background on CBTC System:

Prior to describing the monitoring process, the following provides background and context relative to the Communications-Based Train Control (CBTC) system.

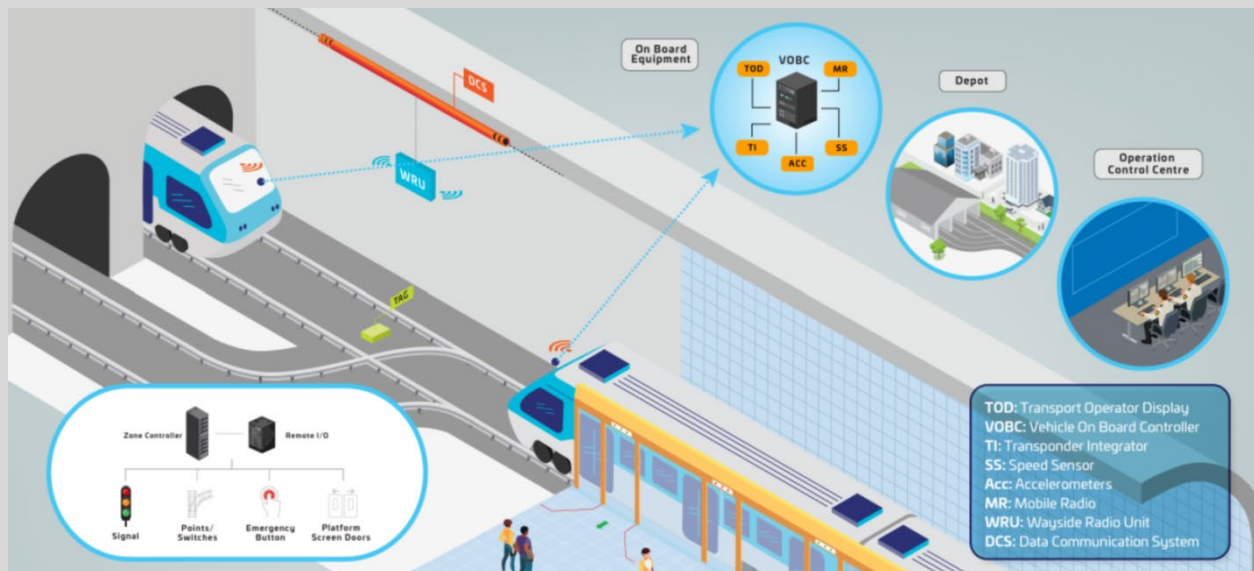
#### 6.1.1 Rationale for Monitoring CBTC:

Communications-based train control (CBTC) is a railway signaling system that uses telecommunications between the trains and track equipment for traffic management and infrastructure control. As such, CBTC plays a major role in the safe and efficient operation of trains by mitigating key human factors risks such as compliance with signal indications and over speeds, as well as operator fatigue and fitness for duty. It is noteworthy that not all commuter lines have CBTC systems; therefore the City's decision to invest in a CBTC system for the Confederation Line brings substantial value to support safe and reliable service.

The Confederation Line's CBTC system is built by Thales and maintained mostly by Alstom under subcontract from RTG / RTM.

The Figure below shows the major elements which make up a typical CBTC system.

**Figure 10 – Communications-Based Train Control**



The risk-based approach described in Subsection 3.3 of this Report identified CBTC as an important area to monitor for the following reasons:

- 1) The Confederation Line’s CBTC system plays a major role in safety and service;
- 2) The CBTC system consists of several elements which need to be inspected in accordance with the P.A requirements as well as manufacturers requirements;
- 3) The CBTC system had not been previously monitored by the RMCO following revenue service inception (refer to Annex 6 for the areas monitored by the RMCO since RSA).

### **6.1.2 Program / Technical Documents:**

The Project Agreement (P.A.) includes specific requirements for contractors relative to the CBTC system, such as Schedule 15-2 (Part 4, Article 5 entitled “Train Control System”). The P.A. is the basis for the contractual agreement between the City of Ottawa and RTG relative to the Confederation Line.

The key ‘OCT Program’ document identified in the City LRT Regulations which specifies requirements for CBTC inspections is the ‘Maintenance and Rehabilitation Plan’ (RTM-MC-PLN-042). This Program document is consistent with the P.A. and is supplemented by a number of technical documents which provide further detail on inspection requirements as well as procedures for such inspections – the key technical documents provided to the RMCO are as follows:

- a) Alstom Asset Management Plan (ENG-SV-OTT-PRO-001) - Appendix B-2 (entitled ‘Maintenance for CBTC (Communications-Based Train Control));
- b) Specific procedures (i.e. ‘WMS’ procedures) developed by Alstom to systematically inspect the CBTC elements in accordance with manufacturer recommendations and good industry practice.

## **6.2 Roles and Responsibilities:**

Refer to Section 5.2 which provides relevant information regarding roles and responsibilities for the organizations involved in the inspection and maintenance of the Confederation Line.

Specifically for the CBTC system, RTG / RTM are responsible for inspections and maintenance; however they have subcontracted the great majority of CBTC inspections to Alstom.

### **6.3 Monitoring Procedure:**

As explained in the previous Subsections, procedures are developed to monitor regulatory compliance relative to ‘OCT Program’ requirements identified in City LRT Regulations. As such, specific procedures were developed to monitor the inspections of the CBTC system.

#### **6.3.1 Monitoring Approach and Timeline:**

As explained in Section 3, the monitoring is performed using a fact and evidence-based approach consisting of the following:

1. Review and analysis of Program-related documents and records;
2. Interviews;
3. Field observations.

As such, following the monitoring of tunnel inspections which was completed in September 2023, the CBTC system was monitored in 2 segments - this is summarized below:

- Segment 3 involved OC Transpo with the objective to monitor their regulatory responsibilities which include Program Adoption, Implementation, Direction, Oversight and Records;
- Segment 4 involved contractors, with the objective to monitor their implementation of the relevant Programs, as well as the applicable Direction and Oversight provided by OC Transpo. In this instance, the monitoring engaged RTM and Alstom since Alstom personnel perform CBTC inspections which were monitored.

Annex 7 provides a Figure summarizing the monitoring approach as well as the key activities performed during each monitoring segment.

#### **Period Monitored:**

Since CBTC components have specific inspection requirements, records were requested for the full year 2022 as well as the first half of 2023. The rationale for this time window is to encompass records for inspections which may be required at short time intervals (e.g. weekly or monthly) as well as longer time intervals (e.g. annually).

#### **Monitoring Timeline:**

The timeline for these monitoring segments is summarized below:

- 1) Inception of segment 1 (OC Transpo): Sept. 22, 2023
- 2) Inception of segment 2 (RTM / Alstom): Sept. 22, 2023
- 3) Interviews: November 8, 9, 14 and 20
- 4) Field visit / observations: November 25 / 26, 2023
- 5) Completion of both segments: December 18, 2023

The following Subsections provide further detail on the monitoring process and Findings.

**6.3.2 Monitoring Process – OC Transpo:**

In order to evaluate objectively compliance relative to OC Transpo’s regulatory responsibilities, the monitoring process was initiated with a request for documents and records associated with the Program being monitored. As such, the monitoring notification was communicated to OC Transpo on Sept. 22<sup>nd</sup> with the monitoring procedure (P4003) and a request for Program-related documents and records summarized in the Figure below:

**Figure 11 - Documents / Records Requested from OC Transpo (excerpt from monitoring procedure P4003)**

	<b><u>OC TRANSPO - DOCUMENTS / RECORDS REQUESTED</u></b>
<b>ADOPTION</b>	<p><b><u>OC TRANSPO TO PROVIDE THE FOLLOWING:</u></b> DOCUMENTS WHICH HAVE BEEN ADOPTED AND WHICH SPECIFY CBTC INSPECTION / MAINTENANCE REQUIREMENTS AS WELL AS OTHER SPECIALIZED WORK (E.G. SOFTWARE UPDATES).</p> <p>THIS MAY INCLUDE THE FOLLOWING: 1) RELEVANT PARTS OF PROJECT AGREEMENT (e.g SCHED. 15-2 PART 4 ARTICLE 5, ETC.). 2) MAINTENANCE &amp; REHABILITATION PLAN; 3) ALSTOM ASSET MANAGEMENT PLAN; 4) ANY OTHER RELEVANT DOCUMENTS AND / OR PROCEDURES.</p>
<b>DIRECTION</b>	<p>THE PROJECT AGREEMENT REPRESENTS DIRECTION PROVIDED CONTRACTUALLY BY THE CITY TO TO RTG / RTM.</p> <p><b><u>ADDITIONAL DOCUMENTS WHICH MAY BE PROVIDED BY OC TRANSPO IF AVAILABLE:</u></b> OC TRANSPO MAY PROVIDE ANY OTHER DOCUMENTS (POST CONTRACT) WHICH CONSTITUTE ADDITIONAL DIRECTION PROVIDED TO RTG / RTM OR OTHER ENTITIES (IF APPLICABLE).</p>
<b>IMPLEMENTATION</b>	<p>IT IS THE RMCO'S UNDERSTANDING THAT RTM AND ITS SUBCONTRACTORS PERFORM ALL CBTC INSPECTIONS / MAINTENANCE ACTIVITIES. AS SUCH, THE RMCO WILL REQUEST EVIDENCE OF IMPLEMENTATION FROM RTM DURING SEGMENT 4. IMPLEMENTATION EVIDENCE CONSISTS OF INSPECTION RECORDS, TRAINING RECORDS etc..</p>
<b>OVERSIGHT</b>	<p><b><u>OC TRANSPO TO PROVIDE THE FOLLOWING:</u></b> OVERSIGHT PLAN AND ANY SCHEDULES SPECIFYING OVERSIGHT ACTIVITIES WHICH RELATE TO CBTC. THE PERIOD MONITORED IS <b>JAN. 2022 - JUNE 2023.</b></p>
<b>RECORDS</b>	<p><b><u>OC TRANSPO TO PROVIDE THE FOLLOWING:</u></b> 1) OVERSIGHT RECORDS WHICH RELATE TO CBTC FOR THE <b>PERIOD JAN. 2022 - JUNE 2023;</b> 2) ANY OTHER RELEVANT RECORDS WHICH RELATE TO ADOPTION, IMPLEMENTATION OR DIRECTION (IF AVAILABLE).</p>



In accordance with the procedure, monitoring activities included the review / analysis of documents and records, as well as meetings with OC Transpo, interviews, and field observations.

### **6.3.3 Monitoring Process - Contractors:**

As indicated earlier, contractors were included in monitoring activities to verify the execution of CBTC inspections, and to assess whether OC Transpo provided appropriate Direction and Oversight to the contractors as required by City LRT Regulations.

Since Alstom is responsible to perform the great majority of CBTC inspections, the monitoring activities engaged both RTM (i.e. primary contractor), as well as Alstom (subcontractor).

