



**Office of the Auditor General: Audit of the  
Regulatory Framework for Light Rail Transit,  
Tabled at Audit Committee – November 30, 2017**

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**Acknowledgments**

The team responsible for this audit, comprised of Ted Pender and Dana Mersich of Samson and Associates and Jean Claude Aurel of Transit Safety & Security Solutions, under the supervision of Ed Miner, Deputy Auditor General and the direction of Ken Hughes, Auditor General, would like to thank those individuals who contributed to this project, and particularly, those who provided insights and comments as part of this audit.

Original signed by:

Auditor General

## Executive summary

### Purpose

This audit was conducted to determine whether the City has developed and implemented a regulatory framework for Light Rail Transit which meets the requirements of the Transport Canada Delegation and is adequate, comprehensive and workable.

### Rationale

The Light Rail Transit (LRT) project is a key part of the Transportation Master Plan and aims to make it more attractive and easier for residents and visitors to move through the city of Ottawa using transit. This \$2.1 billion project includes financial contributions from the Provincial and Federal governments.

The safety and security component associated with the LRT has been delegated by Transport Canada to the City. The City must develop, implement and enforce comprehensive regulatory frameworks for the safety and the security of the railway. This is the first time in Canada that a municipality has been assigned such responsibility. A review was required, given that the effective management of the regulatory framework is a matter of safety and security for Ottawa residents.

This audit is intended to give City Council assurance that the City has developed and implemented a regulatory framework for LRT which meets the requirements of the Transport Canada Delegation and is adequate, comprehensive and workable. The scope of this audit included any and all elements potentially encompassed by the Transport Canada Delegation Agreement. The audit is not to assess the LRT safety and security systems, rather the regulatory frameworks over these areas.

The audit team included a Subject Matter Expert (SME) in order to assess the appropriateness and adequacy of the regulatory framework. He has more than 15 years of diverse engineering and safety management experience, including hazard analysis and safety and security certification implementation.

### Findings

The audit focused on three key areas which were selected based on risk:

- Completeness of **safety** regulatory framework and compliance with delegation agreement

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- Completeness of **security** regulatory framework and compliance with delegation agreement
- Procedures related to incidents

The key findings associated with each area are as follows:

### **1. Completeness of safety regulatory framework and compliance with delegation agreement**

The audit found no gaps in the safety regulatory framework and that it was in compliance with delegation agreement.

A Regulatory Working Group was struck with the aim of developing the structure of the safety management framework and safety documents specific to the Confederation Line. Working Group members had extensive professional experience in light rail safety regulation as well as familiarity with industry standards and other light rail systems. An OC Transpo Safety Management System (SMS) Working Group incorporated the safety-related documentation developed by the Regulatory Working Group into an OC Transpo system-wide SMS. Our SME reviewed the structure and list of elements included in OC Transpo's SMS, and it is his opinion that all required elements for the system are captured.

Once the structure and list were complete, the development and review process for the content of the individual safety framework elements was comprehensive. It was designed to ensure that every element was reviewed by individuals from both the construction consortium, known as the Rideau Transit Group, O-Train Construction (formerly the City's Rail Implementation Office) and OC Transpo, when required. Comments and responses were documented, followed-up on and addressed via a formal tracking tool which captured all correspondence. All parties were required to sign off on completed documents prior to final acceptance of the element.

Once an element was formally accepted by OC Transpo, it was subject to further internal review of format and style for institutional consistency and training purposes. The specific internal process followed by any given element varied depending on its content and intended audience. This process was not standardized or clearly described, and the review details within OC Transpo were generally not documented. This creates a risk that the City would not be able to demonstrate that a proper internal review of the element took place, if required.