The monitoring encompassed 3 key areas:

- ✓ Inspections of key components which make up the CBTC system (see below);
- ✓ Training of employees involved in CBTC inspections;
- ✓ CBTC Software updates.

CBTC inspections / maintenance subcontracted by RTM to Alstom are identified in Appendix B-2 of the Alstom Asset Management Plan (ENG-SV-OTT-PRO-001). This includes major components such as:

- a) CBTC Network
- b) CBTC Back-up Server
- c) CBTC Workstations
- d) Zone controllers
- e) Electronic Point Controller (EPC) Rack
- f) Automatic Train Supervision (ATS) and Data Collection System (DCS) Rack
- g) Power Point Distributor Rack (PPDR)
- h) Cable Termination Frame (CTF)
- i) Second Line Maintenance Device (SLMD)
- j) CBTC Transponder Tags
- k) CBTC Wayside Radio Unit (WRU) and Power / Fibre Splice Enclosure (PFSE)
- l) CBTC Signal Lights
- m) Relay Rack
- n) Etc.

In accordance with the above, the monitoring procedure requested documents and records from RTM / Alstom as summarized in the Figure below:

**Figure 12 - Documents / Records Requested from RTM / Alstom (excerpt from monitoring procedure P4002):**

	<b>RTM - DOCUMENTS / RECORDS REQUESTED</b>
<b>ADOPTION</b>	<b>SEE DIRECTION</b>
<b>DIRECTION</b>	<p><b>RTM TO PROVIDE THE FOLLOWING:</b></p> <p>1) LIST OF CBTC INSPECTION / MAINTENANCE ACTIVITIES PERFORMED BY ALSTOM (I.E. SUCH AS APPENDIX B-2 OF ALSTOM ASSET MANAGEMENT PLAN).</p> <p>2) DOCUMENTS / PROCEDURES WHICH DESCRIBE EACH INSPECTION / MAINTENANCE ACTIVITY PERFORMED BY ALSTOM (e.g. OTT-SIG-MTN10-WMS-001);</p> <p>3) TYPES OF EMPLOYEES (I.E. CRAFT OR TRADE DESIGNATION) INVOLVED IN CBTC INSPECTION / MAINTENANCE ACTIVITIES PERFORMED BY ALSTOM;</p> <p>4) TRAINING MATRIX FOR EACH SUCH EMPLOYEE TYPE;</p> <p>5) OTHER SUBCONTRACTORS RESPONSIBLE TO PERFORM CBTC INSPECTION / MAINTENANCE, OR SPECIALIZED WORK SUCH AS TESTING, SOFTWARE / SECURITY UPDATES etc. (SPECIFY SUBCONTRACTOR NAME AND SPECIFIC RESPONSIBILITY);</p> <p>6) DOCUMENTS / PROCEDURES WHICH DESCRIBE EACH SPECIALIZED WORK ACTIVITY.</p>
<b>IMPLEMENTATION</b>	<p><b>RTM TO PROVIDE THE FOLLOWING:</b></p> <p>1) RECORDS FOR EACH INSPECTION / MAINTENANCE ACTIVITY PERFORMED DURING THE <b>PERIOD JAN 2022 - JUNE 2023;</b></p> <p>2) TRAINING RECORDS FOR EACH EMPLOYEE PERFORMING CBTC INSPECTION / MAINTENANCE WORK DURING THE <b>FIRST QUARTER 2023;</b></p> <p>3) RECORDS FOR CBTC TESTING PERFORMED DURING THE <b>PERIOD JAN. 2022 - JUNE 2023;</b></p> <p>4) RECORDS FOR CBTC SOFTWARE AND SECURITY UPDATES PERFORMED DURING THE <b>PERIOD JAN 2022 - JUNE 2023.</b></p>
<b>OVERSIGHT</b>	<p><b>RTM TO PROVIDE THE FOLLOWING:</b></p> <p>RTM'S OVERSIGHT PROCESS RELATIVE TO CBTC INSPECTION, MAINTENANCE AND OTHER SPECIALIZED WORK.</p>
<b>RECORDS</b>	<p><b>RTM TO PROVIDE THE FOLLOWING:</b></p> <p>IN ADDITION TO THE RECORDS REQUESTED ABOVE (I.E. IDENTIFIED UNDER "DIRECTION" AND "IMPLEMENTATION"), RTM IS REQUESTED TO PROVIDE OVERSIGHT RECORDS FOR THE PERIOD <b>JAN 2022 - JUNE 2023</b> RELATIVE TO CBTC.</p>

The following Subsections describe the monitoring Findings.

## **6.4 Monitoring Findings – CBTC Inspections:**

### **6.4.1 Findings for OC Transpo – CBTC Inspections:**

Regulatory monitoring activities involved the review / analysis of documents and records which were provided as objective evidence relevant to regulatory responsibilities. This was coupled with meetings, interviews and field observations.

The following Figure provides a compliance assessment summary for OC Transpo on the basis of the objective evidence collected during monitoring activities.

**Figure 13 - Monitoring Findings for OC Transpo – Inspections of CBTC System:**

ITEM	REGULATORY REQUIREMENT	REGULATORY REFERENCE	ELEMENT	OC TRANSPO	NOTES
1A	PROGRAM ADOPTION	CITY MANAGER DESIGNATION, APPX B SECTION 1.1 (A)	PROGRAM ADOPTED / DEVELOPED	COMPLIANT	REGULATORY PROGRAM DOCUMENTS ADOPTED / DEVELOPED ARE IDENTIFIED IN CITY MANAGER DESIGNATION (ie MAINTENANCE AND REHAB PLAN) AND SUPPLEMENTARY DOCUMENTS (e.g. ALSTOM ASSET MANAGEMENT PLAN, WMS PROCEDURES etc.).
2A	PROGRAM IMPLEMENTATION	CITY MANAGER DESIGNATION, APPX B SECTION 1.1 (A)	IMPLEMENTATION	NOT APPLICABLE TO OC TRANSPO (REFER TO CONTRACTOR FINDINGS)	1) IMPLEMENTATION IS NOT ASSESSED FOR OC TRANSPO BECAUSE CBTC INSPECTIONS / MAINTENANCE ARE PERFORMED BY RTG / RTM AND SUBCONTRACTORS. 2) THE CITY CONVEYED REQUIREMENTS THROUGH THE PROJECT AGREEMENT, REGULATORY PROGRAM DOCUMENT (ie MAINTENANCE AND REHAB PLAN) AND SUPPLEMENTARY DOCUMENTS (e.g. ALSTOM ASSET MANAGEMENT PLAN, WMS PROCEDURES). 3) IMPLEMENTATION IS ASSESSED THROUGH MONITORING OF CONTRACTORS (REFER TO RTG / RTM FINDINGS). 4) OC TRANSPO IS MONITORING THE WORK DONE BY CONTRACTORS THROUGH IT'S OVERSIGHT PROCESS (REFER TO ITEMS 4A / 4B BELOW)
3A	PROGRAM DIRECTION	CITY MANAGER DESIGNATION, APPX B SECTION 1.1 (B)	DIRECTION	COMPLIANT	1) DIRECTION FOR CBTC INSPECTIONS PROVIDED TO CONTRACTORS THROUGH PROJECT AGREEMENT: - OLRT-SCOPE 5 - SCHEDULE 15-2 PART 4, AND - OLRT-SCOPE 5 - SCHEDULE 15-3 MAINT & REHAB PLAN IDENTIFIIES SPECIFIC REQUIREMENTS FOR TRAIN CONTROL (ie CBTC). 2) CITY DESIGNATED PROGRAM DOCUMENT (i.e. MAINTENANCE & REHAB. PLAN) AND SUPPLEMENTARY DOCUMENTS (e.g. ASSET MANAGEMENT PLAN, WMS PROCEDURES) PROVIDE INSPECTION / MAINTENANCE REQUIREMENTS FOR CBTC.
4A	PROGRAM OVERSIGHT	CITY MANAGER DESIGNATION, APPX B SECTION 1.1 (B)	OVERSIGHT PLAN / PROCESS	COMPLIANT	1) OC TRANSPO HAS A SUBSTANTIVE OVERSIGHT PLAN (i.e. 'LINE 1 OVERSIGHT PLAN') WHICH IS UPDATED ANNUALLY AND INCLUDES DETAILED SCHEDULES OF MONITORING ACTIVITIES FOR EACH YEAR. 2) OC TRANSPO HAS DEDICATED OVERSIGHT RESOURCES FOCUSED ON MONITORING, INCLUDING CBTC SPECIFICALLY.
4B			OVERSIGHT ACTIVITIES	MOSTLY COMPLIANT	1) OC TRANSPO OVERSIGHT ACTIVITIES ENCOMPASS THE REVIEW OF CBTC INSPECTION / MAINTENANCE RECORDS AND FIELD OBSERVATIONS. 2) A REVIEW OF OC TRANSPO'S OVERSIGHT RECORDS INDICATES THAT FINDINGS ARE BEING IDENTIFIED, ACTIONED WITH CONTRACTOR AND FOLLOWED-UP. 3) OBJECTIVE EVIDENCE INDICATES THAT OC TRANSPO IS FOLLOWING UP WITH RTG / RTM THROUGH CONTRACTUAL LETTERS REGARDING CBTC INSPECTION / MAINTENANCE RECORDS WHICH ARE NOT BEING PROVIDED IN A TIMELY MANNER. 4) OC TRANSPO DOES NOT APPEAR TO PERFORM OVERSIGHT ON TRAINING OF EMPLOYEES INVOLVED IN CBTC INSPECTIONS / MAINTENANCE. THIS IS AN AREA WHERE CONFORMANCE GAPS WERE IDENTIFIED WITH THE TRAINING OF INVOLVED TECHNICIANS.
5A	PROGRAM RECORDS	CITY MANAGER DESIGNATION, APPX B SECTION 1.1 (C)	RECORDS	COMPLIANT	1) OC TRANSPO HAS A SYSTEM TO STORE AND MAINTAIN RECORDS; 2) OC TRANSPO PROVIDED RECORDS RELATIVE TO PROGRAM DOCUMENTS, PROCEDURES AND OVERSIGHT ACTIVITIES.

### **Comments Relative to Monitoring Findings for OC Transpo:**

The above Table shows the following Findings for the 5 regulatory responsibilities monitored for OC Transpo.

- 1) Program Adoption, Direction, and Records are compliant;
- 2) Oversight is mostly compliant (refer to part below);
- 3) Implementation is not assessed for OC Transpo because CBTC inspections are performed by RTG / RTM and its subcontractors – the monitoring of Implementation and the respective Findings are presented in Subsection 6.4.2.

#### **Oversight:**

As indicated in the Table above, and in Subsection 5.4.1, OC Transpo has a substantive Oversight program with an Oversight Plan, specific oversight schedules which are updated annually, dedicated resources and an information system to maintain records.

OC Transpo provided oversight records relative to CBTC for 2023. This encompassed the review of CBTC inspection records as well as field observations. However, OC Transpo did not perform oversight activities for CBTC in 2022 because they did not receive on a timely basis the inspection records which they requested from RTM. OC Transpo provided objective evidence that such records were requested in 2022, as well as subsequent letters following-up on such requests.

OC Transpo does not appear to perform Oversight relative to the training of employees involved in CBTC inspections / maintenance (i.e. Alstom signals and communications technicians). This is an area which the RMCO monitored with RTM / Alstom (refer to next Subsection) - Findings show a conformance gap where some of the employees were either missing or not current with certain mandatory courses.

#### **Remedial Actions Taken by OC Transpo:**

The Finding relative to Oversight was reviewed with OC Transpo - the following actions are being taken:

- OC Transpo's 2024 Oversight Plan will be enhanced to encompass the monitoring of training for signals and communications employees performing CBTC inspections.

**6.4.2 Monitoring Findings for RTM – CBTC Inspections:**

Regulatory monitoring activities relative to RTM / Alstom involved the review / analysis of more than 900 documents and records which were provided as objective evidence relative to the execution of inspections, training and software updates for the CBTC system. This was coupled with meetings, interviews involving both RTM and Alstom, as well as field observations.

The monitoring segment was completed successfully with good collaboration from RTM and Alstom.

The following Figure summarizes monitoring Findings for RTM on the basis of the objective evidence collected during monitoring activities. Please note that Figure 14 includes two Tables which are presented below:

**Figure 14 - Monitoring Findings for RTM – Inspections of CBTC System:**

ITEM	REFERENCE	ELEMENT	RTM	COMMENTS
1A	DIRECTION	PROCEDURES FOR PERFORMING INSPECTIONS	CONFORMANT	1) RTM PROVIDED ALSTOM'S RELEVANT WMS PROCEDURES (23) AND ASSET MANAGEMENT PLAN (REV. G). WMS PROCEDURES ARE SUBSTANTIVE IDENTIFYING WORK PREPARATION, WORK STEPS AND RECORDING PROCESS FOR WORK / FINDINGS; 2) WMS-044, 45, 46, 47 WERE PROVIDED BUT NOT REFERENCED IN THE CURRENT ASSET MANAGEMENT PLAN - RTM ADVISED THAT THESE WILL BE ADDED TO REV. H OF THIS PLAN; 3) TRAINING MATRIX PROVIDED FOR SIGNAL & COMM. TECHNICIANS SHOWING MANDATORY COURSES REQUIRED (REFER TO PART 2B BELOW)  OPPORTUNITY: - AT LEAST 3 WMS PROCEDURES (WMS-0003, 13, 20) STATE "ONE OR MORE STEPS IN THIS WMS CAN NOT BE PERFORMED UNTIL THALES PROVIDES DETAILS...". - RTM RESPONDED ON NOV. 17 THAT THEY PLAN TO RESOLVE THIS WITH ALSTOM BY Q2 2024 AND ARE "COMFORTABLE CONSIDERING SYSTEM DESIGN, AUTOMATED MONITORING AND BUILT-IN REDUNDANCY".

2A	IMPLEMENTATION	CBTC INSPECTIONS	MOSTLY CONFORMANT	<p>SERVICE ORDERS PROVIDED FOR 7 TYPES OF INSPECTIONS:                  A) SERVICE ORDERS COVER ALL APPLICABLE WMS PROCEDURES                  B) CBTC INSPECTIONS / ACTIVITIES INCLUDE FREQUENCIES OF 1 DAY, 1 WEEK, 1 MONTH, 6 MONTHS (2 TYPES), 1 YEAR AND 2 YEARS.                  C) CONFORMANCE FOR EACH TYPE OF INSPECTIONS SHOWN BELOW:</p>
				<p>1) "1 YEAR CBTC RACK &amp; WORKSTATION INSPECTION" = MOSTLY CONFORMANT (40 ALSTOM RECORDS PROVIDED)                  - 6 RECORDS (ABOUT 15%) SPAN MORE THAN 2 MONTHS (WHILE MOST SPAN A FEW DAYS)</p>
				<p>2) "6 MONTH CBTC RACK &amp; WORKSTATION INSPECTIONS" = MOSTLY CONFORMANT (14 ALSTOM RECORDS PROVIDED)                  - THERE ARE 3 AREAS WHERE ONE RECORD IS MISSING (ABOUT 20%)</p>
				<p>3) "6 MONTH SLMD (SECOND LINE MAINT. DEVICE INSPECTION) = MOSTLY CONFORMANT (4 ALSTOM RECORDS PROVIDED)                  - THERE ARE 2 AREAS WHERE ONE RECORD IS MISSING (ABOUT 30%)</p>
				<p>4) "2 YEAR KVM SWITCH INSPECTIONS" = CONFORMANT (5 ALSTOM RECORDS)</p>
				<p>5) "1 MONTH CBTC WORKSTATION DEFRAG" = MOSTLY CONFORMANT (108 ALSTOM RECORDS)                  - ABOUT 15% OF INSPECTIONS PERFORMED BEYOND TIME TOLERANCE (5 DAYS), AND 1 APPEARS TO BE MISSING</p>
				<p>6) "1 WEEK BACK UP SERVER" = MOSTLY CONFORMANT (78 ALSTOM RECORDS)                  - 5 INSTANCES IN 18 MONTHS (ABOUT 7%) WHERE WEEKLY SERVER UPDATES WERE LATE BY MORE THAN 2 DAY TOLERANCE (RANGE OF LATE INSTANCES 10-14 DAYS)                  - ALSO THERE ARE INSTANCES WHERE SERVICE ORDER SPANS MORE THAN 2 DAY TOLERANCE</p>
				<p>7) "1 DAY CBTC NETWORK" = MOSTLY CONFORMANT (546 ALSTOM RECORDS)                  - GENERALLY GOOD EXECUTION OF DAILY INSPECTIONS, BUT RECORDS MISSING FOR SOME DAYS (ABOUT 10%)                  - A CHRONOLOGICAL REVIEW OF RECORDS SHOWS GENERALLY GOOD EXECUTION OF DAILY INSPECTIONS, WITH 3 MINOR ISSUES:                  I) RECORDS MISSING FOR SOME DAYS (ABOUT 10%) FOR SAMPLE OF MONTHS REVIEWED;                  II) SOME DAYS HAVE DUPLICATE RECORDS;                  III) SOME RECORDS SPAN MORE THAN 1 DAY</p>

2B		TRAINING	PARTIALLY CONFORMANT	<p>TRAINING DELIVERY IS PARTIALLY CONFORMANT:</p> <ul style="list-style-type: none"> <li>- RTM / ALSTOM PROVIDED TRAINING RECORDS FOR 9 TECHNICIANS: THESE APPEAR TO BE MOSTLY CONFORMANT (THEY COMPLETED AND WERE CURRENT IN ABOUT 86% OF THEIR MANDATORY COURSES).</li> <li>- TRAINING RECORDS WERE NOT PROVIDED FOR CERTAIN S&amp;C TECHNICIANS (AT LEAST 2) WHO WORKED DURING Q1 2023 (i.e. IDENTIFIED IN SERVICE RECORDS).</li> </ul> <p>OPPORTUNITY:</p> <ul style="list-style-type: none"> <li>- THE THREE COURSES ON WMS PROCEDURES FOR S&amp;C TECHNICIANS (IN ALSTOM TRAINING MATRIX) ARE NOT IDENTIFIED AS MANDATORY, YET THESE CONTAIN STEP-BY-STEP INSPECTION PROCEDURES AS WELL AS IMPORTANT TECHNICAL INFORMATION;</li> <li>- FURTHER 3 OF 9 TECHNICIANS DID NOT TAKE ANY WMS COURSES;</li> <li>- RTM SHOULD CONSIDER MAKING CERTAIN WMS COURSES MANDATORY AS THEY IMPACT CBTC INSPECTIONS.</li> </ul>
2C		SOFTWARE UPDATES	CONFORMANT	<p>CONFORMANT.</p> <ul style="list-style-type: none"> <li>- RTM PROVIDED OBJECTIVE EVIDENCE OF ENGAGEMENT WITH OLRTC AND THALES FOR SOFTWARE UPDATES BUILD 8 (COMPLETED) AND 9 (IN PROGRESS)</li> </ul>
3A	OVERSIGHT	PROCESS / RECORDS	CONFORMANT	<p>CONFORMANT.</p> <ul style="list-style-type: none"> <li>- RTM PROVIDED AUDIT REPORT PERFORMED IN 2022 ENCOMPASSING CBTC RECORDS AND TRAINING;</li> <li>- AUDIT REPORT PROVIDED IS SUBSTANTIVE WITH FINDINGS AND REFERENCE TO PRIOR AUDIT;</li> <li>- RTM PROVIDED UPDATED OVERSIGHT PLAN (DRAFT);</li> <li>- RTM ADDED TECHNICAL / OVERSIGHT RESOURCE OVER THE PAST YEAR WITH EXPERTISE IN CBTC.</li> </ul>

**CONFORMANCE SCALE:**

CONFORMANT	<b>Conformant:</b> means that monitoring activities have <b>not</b> identified any non-conformances relative to Program requirements by Contractor.
MOSTLY CONFORMANT	<b>Mostly Conformant:</b> means that monitoring activities have only identified a limited number of relatively minor non-conformances capable of being easily remedied in normal course.
PARTIALLY CONFORMANT	<b>Partially Conformant:</b> means that monitoring activities have identified more regular and/or more serious non-conformances that require timely attention.
NOT CONFORMANT	<b>Not Conformant:</b> means that monitoring activities have identified either full or serious non-conformance, or many non-conformances at the same time or on a repeated or unrectified basis.

**NOTE:** Refer to Annexes 2,3 and 9 for RMCO Scope and Regulatory / Legal context.

Note: The term ‘conformant’ is used for contractors, rather than ‘compliant’, since findings relate to contractual requirements (i.e. Project Agreement) and Direction from OC Transpo, rather than City LRT Regulations.