We were informed that OC Transpo consulted many sources during the development and review of the SMS elements, including but not limited to the American Public

Transportation Association's SMS Guidelines, Transport Canada's Railway Safety Management System Regulations, Transport Canada's Safety Management System Industry Guidance, the Canada Labor Code, the existing O-Train Trillium Line SMS and comparator operators in other North American municipalities. We were able to view a number of specific examples where the consultation of such sources was documented; however, this was not performed and documented in a structured or consistent manner.

We selected a sample of 15 elements from the safety framework and tested them for compliance with the delegation's requirement that they be based on industry standards. In all cases, we were able to clearly link the content of the element to at least one industry standard. These sources were not being tracked when the elements were being developed; however, OC Transpo was able to compile and provide us with sufficient documentation to demonstrate compliance for each element selected. In addition, the contents of 20 sample elements were reviewed by our SME who was of the opinion that the content of each was appropriate and consistent with industry practices.

We interviewed safety professionals from light rail operations in other Canadian municipalities, and they indicated that it is not common industry practice to specifically link safety regulation documentation elements to the sources consulted during their development. Our SME was also of this opinion. The employee within the City's Legal Services branch who was involved in drafting the delegation agreement advised that he did not believe the intention of the delegation was that every element of the framework necessarily be directly linked to its source documentation.

## **2. Completeness of security regulatory framework and compliance with delegation agreement**

The audit found no gaps in the security regulatory framework and that it was in compliance with delegation agreement.

The audit found that the structure of OC Transpo's system-wide Security Management System (SeMS) is based largely on the existing OC Transpo SeMS for the Trillium line, which has been accepted by Transport Canada. The changes to security that are required for OC Transpo to transition from the existing transit system to one including the Confederation Line are relatively minor because security is generally not mode contingent. The development and review process for the updating of the SeMS began with a review of the existing elements as well as consideration of the requirement for new elements. This was done by a team including the Chief Special Constable and key OC Transpo staff. Our SME reviewed the structure and list of elements included in OC

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Transpo's SeMS, and it is his opinion that all required elements for the system are captured. He did not identify any gaps.

We were advised that the Chief Special Constable sought out updates in industry standards and practices through discussions with colleagues in other municipalities among other approaches. Records of this process were not documented; however, interviews with equivalent staff in other municipalities demonstrated a culture of sharing of best practices within the community.

We selected a sample of 10 elements from the security framework to test compliance with the delegation's requirement that it be based on industry standards. For all 10 elements, we were able to clearly link the content of the element to at least one industry standard. The content of these samples was also reviewed by our SME who was of the opinion that the content of each was appropriate and consistent with industry practices.

### **1. & 2. Completeness of safety and security regulatory frameworks**

While several light rail safety and security standards and frameworks are generally accepted in the industry worldwide, there is no one comprehensive set of criteria that serves as the ultimate authority. In addition, as no two light rail systems are identical or operate under identical conditions, only portions of such a framework are ever applicable to any given system. Discussions on this topic with OC Transpo and Legal Services staff and our SME confirmed this as an accurate description of the safety and security regulation environment in the industry. Consequently, while no gaps were identified, we are limited in the degree of assurance that we can provide on the completeness of the content of the SMS or SeMS. Significantly, this is not to imply however that OC Transpo's SMS or SeMS are incomplete.

### **3. Procedures related to incidents**

The audit found that OC Transpo had significant and comprehensive documentation related to incident identification, classification and escalation policies and procedures and guidelines for incidents related to railway operation and maintenance. Our SME reviewed the relevant documentation and did not identify any gaps. Similarly, accident investigation assessment and reporting policies, as well as procedures and guidelines for response and recovery for potential accidents were found to be well documented.

Authorities and responsibilities for accident investigation, assessment, and reporting were clearly established and documented. Detailed protocols exist, and substantial effort is invested by OC Transpo into collecting incident data and using it to inform future actions to improve customer and employee safety.