## Monitoring Findings for RTM – Overview:

Overall, the monitoring activities reviewed 3 major areas relating to Direction, Implementation and Oversight. The monitoring Findings are summarized below:

- 1) With respect to **Direction**, there are detailed inspection procedures for all the elements monitored – this enables for a consistent and systematic approach to the performance of such inspections - as such this area is conformant;
- 2) With respect to **Oversight**, RTM provided reports substantiating their audit process where the execution of inspections and training are assessed. Gaps are addressed with their subcontractors and monitored in subsequent audits - as such this area is conformant. In addition, RTM added an expert resource during the past year who is involved in CBTC oversight and technical reviews;
- 3) **Implementation** was monitored in 3 areas as follows:
  - a) **Execution of Inspections:** The execution of inspections was monitored for 7 different CBTC elements by reviewing inspection records and determining whether these were performed in accordance with requirements. As indicated in the Table above, the analysis of records shows that the execution of inspections ranges from mostly conformant to conformant. Below is a summary of the Findings for each CBTC element:
    - i) CBTC Rack and Workstation Inspection (1 year): mostly conformant;
    - ii) CBTC Rack and Workstation Inspection (6 month): mostly conformant;
    - iii) Second Line Maintenance Device (SLMD) Inspection (6 months): mostly conformant;
    - iv) KVM Switch Inspections (2 years): conformant
    - v) Workstation Defragmentation (1 month): mostly conformant.
    - vi) Back-Up Server Inspection (1 week): mostly conformant.
    - vii) CBTC Network Inspection (1 day): mostly conformant.
  - b) **Training:** Training was partially conformant. RTM / Alstom provided a training matrix and records for 9 technicians (i.e. “Alstom Signals and Communications technicians”) who perform the CBTC inspections. The training records provided show that about 86% of mandatory courses were completed and current; however training records were not provided for 2 technicians who performed inspections during the period monitored.
  - c) **Software updates:** this is conformant on the basis of the objective evidence provided which demonstrates a diligent and documented approach with stakeholders, including Thales and OC Transpo, in the preparation and implementation of CBTC software updates. Currently the CBTC system software is updated to “Build 8” with preparations ongoing for “Build 9” expected to be implemented towards the end of 2024. Following “Build 9” further software updates will be performed for Stage 2.

As explained in Subsection 5.4.2, conformance for inspections is based on two criteria:

- There must be inspection records which substantiate the execution of inspections;
- The dates on the inspection records must be consistent with the specified inspection time intervals as well as the allowable time tolerances.

Conformance gaps for inspections were generally small and involved either missing records or inspection dates which exceeded established time intervals and tolerances.

### **6.4.3 Opportunities\*:**

As explained in Subsection 5.4.3, in addition to the Findings identified above, the monitoring activities identified ‘opportunities’ which do not relate directly to regulatory compliance\*. Such opportunities represent possibilities to make improvements, and / or could potentially have an effect on service and / or safety. The following ‘opportunities’ were identified:

#### **Inspection Procedures**

Some inspection procedures (i.e. ‘WMS’) contain a note which states that certain steps are not being performed by Alstom because information is required from Thales. RTM acknowledged this issue and stated that they are engaging Alstom and Thales to resolve this issue by Q2-2024. Further, RTM stated that in the interim these steps are not critical because of system design, built-in redundancy and automated monitoring.

#### **Training Matrix**

The training matrix for Alstom technicians performing CBTC inspections shows that the courses on inspection procedures (i.e. “WMS procedures”) are not mandatory. Such courses contain detailed inspection procedures and important technical information. Considering their importance, the RMCO identified an opportunity for some of these courses to become mandatory. RTM responded that they are reviewing this matter with Alstom.

*\* RMCO mandate is focused on monitoring regulatory compliance but does not formally include the assessment of Program adequacy or sufficiency, improvement opportunities etc.*

#### **6.4.4 Actions Taken Relative to Findings and Opportunities:**

The above Findings have been the subject of meetings engaging OC Transpo, RTM, Alstom and the RMCO. OC Transpo has formally requested corrective action plans from RTG / RTM for each Finding. Findings and remedial actions are the subject of regular meetings with stakeholders and are tracked formally by OC Transpo and the RMCO in a tracking table (refer to Annex 10). Further details on the remedial actions process are provided in Section 7.

With respect to the Opportunities identified, these are also the subject of ongoing reviews by OC Transpo and the RMCO including periodic meetings held with RTM. Progress is reviewed periodically in order to address / mitigate the Opportunities identified.

## **7. Remedial Actions for RMCO Monitoring Findings:**

As explained in Section 3 of this Report, the RMCO monitoring process involves the ongoing review of findings with stakeholders for two key reasons:

- Provide an opportunity for stakeholders to provide objective evidence which contributes to the accuracy and completeness of findings;
- Provide the ability for stakeholders to develop remedial actions expediently.

Further, it is important to note that the RMCO's mandate does not encompass the resolution of remedial actions with contractors since the City (i.e. OC Transpo) is responsible to engage its contractors to request remedial actions for RMCO findings, to monitor resolution and to use contractual means as required, and to expedite resolution.

In an effort to support structured and timely follow-up, OC Transpo has established and communicated to RTG / RTM a process map which identifies expectations and timelines relative to the submission of remedial action plans as well as their implementation. Further, OC Transpo has requested remedial actions from RTG / RTM for all RMCO monitoring findings.

In accordance with the above, the RMCO continues to work closely with OC Transpo to provide detailed information on findings, and to jointly engage contractors in an effort to clarify findings and expectations for appropriate remedial actions which address findings.

Remedial actions are reviewed throughout the year in meetings with OC Transpo, RTG / RTM and the RMCO. The level of collaboration by RTM has been good with updates on remedial actions provided regularly, as well as participation during the meetings - notwithstanding the good collaboration, and progress made on many findings, the resolution of some items is prolonged due to a number of factors, such as:

- Certain findings relate to the execution of inspections for areas such track, LRV and the catenary. OC Transpo has been engaging RTG / RTM to develop and implement a process which will provide visibility on the ongoing conformance of such inspections.
- Training conformance has been an ongoing challenge given the ongoing movement / hiring of contractor / subcontractor employees;
- Therefore such findings remain open until data and objective evidence demonstrate that they are resolved conclusively.

The Tables of open findings and their respective remedial actions are presented in Annex 10. These Tables show the following information:

- Since revenue service inception, the RMCO’s monitoring activities have identified a total of 48 findings, of which 37 have been addressed and closed through remedial actions provided by RTG / RTM. It should be noted that such closed items remain the subject of ongoing oversight by OC Transpo and monitoring by the RMCO;
- Of the 11 findings which are open, OC Transpo has requested remedial action plans for all such findings, however these items remain open until objective evidence is provided to demonstrate a conclusive resolution. Below is a summary of the open findings:
  - 1 finding relates to the Emergency Response Plan (ERP). 5 findings were identified by the RMCO in Q4-2021 during the ERP monitoring, of which 4 findings have been closed. This area has been the subject of significant development by RTM, including the implementation of a strengthened ERP; however RTM continues to provide records to demonstrate conformance;
  - 2 findings relate to the Security Management Plan (i.e. “SeMP”). 6 findings were identified by the RMCO in Q4-2022, of which 5 findings have been closed. RTM developed a strengthened SeMP, but the following areas require additional work to complete: i) fence intrusion detection system (i.e. “FIDS”); ii) Direction to subcontractors;
  - 4 findings relate to the monitoring of track, LRV and catenary performed during mid-2022. 3 of these open findings relate to the execution of inspections, which require objective evidence to demonstrate ongoing conformance, while 1 open finding relates to training conformance.
  - 4 findings relate to the most recent monitoring segments performed in 2023 relative to tunnels and CBTC. RTG / RTM have provided remedial actions which are under review.

During 2024, remedial actions will continue to be the subject of ongoing follow-up by OC Transpo with support from the RMCO.

It is to be noted that the Table in Annex 10 provides remedial actions for contractors only - remedial actions relative to OC Transpo have been covered in Sections 5 and 6 of this Report.

## **8. Monitoring Approach in 2024:**

In accordance with the risk-based approach outlined in Section 3 of this Report, as well as City LRT Regulations, the RMCO will perform risk-based analyses to identify areas / Programs to be monitored in 2024.

The risk-based selection process will review the following risk inputs (refer to Subsection 3.2 of this Report):

- Confederation line experience, including safety, security and operations;
- Oversight and monitoring findings, including RMCO monitoring, oversight performed by OC Transpo and oversight / investigations performed other parties;
- Typical hazards / risks and occurrences faced by similar commuter operations (based on research performed and presented in 2018 Work Plan);
- Confederation Line characteristics and regulatory Programs.

The risk-based analysis will be performed early in the second quarter of 2024 and will be followed with the development of a monitoring plan and procedures which will be communicated to initiate monitoring.

During 2024, the RMCO will continue to perform regulatory monitoring in accordance with the City's mandate using a structured approach and the principles described in Section 3 of this Report. The intent is to monitor two major risk areas, with the first area to be monitored from June to August, while the second area will be monitored from September to December.

## **Context / Disclaimers**

This Report, including any enclosures, attachments and annexes, has been prepared for the exclusive use of the City of Ottawa solely for the purpose for which it is provided under the Terms of the Contracts executed March 2<sup>nd</sup> 2018 and April 26<sup>th</sup> 2023 between the City of Ottawa and SAB Vanguard Consulting Inc., as well as the supplementary information in Annexes 1-3 and 9 of this Report.

Any use, decisions or actions taken as a result of this work shall be the responsibility of the parties directly involved in the decisions or actions.

**ANNEXES**



## ANNEX 1

### OTTAWA LIGHT RAIL TRANSIT (OLRT) – REGULATORY BACKGROUND

This Annex provides background information on the Ottawa Light Rail Transit (OLRT) project which is considered in law to be a federal rail transportation undertaking:

On July 14<sup>th</sup>, 2011, Ottawa City Council approved the implementation plan for the Ottawa Light Rail Transit (OLRT) project which is considered in law to be a federal rail transportation undertaking.

Since Federal legislation was not developed for application to municipal light rail systems, the City of Ottawa was provided with the authority to regulate its light rail transit system. This was formalized with a **Delegation Agreement** between the Minister of Transport and the City of Ottawa on October 1<sup>st</sup>, 2011, which provides authority to the City to regulate any matters covered by Part III and IV of the *Canada Transportation Act* as well as the *Railway Safety Act*. This delegated authority applies only to the Confederation Line and does not extend to other OC Transpo operations (i.e. Trillium Line, Bus, Para).

In accordance with the Delegation Agreement, and By-Law No. 2015 – 301, the position of ‘Light Rail Regulatory Monitor and Compliance Officer’ (i.e. ‘Regulatory Monitor and Compliance Officer – RMCO’, or ‘Compliance Officer’) was created to monitor and report on compliance with the Ottawa Light Rail Transit (OLRT) Regulations (i.e. City LRT Regulations); the duties and responsibilities of this position are shown in Annex 2. The Compliance Officer is independent of the Transportation Services department and reports directly to the City Manager and City Council.

The RMCO is tasked with specific responsibilities as follows:

1. Development of a **multi-year Work Plan** for monitoring compliance relative to City LRT Regulations as they relate to the safety and security of the system;
2. Perform ongoing compliance monitoring in accordance with the RMCO mandate and Work Plan;
3. Prepare **Annual Compliance Reports** that describe the specific areas of the regulatory framework that were reviewed during the past year; report on the work that was undertaken to verify compliance in these areas; identify areas where compliance with City LRT Regulations has been fully achieved; and report on areas where compliance has not been fully achieved;
4. **Ongoing monitoring** and reporting of any potential regulatory compliance gaps to the City Manager, in order for City staff to correct any compliance deficiencies.