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Detailed testing of mechanisms in place to identify and address delays in delivery of the SMS and/or SeMS was not necessary as there is essentially no risk related to a possible delay in the delivery of the SMS and/or SeMS. The final training-ready version of the SMS is complete and was approved by the Chief Safety Officer and presented to OC Transpo senior management in April 2017 and has been in use for training since May 2017. At the time of completion of audit work, all SeMS content had been reviewed and approved by the Chief Safety Officer. As described by the Chief Safety Officer, the SMS is an evergreen document that will be continuously updated throughout its lifetime, and a working group is in place to perform this duty.

## Conclusion

No areas of high risk or gaps related to the safety or security frameworks were identified in this audit. The development of the structure and content of the frameworks involved the contribution and oversight of many experienced professionals. Evidence was provided that a multitude of industry standards were also consulted throughout the development process.

While the reality of the regulatory environment of light rail means that it is not possible to provide assurance on the completeness of OC Transpo's safety and security frameworks, they were reviewed by numerous industry professionals to reduce the risk of omissions, and our SME did not identify any gaps.

Documentation surrounding incident and accident identification and investigation was found to be adequate and comprehensive. As the safety and security frameworks have been completed and approved as of completion of our audit field work, there is no risk of delay in their delivery.

Opportunities exist for the City to improve in the tracking and documentation of both the processes followed to develop safety and security framework elements, as well as of the sources consulted in their development. Such actions would facilitate future reviews and reduce the resources required to trace content to its source.

## Recommendations and responses

### Recommendation #1

That the City improve the tracking and documentation of the sources consulted during the development/review/updating of all safety documents which are subject to the delegation agreement.

**Management response:**

Management agrees with this recommendation.

The Safety and Compliance Branch within the Transportation Services Department will follow the document management program (referred to in the response to Recommendations 2 and 3) when amending/updating the SMS. This program includes processes for tracking and logging all sources consulted during the development of OC Transpo documentation, including the annual review and revision of the SMS. Each source utilized will be referenced and logged as each component, or supporting component, of the SMS is created or updated. This program is expected to be finalized by the end of 2017 and implemented in Q1 2018.

**Recommendation #2**

That the City document the high-level document development/review process to reflect the controls in place, defining each step in the process and the links between them.

**Management response:**

Management agrees with this recommendation.

A document management program is currently being developed by document control leads from Transit Operations, Transit Fleet Maintenance and Rail Operations within the Transportation Services Department, to incorporate/replace current OC Transpo document management procedures. The document management program will outline the responsibilities of managers, document authors and document control administrators during the development (writing and research), review, revision, approval, communication, distribution and record keeping of OC Transpo documents. The document management program will ensure that controls are in place, define each step in the process, and the links between them. This program is expected to be finalized by the end of 2017 and implemented in Q1 2018.

**Recommendation #3:**

That the City improve its documentation of the review process for the development/review/updating of all security documents which are subject to the delegation agreement.

**Management response:**

Management agrees with this recommendation.

A document management program is currently being developed by document control leads from Transit Operations, Transit Fleet Maintenance and Rail Operations within the Transportation Services Department, to incorporate/replace current OC Transpo document management procedures. The document management program will outline the responsibilities of managers, document authors and document control administrators during the development (writing and research), review, revision, approval, communication, distribution and record keeping of OC Transpo documents. This program is expected to be finalized by the end of 2017 and implemented in Q1 2018.

The development/review/updating of all security documents will follow all processes outlined in the OC Transpo document management program.

## Audit of the Regulatory Framework for Light Rail Transit

The detailed section of this report is currently available in English only. The French version will be available shortly. For more information, please contact Ines Santoro at 613-580-2424, extension 26052.

La partie détaillée de ce rapport n'existe qu'en anglais. Elle sera disponible en français sous peu. Pour tout renseignement, veuillez communiquer avec Ines Santoro, 613-580-2424, poste 26052.

## Detailed audit report

### **Audit of the Regulatory Framework for Light Rail Transit**

#### **Introduction**

The Audit of the Regulatory Framework for Light Rail Transit (LRT) was included in the 2016 Audit Plan of the Office of the Auditor General (OAG), approved by City Council on December 9, 2015.