## **ANNEX 2**

### **REGULATORY MONITOR AND COMPLIANCE OFFICER (RMCO) - DUTIES AND RESPONSIBILITIES**

The following schedule was prepared by the City of Ottawa to describe the duties and responsibilities of the RMCO. It is part of the Contracts signed between the City of Ottawa and SAB Vanguard Consulting Inc. on March 2<sup>nd</sup>, 2018 and April 26<sup>th</sup>, 2023.

#### **SCHEDULE "A"**

##### **STATEMENT OF DUTIES AND RESPONSIBILITIES**

The Light Rail Regulatory Monitor and Compliance Officer ("Compliance Officer") is responsible for reviewing, investigating, monitoring and reporting on compliance with the Ottawa Light Rail Transit (OLRT) regulations.

The Compliance Officer will be independent of the Transportation Services Department and will report directly to the City Manager and City Council.

The Compliance Officer will be responsible for the development of a multi-year workplan for monitoring compliance with the OLRT regulations as it relates to the safety and security of the system. The workplan will detail the strategy for the selection of regulations, rules, and procedures to be monitored, the overall methodology to undertake monitoring and reporting, the specific regulatory areas to be monitored, and the timeframes for undertaking the work. The multi-year workplan will be submitted to both the Transit Commission and Ottawa City Council. Prior to developing the multi-year workplan, the Compliance Officer will be required to review and understand the City's comprehensive regulatory framework.

The role is expected to involve monitoring regulatory compliance through site visits, interviews with City staff and contractors, and review of relevant documentation, records, and performance reporting. These tasks are expected to include but not be limited to:

- Reviewing regulations, policies and procedures;
- Conducting interviews and meetings with field staff and senior management;
- Conducting field observations of operations, maintenance and/or safety management activities;
- Reviewing technical submissions;
- Analyzing data and performance records;
- Assessing compliance with regulations;
- Providing timely and accurate advice to staff to consider improvements to the regulations and/or to the implementation and enforcement of regulations when required; and,
- Monitoring implementation of staff recommended improvements, developments and new initiatives in respect to the OLRT Regulations.

The Compliance Officer will prepare an Annual Compliance Report that will describe the specific areas of the regulatory framework that were reviewed during the past year; report on the work that was undertaken to verify compliance in these areas; identify areas where compliance with Regulations has been fully achieved; and report on areas where compliance has not been fully achieved. The Annual Compliance Report will also include any revisions to the multi-year workplan.

After preparing a draft of the report and taking input from the City Manager and affected persons as determined necessary, the Annual Compliance Report will be submitted annually to the City’s Transit Commission and City Council. The City Manager will prepare a Management Response Companion Report that will be considered by Transit Commission and Council alongside the Annual Compliance Report.

The Compliance Officer will also be responsible for quarterly monitoring and reporting of any potential regulatory compliance gaps to the City Manager, in order for City staff to correct any compliance deficiencies.

Please refer to Annexes 3 and 9 of this report for further information on the RMCO responsibilities and regulatory context.

## ANNEX 3

### REGULATORY MONITOR AND COMPLIANCE OFFICER (RMCO) - SUPPLEMENTAL INFORMATION RELATIVE TO SCOPE / RESPONSIBILITIES

In accordance with the Delegation Agreement referenced in Annex 1, and the report submitted to City Council on September 23<sup>rd</sup>, 2015, the duties and responsibilities of the RMCO are described in Annex 2.

In addition, the following information is provided to further clarify the scope and responsibilities of the RMCO:

- The RMCO is responsible for regulatory compliance monitoring for the Confederation Line after revenue service.
- This mandate covers the Confederation Line exclusively and any expansions or extensions to this transit system or other light rail systems. This mandate does **not** cover commuter rail operations such as the Capital / Trillium railway, bus transit operations, or Para Transpo operations.
- The RMCO regulatory compliance monitoring primarily relates to City LRT Regulations adopted by the City through bylaw or by other means, including standards and requirements imposed by Contract. Specifically, the basis for RMCO regulatory monitoring is the 'City Manager Designation' dated 12 February 2021 (refer to Annex 4 of this Report).
- The RMCO was not involved in the construction, implementation, independent safety certification or revenue service availability activities for the Confederation Line.
- RMCO activities consist of performing regulatory compliance monitoring rather than audits. This implies that the assessment of risks, controls, governance, etc. are not part of the RMCO monitoring scope.
- The RMCO monitors compliance relative to City LRT Regulations / Programs on a progressive basis according to monitoring schedules and provides quarterly updates to the City Manager as well as Annual Compliance Reports to City Council and the Transit Commission. This provides a progressive assessment of compliance.
- The development and follow-up for remedial actions required as a result of RMCO monitoring findings are the responsibility of the City. This applies to findings relative to the City's departments (e.g. OC Transpo) as well as contractors.

The following additional information provides further detail on the RMCO monitoring scope:

- The RMCO monitors compliance with operations and maintenance ("O&M") related LRT Regulations by OC Transpo (OCT) as per City Manager Designation (Feb. 12/2021).

- OCT must adopt and implement, provide oversight and direction and maintain records in relation to designated O&M Programs, including the direction to relevant Contractors to do the same and to adhere to Program requirements.
- The RMCO monitors Contractor work activities in relation to the requirements of these O&M Programs as one method of assessing whether OCT is complying with its regulatory obligation to provide meaningful oversight and direction to Contractors in relation to these Programs.
- The RMCO does not: (a) assess the adequacy, sufficiency or effectiveness of Programs or their terms; (b) adjudicate possible legal defaults or breaches by Contractors in the performance of their Program related work activities; or (c) enforce Contractor performance obligations.
- The RMCO will be guided by OCT interpretations of Program requirements in monitoring and reporting on conformance by Contractors with their P.A. (Project Agreement) related obligations, including in relation to OCT requested remedial actions by Contractors.
- OCT management, together with internal and/or external legal support, will determine whether RMCO findings of non-conformance according to any of the categories described in the Report Tables (refer to Sections 5 and 6 of this Report), on their own or on a cumulative, sustained or unrectified basis, constitute a contractual default or breach by Contractor according to relevant contract terms.
- The RMCO's findings are primarily intended to assist OCT and its Contractors in making ongoing improvements to the performance of Program work activities, including OCT oversight practices. These findings are not intended to ascribe legal fault or failure.

## **ANNEX 4**

### **EXCERPTS FROM CITY LRT REGULATIONS– APPENDIX B OF ‘CITY MANAGER DESIGNATION’ DATED FEB. 12, 2021**

The following excerpt from the ‘City Manager Designation’ is provided because of its relevance to the regulatory monitoring activities performed by the RMCO.

#### **APPENDIX B – MASTER LIST OF LRT REGULATIONS**

**UPDATED AS OF: February 11, 2021**

**Introduction:** The City’s delegated self –regulatory regime is based fundamentally on:

- (a) City imposed obligations on various City Departments to adopt and manage specified programs, plans, procedures and practices in relation to LRT Railways, currently Line 1 - Confederation Line (collectively “**Programs**”); and
- (b) the City’s reliance on various oversight mechanisms, procedures and practices that the City has adopted to manage or direct those persons who are responsible for complying with the requirements of these Programs.

#### **1. OC Transpo Programs**

**1.1 LRT Regulation:** OC Transpo shall generally follow and apply Good Industry Practice in:

- (a) approving, adopting, confirming, or otherwise implementing, and overseeing the administration of, the Programs described in paragraph 1.3 below (the “**OCT Programs**”);
- (b) providing the necessary oversight and direction to OC Transpo employees, Contractors and other persons over whom it has lawful authority to ensure timely compliance with the requirements of the OCT Programs; and
- (c) monitoring, maintaining records, providing access to records and responding to enquiries from the RMCO and reporting to the City Manager, in relation to the compliance with the OCT Programs by those who are responsible for compliance;

For the purposes of subparagraph (b) above, to the extent relevant, OC Transpo should generally require applicable Contractors (and their applicable Subcontractors) to:

- (i) adopt and maintain in place plans, programs, procedures and practices that are substantially consistent with the OCT Programs to the extent applicable to the Contractor’s scope of required work in relation to the LRT Railway; and
- (ii) maintain and provide access to records to, and to respond to enquiries from, the RMCO, OCT Director and/or the City Manager in relation to compliance with the foregoing plans, programs, procedures and practices.

**1.2 Reference Information:** The OCT Programs, and the Supplementary Documents that provide additional background reference and guidance information relevant to the OCT Programs, are available from the OCT Director (or designate) on a demonstrated, as needed basis.

**1.3 OCT Programs:** include the:

- (a) Safety Management System Plan (SMS)
- (b) Security Management System Plan (SeMS)
- (c) Threat and Vulnerability Assessment System (T&VA)
- (d) Standard Operating Procedures (SOP)
- (e) LRT Operating Rules and Procedures
- (f) Maintenance and Rehabilitation Plan
- (g) Light Rail Vehicles – Maintenance Plan
- (h) Rates and Terms of Service
- (i) Accident and Safety Incidents – Reporting Requirements
- (j) Mobility Requirements (aligned with TC requirements); and
- (k) Other Programs - that the City Manager may direct OC Transpo to adopt from time to time.

**Note:** *for clarity, the Federal Government has retained primary regulatory authority and responsibility over mobility matters in relation to LRT Railways. Accordingly, as per (j) above OCT has adopted a program and practice that requires compliance with these federal requirements.*

## **ANNEX 5**

### **RISK-BASED APPROACH FOR MONITORING**

#### **Risk-Based Selection of Areas / Regulations to Monitor:**

As described in Section 3 of this Report, a number of factors are considered in the risk-based selection of Regulations / Programs to be monitored - this is summarized below:

- 1) Research relative to hazards and risks for commuter operations (refer to Work Plan);
- 2) Research and analysis relative to incident / accident data for commuter operations (refer to Work Plan);
- 3) Consideration for Confederation Line characteristics (e.g. technology and infrastructure) as well as Regulations and Program documents;
- 4) Consideration for Confederation Line experience (e.g. incidents / accidents, service issues etc.);
- 5) Consideration for internal and external oversight activities (e.g. RMCO monitoring, OC Transpo oversight) as well as audits.

This approach is dynamic since key inputs such as those identified in items 4 and 5 (above) are reviewed periodically to better understand risk and to make appropriate selections for Programs to monitor. In this manner, such inputs are considered in the ongoing risk-based selection of Programs to be monitored.

#### **Overview of Potential Hazards / Risks:**

The City mandate for the RMCO states that the focus of regulatory monitoring is on safety and security. As such, related risks can result from multiple sources (hazards), each with their respective potential probability (i.e. likelihood) and consequence (i.e. severity).

The multi-year Work Plan presented research performed on potential hazards, accident / incident causes for commuter operations, and other relevant research. This enabled the identification of the following broad hazard / risk categories:

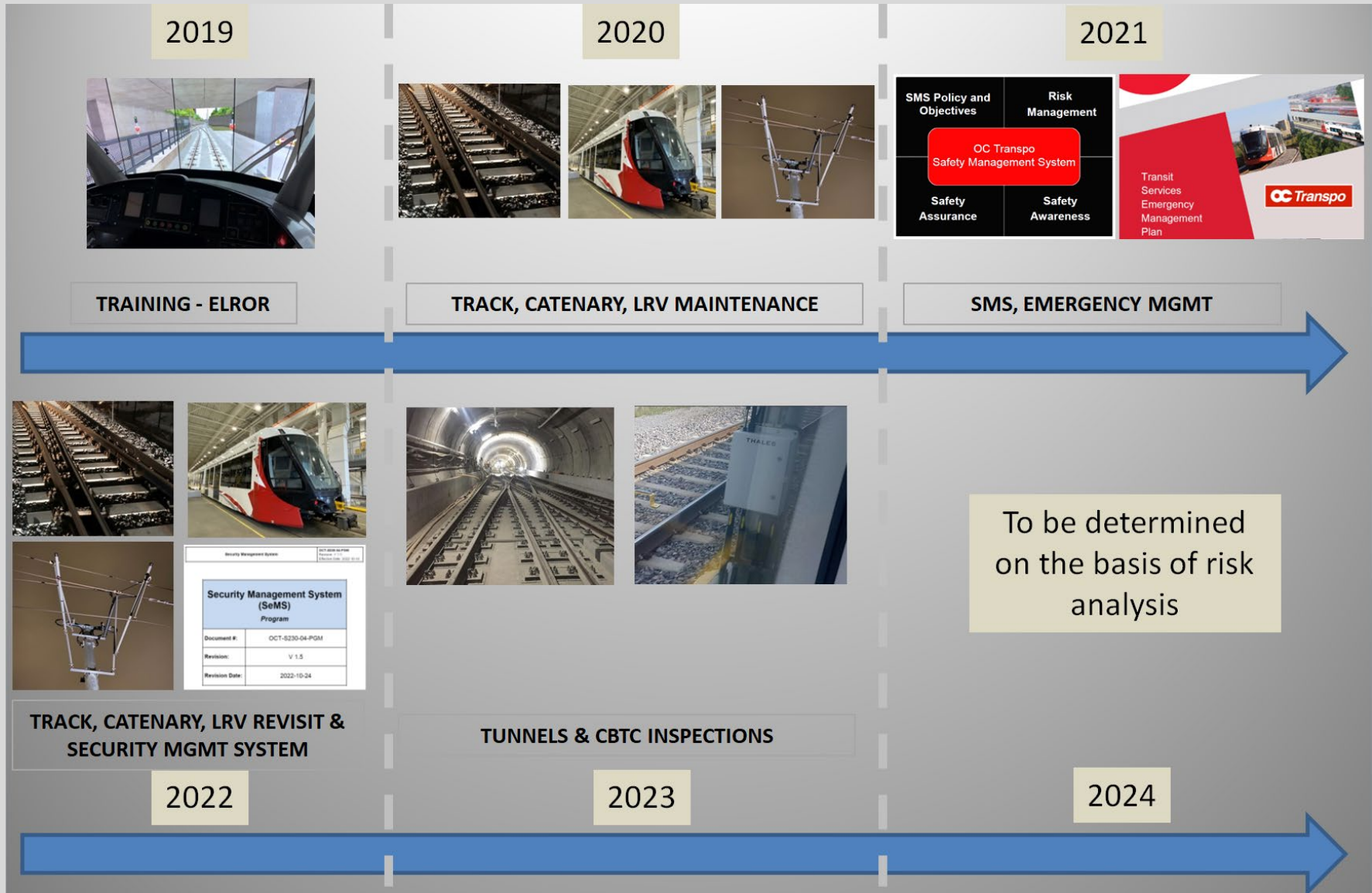
- Human Factors;
- Security Management System and Emergency Procedures;
- Rolling stock inspection / maintenance (i.e. light rail vehicles);
- Track inspection / maintenance;
- Other equipment / infrastructure, environmental and other.

Safety Management Systems has been added to the above categories since this is an integral part of managing safety and operations.

The above risk areas and the corresponding 'OCT Programs' identified in City LRT Regulations are the focus of the RMCO's regulatory monitoring activities.



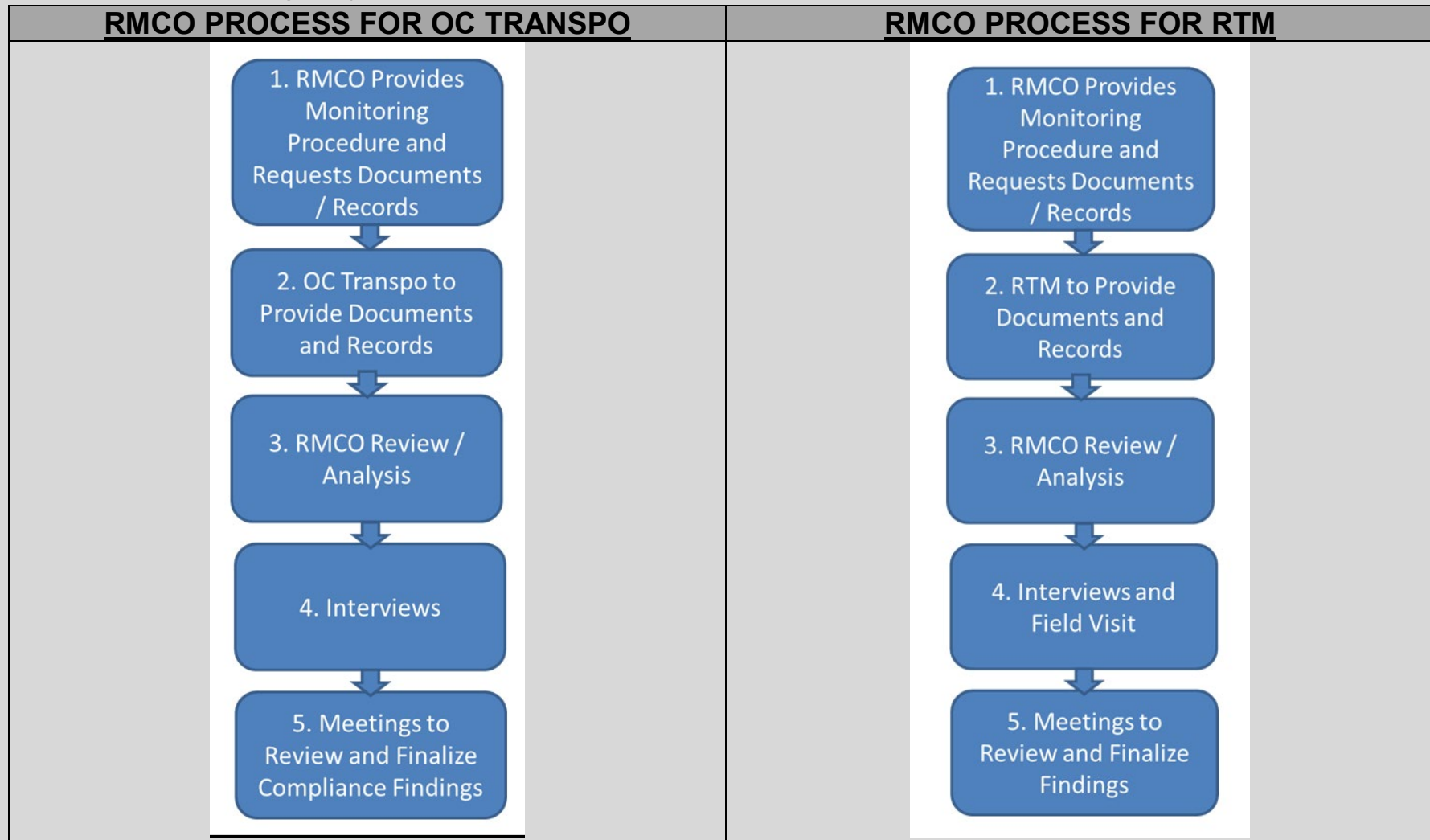
# ANNEX 6 – AREAS MONITORED BY RMCO SINCE REVENUE SERVICE INCEPTION



## **ANNEX 7 – Monitoring Steps**

The RMCO monitoring approach consists of performing two segments which are summarized below:

- 1) Segment 1 is focused on OC Transpo's regulatory responsibilities;
- 2) Segment 2 is focused on the contractual responsibilities for RTM and their subcontractors, as well as Direction and Oversight by OC Transpo



# ANNEX 8 – PART 1 (ST-LAURENT TUNNEL) : MTO LETTER DATED JAN. 21, 2009

Ministry of Transportation

Ministère des Transports

Bridge Office

Bureau de la gestion des ponts

Highway Standards Branch  
301 St. Paul Street, 2<sup>nd</sup> Floor  
St. Catharines, Ontario L2R 7R4  
Tel Number: (905) 704-2406  
Fax Number: (905) 704-2060

Direction des normes routières  
301, rue St. Paul, 2<sup>e</sup> étage  
St. Catharines (Ontario) L2R 7R4  
Tél. : (905) 704-2406  
Télééc. : (905) 704-2060



## MEMORANDUM

**DATE:** January 21, 2009  
**TO:** Distribution List (attached)  
**FROM:** Bala Tharmabala  
**RE:** Bridge Office Bulletin  
Inspection of Newly Constructed Structures and Rehabilitated Structures

### Purpose

Provide guidelines on the inspection timing for new structures and recently rehabilitated structures.

### Background

Bridges and Culverts are inspected every two calendar years (biennially) in compliance with the Public Transportation and Highway Improvement Act, Regulation 104/9 and following the procedures in the Ontario Structure Inspection Manual (OSIM). There have been some inconsistencies as to when structures are inspected - after rehabilitation or after structures have been newly built but not open to traffic. A new structure or an existing structure that has been rehabilitated receives an inspection at the completion of construction to ensure that the structure was built or rehabilitated according to the contract requirements. This inspection is for contract compliance only and is not considered equivalent to an OSIM inspection. This policy will clarify the inspection timing requirements for new structures and structures that have been rehabilitated.

### Guidelines

A new structure shall be inspected in accordance with OSIM and entered into the Ontario Bridge Management System (OBMS) within 2 calendar years of completion of the construction contract and opening of the structure to traffic. The normal cycle of inspection shall be followed thereafter. Basic inventory data shall be updated in the OBMS upon completion of construction. This data includes the operation status, year of construction, structure type and material, span data, length, width and deck area.

For an existing structure undergoing rehabilitation, the inspection shall be completed within 2 years of completion of the rehabilitation or by its next scheduled inspection, whichever is earlier.

When a portion of a structure is under construction and another portion open to traffic, the portion open to traffic shall be inspected as per its normal schedule unless directed otherwise by the Head of Structures for the region in which the structure is located.

### Implementation

These guidelines shall become effective immediately.