#### **Background and context**

The Ottawa LRT system is a key part of the Transportation Master Plan and aims to make it more attractive and easier for residents and visitors to move through the city of Ottawa using public transit. Phase 1 of Ottawa's LRT system is called the Confederation Line. This \$2.1 billion project includes financial contributions from the provincial and federal government.

Within the City, the O-Train Construction team within the Transportation Services department is the lead on the Confederation Line project. The team oversees the overall design, engineering, construction and commissioning of the Confederation Line including, among other responsibilities:

- Ensuring technical compliance with contractual requirements (such as the Project Agreement) including review of contractor design submissions, construction activities, vehicle requirements, systems, testing and commissioning
- Risk Management
- Quality Management
- Safety and Security Management

Actual construction of the infrastructure, vehicles and systems is being carried out by a consortium engaged for this purpose, known as the Rideau Transit Group (RTG). Once

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completed, OC Transpo will operate the LRT system, together with the existing O-Train and Bus Rapid Transit (BRT) bus network.

The City's LRT system is considered in law to be a federal rail transportation undertaking; however, federal legislation and regulations have not been developed for application to municipal light rail systems. In addition, Transport Canada is not organized administratively to provide active regulatory oversight for these kinds of municipal transit systems. As such, Transport Canada has delegated this authority to the City. As set out in the delegation agreement (see Appendix B), the City has the authority to:

- develop, implement and enforce a comprehensive regulatory framework for the safety and security of Ottawa Light Rail Systems
- assume responsibility and accountability in respect of the development, implementation and enforcement of the regulations
- establish procedures that require that compliance with the regulations be monitored and reported on by an independent internal auditor or other responsible City official

In addition, as set out in the delegation agreement, prior to completion of construction, the City must develop, implement and enforce comprehensive regulatory frameworks for the safety and the security of the railway. "Regulations" refers to the bylaws, guidelines, policies, regulations, rules, standards, safety management systems and/or security management systems adopted by the City in relation to the LRT system.

### **Audit objectives and criteria**

The objective of the audit is to ensure that the City has developed and implemented a regulatory framework for LRT which meets the requirements of the Transport Canada Delegation and is adequate, comprehensive and workable.

The following audit criteria were developed during the planning phase of the audit:

1. To assess whether the regulatory framework developed for the operational **safety** of the Railway has met the requirements of the Transport Canada Delegation and is complete and comprehensive "based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in

respect of similar systems and/or by established professional or technical railway associations”<sup>1</sup>.

2. To assess whether the regulatory framework developed for the operational **security** of the Railway has met the requirements of the Transport Canada Delegation and is complete and comprehensive “based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations”<sup>2</sup>.
3. To assess the adequacy, comprehensiveness and utility of procedures developed to ensure that any occurrences or incidences of non-compliance with the regulatory framework are identified, reported on and appropriately managed.

The audit criteria have been organized according to lines of enquiry and, taken together, address the entirety of the stated audit objectives. Refer to Appendix A for the detailed audit sub-criteria.

## Scope

The scope of this audit included any and all elements potentially encompassed by the Transport Canada Delegation Agreement. The audit work was conducted from February 1, 2017 through July 31, 2017.

The objective of the audit was not to assess the LRT safety and security systems, but rather the development and implementation of the Regulatory Framework over these areas. Therefore, examples of aspects of the LRT project that were out of the scope of this audit include:

- Construction and civil works and items such as pre-existing site conditions and sinkholes.
- Safety and security of the construction sites, which are the responsibility of RTG, not the City.

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<sup>1</sup> Transport Canada delegation agreement Terms and Conditions section 3.1 (see Appendix B)

<sup>2</sup> Transport Canada delegation agreement Terms and Conditions section 3.2 (see Appendix B)

## **Audit approach and methodology**

The audit was designed so that sufficient and appropriate audit procedures were conducted, and evidence gathered to provide reasonable assurance of the accuracy of audit findings and conclusions, as they existed at the time of the audit.