*J. Tharmabala*

Bala Tharmabala  
Manager

c: G. Chaput

Distribution List:

### Managers of Engineering

K. Bentley, Southwestern Region  
B. Snell, Northwestern Region  
L. Politano, Central Region  
P. Lecoarer, Northeastern Region  
P. Makula, Eastern Region

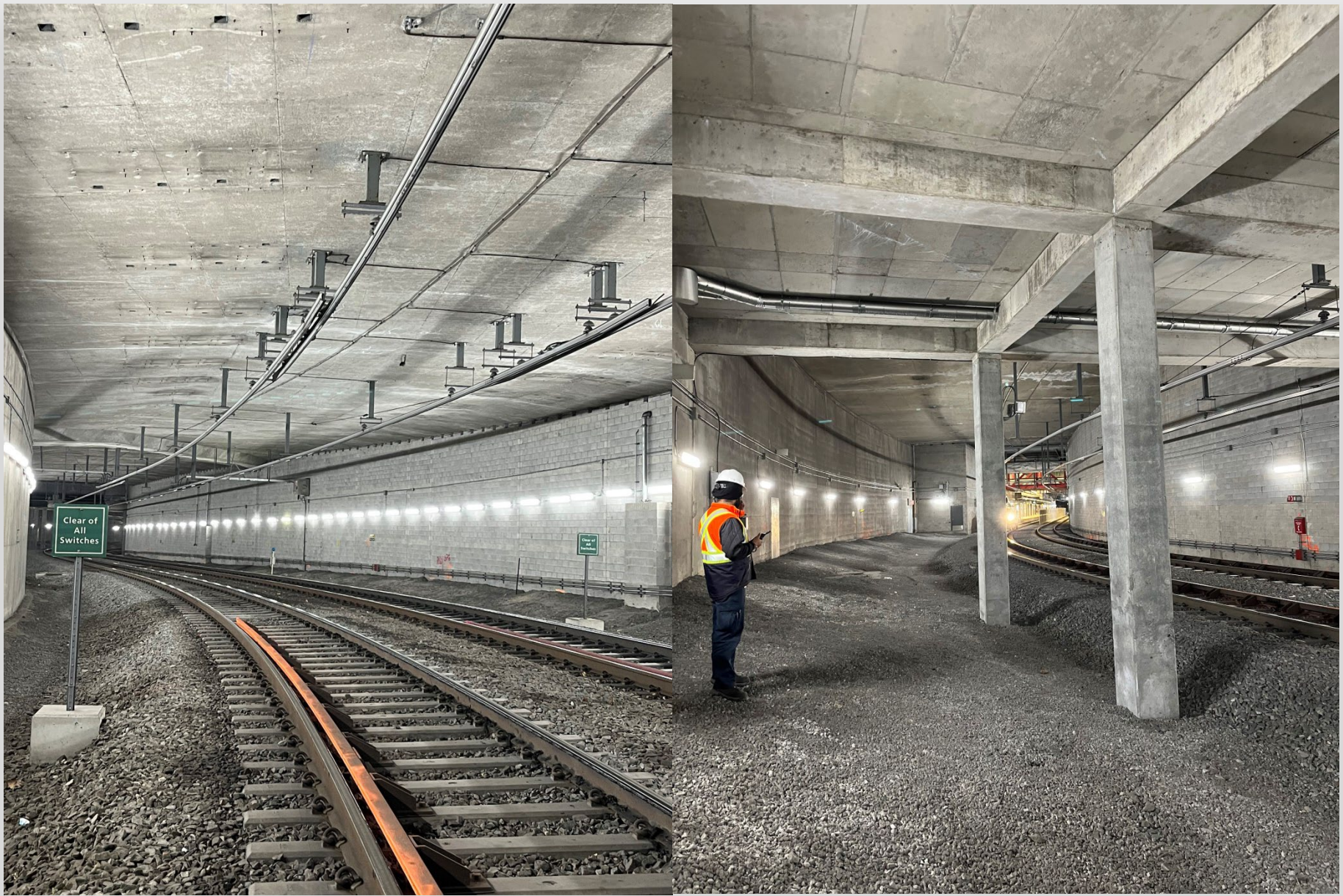
### Heads, Regional Structural Sections

R. Albino, Northeastern Region  
A. Ho, Central Region  
Q. Islam, Eastern Region  
R. Krisciunas, Northwestern Region  
W. Young, Southwestern Region

### Heads, Bridge Office

D. Bagnariol, Evaluation  
W. Kenedi, Evaluation (Acting)  
N. Theodor, Standards  
I. Husain, Design  
D. Lai, Rehabilitation  
C. Lam, Bridge Research  
T. Merlo, Design Systems  
R. Mihaljevic, Quality Assurance

## **ANNEX 8 – PART 2: ST-LAURENT TUNNEL IMAGES (NOV. 26, 2023)**



## **ANNEX 8 – PART 3: INCIDENT OF JANUARY 2, 2024 AND MEMO FROM ACTING IWSD**

Following the completion of the monitoring segments relating to tunnel inspections, an incident occurred on January 2nd, 2024 during which concrete debris fell near LRT tracks in the St-Laurent tunnel, resulting in the temporary interruption of service between Hurdman and Blair stations.

Subsequently the City's Infrastructure and Water Services Department (IWSD) engaged a structural engineering firm to conduct a detailed inspection. Following the structural inspection, a procedure involving "sounding / scaling" was conducted to remove small concrete pieces which had separated from the main slab.

The City's IWSD acting General Manager wrote a memo to City Council (see below) which states that *"It is not uncommon to see delamination and scaling required in a structure of this age and with this level of complexity"*.

Further, the memo states that the *"report from the structural engineer deemed there are no hazards, and the structure is safe to resume service"* which allowed service to resume shortly before 17h00 the same day.

The City's IWSD acting General Manager memo to City Council dated January 2, 2024 is attached below:

**MEMO / NOTE DE SERVICE**



**To / Destinataire** Mayor and Members of City Council  
**From / Expéditeur** Carina Duclos  
Acting General Manager  
Infrastructure and Water Services Department

**Subject / Objet** Structural Inspection at St-Laurent Station Tunnel      Date: January 2, 2024

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The purpose of this memorandum is to provide an update to Mayor and Members of Council on the structural inspection at the St-Laurent Station on Tuesday, January 2, 2024. As outlined in the memo provided by Transit Services Department on January 2, the Infrastructure and Water Services Department (IWSD) was notified of pieces of concrete debris along the track and conducted a condition assessment to identify the cause. Following the preliminary assessment and out of an abundance of caution, IWSD engaged a structural engineering firm to conduct a detailed inspection.

Results from the inspection confirmed delamination, which is the separation of the paste layer at the surface, creating an unbonded layer with the main slab. With direction and oversight from the structural engineer, sounding and scaling was conducted by a contractor to remove the small concrete pieces that had separated from the main slab.

The St. Laurent Bus Rapid Transit Station was constructed in the mid 1980's. The lower-level tunnel accommodates Light Rail Transit (LRT) and consists of a series of single span concrete rigid frame structures with the upper-level platform partially located on its deck surface. It is not uncommon to see delamination and scaling required in a structure of this age and with this level of complexity.

Required work concluded at approximately 4:15 pm and a report from the structural engineer deemed there are no hazards, and the structure is safe to resume service. As a result, O-Train Line 1 service resumed shortly before 5 pm.

IWSD will continue to conduct routine condition assessments of the structure. Transit Services and IWSD will collaborate to determine the appropriate schedule for these inspections.

Should you have any questions about this information, please contact me at extension 16507.

Sincerely,

---

Carina Duclos  
Acting General Manager  
Infrastructure and Water Services Department

**ANNEX 9 – DOWNTOWN TUNNEL IMAGES - WATER INFILTRATION (EAST OF RIDEAU STATION) – AUGUST 21, 2023**







## ANNEX 10 - STATUS OF RMCO FINDINGS AND REMEDIAL ACTIONS\*

REGULATORY AREA / PROGRAM	PERIOD MONITORED	NUMBER OF FINDINGS	NUMBER OF FINDINGS CLOSED	NUMBER OF FINDINGS OPEN
RULES TRAINING - OPERATING EMPLOYEES	Q4 - 2019	1	1	0
TRACK INSPECTIONS	Q1 / Q2 - 2020	8	8	0
LRV INSPECTIONS	Q3 / Q4 - 2020	5	5	0
CATENARY INSPECTIONS	Q3 / Q4 - 2020	5	5	0
SMS	Q2 / Q3 - 2021	6	6	0
ERP	Q4 - 2021	6	5	1
INSPECTIONS LRV, TRACK, CATENARY	Q2 / Q3 - 2022	4	0	4
SECURITY MANAGEMENT SYSTEM	Q4 - 2022	6	4	2
TUNNEL INSPECTIONS	Q2 / Q3 - 2023	5	3	2
CBTC INSPECTIONS	Q3 / Q4 - 2023	2	0	2
	<b>TOTAL</b>	<b>48</b>	<b>37</b>	<b>11</b>

\* This status was taken on Jan. 24, 2024. Please refer to the next pages for details on open RMCO findings.

Finding #	Area Monitored	Monitoring Period	Finding Description	Relevant Program Document(s)	Status (Dec. 2023)	Comments / Next Steps Requested by OC Transpo
<u>31</u>	Emergency Response	DEC-FEB. 2022	<u>2022-5C Records Monitoring: Oversight / Monitoring Plan for ERP to identify how records will be maintained.</u>	P.A. Schedule 15-2 Part 1 Article 11	OPEN	1) RTM actions in progress; 2) Workshop held between OCT and RTM Dec. 13 to expedite resolution.
<u>32</u>	Inspections of LRV, Track and Catenary	JUNE - AUG. 2022	<u>2022-6 Training of Employees Involved in Inspections of Track, Catenary and LRV :</u>  <u>Finding: A majority of employees monitored were missing some mandatory courses</u>	i) P.A. Schedule 15-3 Maintenance and Rehabilitation Requirements; ii) City adopted Program "Maintenance and Rehabilitation Plan RTM-MC-PLN-042"; iii) City adopted Program "Track Safety and Inspection Rules RTM-ENG-RUL-132"	OPEN	1) RTM actions in progress; 2) Documents and records provided by RTM Dec. 1, 2023. 3) OCT reviewing with RTM reporting required to demonstrate conformance objectively
<u>33</u>	Inspections of LRV, Track and Catenary	JUNE - AUG. 2022	<u>2022-7 Inspections of LRV's:</u>  <u>Finding: LRV mileage inspections generally conformant, but about 30% of sample monitored show 10K inspections performed beyond 5% allowable tolerance.</u>	i) P.A. Schedule 15-3 Maintenance and Rehabilitation Requirements; ii) City adopted Program "Maintenance and Rehabilitation Plan RTM-MC-PLN-042"; iii) City adopted Program "Track Safety and Inspection Rules RTM-ENG-RUL-132"	OPEN	1) RTM actions in progress; 2) Documents and records provided by RTM Dec. 1, 2023. 3) OCT reviewing with RTM reporting required to demonstrate conformance objectively
<u>34</u>	Inspections of LRV, Track and Catenary	JUNE - AUG. 2022	<u>2022-8 Inspections of Track (i.e. Guideway):</u>  <u>Finding: Monitoring of Track inspections show about 30% of records missing for three types of inspections (3 month mainline, 1 day mainline, 1 month turnout) and 15% of records missing for 3 day mainline inspections. Track inspections relative to extreme weather were conformant.</u>	i) P.A. Schedule 15-3 Maintenance and Rehabilitation Requirements; ii) City adopted Program "Maintenance and Rehabilitation Plan RTM-MC-PLN-042"; iii) City adopted Program "Track Safety and Inspection Rules RTM-ENG-RUL-132"	OPEN	1) RTM actions in progress; 2) Documents and records provided by RTM Dec. 1, 2023. 3) OCT reviewing with RTM reporting required to demonstrate conformance objectively
<u>35</u>	Inspections of LRV, Track and Catenary	JUNE - AUG. 2022	<u>2022-9 Inspections of Catenary / OCS:</u>  <u>Finding: Monitoring of Catenary inspections show 5 of 12 records missing for 6 month OCS tensioning WMS002, and 3 of 12 records missing for two types of inspections (6 month WMS001 and 1 year WMS005). As well, inspection records for 2M inspections identified 2 inspections which were done late.</u>	i) P.A. Schedule 15-3 Maintenance and Rehabilitation Requirements; ii) City adopted Program "Maintenance and Rehabilitation Plan RTM-MC-PLN-042"; iii) City adopted Program "Track Safety and Inspection Rules RTM-ENG-RUL-132"	OPEN	1) RTM actions in progress; 2) Documents and records provided by RTM Dec. 1, 2023. 3) OCT reviewing with RTM reporting required to demonstrate conformance objectively

39	Security Management System	OCT. - DEC. 2022	<p><u>2022-13 Fence Intrusion Detection System:</u></p> <p><b>Finding:</b> Fence Intrusion Detection System (FIDS) does not appear to be operational as per RTM SeMP.</p>	i) RTM SeMP 4.7	OPEN	1) RTM actions in progress; 2) Workshop held between OCT and RTM Dec. 13 to expedite resolution.
40	Security Management System	OCT. - DEC. 2022	<p><u>2022-14 Direction to Subcontractors:</u></p> <p><b>Finding:</b> Direction to subcontractors does not appear to refer to RTM SeMP or key initiatives such as employee security verifications. Applicable SeMP requirements to be conveyed to subcontractors.</p>	i) P.A. Sched. 15-3 Article 5 and 15-4; ii) RTM SeMP 1.2	OPEN	1) RTM actions in progress; 2) Workshop held between OCT and RTM Dec. 13 to expedite resolution.
44	Tunnel TVS Inspections	MAY-SEPT 2023	<p><u>2023-3 Tunnel TVS Inspections:</u></p> <p><b>Finding:</b> TVS inspections were mostly conformant. WMS-003 (1 month), 006 (3 months) and 011 (1 year)</p>	1) PA Sched. 15-3 Appdx A, Attach 8; 2) City Designated Program "Maintenance & Rehabilitation Plan" (RTM-MC-PLN-042) 3) Supplementary documents such as Alstom Asset Management Plan and WMS procedures	OPEN	1) OC Transpo reviewing with RTM reporting required to demonstrate conformance objectively. 2) Documents and records provided by RTM Dec. 1, 2023.
46	Tunnel Lighting Inspections	MAY-SEPT 2023	<p><u>2023-5 Tunnel Lighting Inspection:</u></p> <p><b>Finding:</b> Lighting inspections were mostly conformant. WMS-005 (6 month) and 009 (1 year)</p>	1) PA Sched. 15-3 Appdx A, Attach 8; 2) City Designated Program "Maintenance & Rehabilitation Plan" (RTM-MC-PLN-042) 3) Supplementary documents such as Alstom Asset Management Plan and WMS procedures	OPEN	1) OC Transpo reviewing with RTM reporting required to demonstrate conformance objectively. 2) Documents and records provided by RTM Dec. 1, 2023.
47	CBTC Inspections / Maintenance	SEPT. - NOV. 2023	<p><u>2023-6 CBTC Inspections / Maintenance :</u></p> <p><b>Finding:</b> Several CBTC inspection types were mostly conformant (1Y, 6M, 1M, 1W, 1D)</p>	i) P.A. Schedule 15-2 Part 4 Article 5; ii) P.A. Schedule 15-3 (Maintenance and Rehabilitation Requirements); iii) City adopted Program "Maintenance and Rehabilitation Plan RTM-MC-PLN-042";	OPEN	Findings reviewed with OCT and RTM Dec. 18
48	CBTC Inspections / Maintenance	SEPT. - NOV. 2023	<p><u>2023-7 Training of Employees Involved in CBTC Inspections / Maintenance :</u></p> <p><b>Finding:</b> S&amp;C Technicians responsible for CBTC inspections / maintenance were missing mandatory courses (partially conformant)</p>	i) P.A. Schedule 15-2 Part 4 Article 5; ii) City adopted Program "Maintenance and Rehabilitation Plan RTM-MC-PLN-042"; iii) RTM "Training and Competency Plan" RTM-ADM-PLN-123	OPEN	Findings reviewed with OCT and RTM Dec. 18

## ANNEX 11 - REGULATORY AND LEGAL CONTEXT

The information below is provided to further assist readers with a proper review of this Report. This provides guidance regarding the limits on the scope of the RMCO's monitoring work; the monitoring and oversight work carried out and confirmed by others; and the coordinated interplay between these various oversight functions:

**1. Limited Scope:** The RMCO only monitors OC Transpo (OCT) regulatory compliance obligations and commenced doing so after revenue service inception.

This means the RMCO Monitoring is limited to operations and maintenance (O&M) activities and OCT's compliance with its LRT regulatory obligations (i.e. adopt, implement, provide direction, oversight and maintain records relative to designated Programs).

**2. Other Compliance Monitoring:** The monitoring and reporting of compliance with LRT Regulations applicable to other Confederation Line activities and other designated Programs, is carried out by designated representatives for the other City Departments responsible for these other activities.

These other activities include design, construction, testing and commissioning activities, property planning and land management matters, oversight of accident and safety incident investigations and other LRT regulatory management matters.

**3. Review of Contractor Performance:** There are no LRT Regulations that apply to contractors directly. The LRT Regulations only apply to OCT and other City Departments.

The RMCO reviews contractor work activities as one method by which to assess whether or not OCT is complying with its LRT regulatory obligation to provide responsible oversight and direction to the contractors regarding their compliance with O&M related Programs (e.g. SMS Plan, SeMS Plan, Maintenance and Rehabilitation Plan etc.).

**4. Interplay with Other Oversight Activities:** The RMCO obtains information from, and periodically exchanges observations and insights regarding contractor work activities, with OCT who are involved with contract oversight procedures and practices to the extent these relate to the O&M matters and Programs being monitored by the RMCO.

This provides the RMCO with an opportunity to compare and cross check his findings with the findings arising from these other oversight functions.

There is however no expectation that the findings of the RMCO for a particular reviewed O&M segment at a particular point in time will fully align with the findings from these other oversight functions because of differences in the:

- (a) Timing of the monitoring, oversight and reporting activities;
- (b) The nature and scope of the RMCO monitoring work compared to the OCT and RCP contract oversight investigations and reviews; and
- (c) The nature and scope of the information being relied upon in these different proceedings (e.g. prescriptive PA related performance metrics and reports versus tailored

information requests, inspections, interviews and other RMCO required information identified at time of review).

**5. Compliance Categories:** Included with the Table of Findings at each of paragraphs 5.4.1 and 6.2.1, as well as Annex 3 of this Report, is an Explanatory Note attachment that provides further guidance regarding the:

- Difference between compliance findings for OCT versus conformance findings for the contractor being monitored (e.g. RTM)
- Different levels of compliance and non – compliance (i.e. fully, partial, mostly and not)
- Threshold level of findings (by reference to severity, frequency, rectification response and other factors) that could possibly result in a declared breach of a LRT Regulation
- Limited role of the RMCO in a declared breach situation in the context of a self – regulatory model of regulation

**6. Conformance Categories:** Included with the Table of Findings at each of paragraphs 5.4.2 and 6.2.2, as well as Annex 3 of this Report, is an Explanatory Note attachment that provides further guidance regarding the:

- Difference between conformance findings for RTM versus compliance findings for OCT
- Different levels of contract conformance and non-conformance (i.e. fully, partial, mostly and not)
- Threshold level of findings (by reference to severity, frequency, rectification response and other factors) that could possibly result in a declared breach of a term of the PA
- Limited role of the RMCO in a declared contract breach or default situation

**7. Limits on RMCO Role:** The RMCO monitors and reports on compliance with LRT Regulations that apply to OCT (i.e. adopt, implement, provide direction, oversight and maintain records relative to designated Programs). There are related activities and responsibilities which are not assigned to or vested with the RMCO:

*(a) No Enforcement of Regulations:* The RMCO is not a regulatory officer with powers to enforce compliance by OCT with LRT Regulations.

In a self – regulatory model of regulation enforcement against OCT (and other City Departments) is the responsibility of the City Manager or designate as the senior regulatory officer for the City.

Enforcement and / or corrective actions that may be taken or directed by the City Manager at her/his discretion will most likely be process and continuous improvements, and / or employer/employee based (e.g. possible directions to rectify, reprimands, compensation adjustments, warnings, suspension, termination or other).

*(b) No P.A. (i.e. Project Agreement) Enforcement:* The RMCO does not enforce conformance with PA obligations by RTG/ RTM or other contractors. This is the responsibility of the City through designated OCT/RCP representatives and according to PA remedies and recourse rights in favor of the City.

The RMCO however will confer with OCT and RTG/RTM representatives regarding potential PA enforcement matters in relation to outstanding remedial actions and plans as part of the RMCO's ongoing monitoring of OCT's oversight and direction responsibilities.

*(c) No Auditing:* The RMCO is not a safety and/or security auditor. Audits are carried out on a scheduled basis by other contracted professional safety and security audit firms.

*(d) No Adjudication:* The RMCO does not make legal determinations regarding possible breaches or non-compliances with LRT Regulations. This is the responsibility of OCT and RCP management, City legal advisors (internal/external) and potentially a formally appointed adjudicator and/or Court.

*(e) No Assessment:* The RMCO does not assess the adequacy, suitability or completeness of the LRT Regulations or the terms of the PA and is not required or expected to make recommendations for change.

This is the responsibility of the City Manager with input and recommendations from designated representatives for the City Departments who have the responsibility to comply with LRT Regulations.

*(f) Informal Observations:* The RMCO may, but is not required to, provide informal non-binding observations and insights in relation to any of the above and in relation to other Confederation Line activities, developments or matters on a voluntary basis in the course of carrying out the RMCO mandated work activities.