Information was obtained through the following activities:

- Interviews with members of the City of Ottawa, OC Transpo, Ottawa Light Rail Transit, representatives of other municipal rail operations, and other industry experts.
- Review of relevant documentation such as policies and procedures, process descriptions, meeting minutes, and document tracking tools.
- A variety of audit techniques including reviewing of samples of regulations.
- The engagement of a subject matter expert (SME) with more than 15 years of diverse engineering and safety management experience, including hazard analysis, and safety and security certification implementation.

## **Audit observations and recommendations**

Note: “codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations” will be referred to in this section as “industry standards” for simplicity.

### **Completeness of safety regulatory framework and compliance with delegation agreement**

The audit expected to find that the regulatory framework developed for the operational **safety** of the Railway meets the requirements of the Transport Canada Delegation. As such, we expected it to be comprehensive and “based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations”.

Industry standards are very comprehensive in that there are many elements, not all of which pertain to any given light rail system. The appropriateness or relevance of any given regulation to a light rail system is dependent on many factors associated with the

specific system. For example, industry standards related to at-grade crossings<sup>3</sup> and third-rail electrification<sup>4</sup> are not applicable to Ottawa's light rail system. We expected reasonable judgment to have been exercised in determining which elements to include in Ottawa's regulatory framework as no authoritative industry reference exists. We did not attempt to provide further assurance on the completeness of the safety regulatory framework.

### **Structure/list of elements included**

A Regulatory Working Group, consisting of membership from RTG, O-Train Construction (formerly the City's Rail Implementation Office) and OC Transpo was struck once the Project Agreement was signed, with the aim of developing the structure of the safety management framework and safety documents specific to the Confederation Line. Members had extensive professional experience in light rail safety regulation as well as familiarity with industry standards and other light rail systems.

Subsequently, OC Transpo struck a Safety Management System Working Group consisting of membership from OC Transpo, and additional consultants, which incorporated the safety-related documentation developed by the Regulatory Working Group into an OC Transpo SMS for all modes of transit service, including the Confederation Line.

The SMS Working Group consulted numerous industry standards during the development of the safety framework structure and provided examples of several specific standards considered, however there is room for improvement related to the documentation of such discussions and reviews. The SMS structure developed by the group was formally accepted by all parties.

As noted, a key component of our approach was the engagement of a subject matter expert. Our SME has extensive experience in light rail safety and security regulation and reviewed the structure and list of elements included in OC Transpo's SMS. It is his opinion that all required elements for the system are captured. He did not identify any gaps.

It is important to note that, while several light rail safety standards and frameworks are generally accepted in the industry worldwide, there is no one comprehensive set of

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<sup>3</sup> An intersection where a rail line crosses a road or path at the same level, as opposed to crossing over or under using a bridge or tunnel. Ottawa's LRT system has no at-grade crossings.

<sup>4</sup> A method of providing electric power to a train through a conductor placed alongside or between the rails of a railway track. Ottawa's Confederation line uses overhead electrification.

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criteria that serve as the ultimate authority. In addition, as no two light rail systems are identical or operate under identical conditions, only portions of such a framework would be applicable to any given system. Discussions on this topic with OC Transpo and legal services staff and our SME confirmed this as an accurate description of the safety regulation environment in the industry. Consequently, while no gaps were identified, it is not possible to provide assurance on the completeness of the content of the SMS. Significantly, this is not to imply that OC Transpo's SMS is incomplete.

### **Content of the elements**

OC Transpo's SMS is based on a core document and encompasses the entirety of the entity's safety-related material. This includes policies, standard operating procedures, work instructions, and other such documentation. For the purposes of this audit, we refer to each of these as an element.

The development process of the content of most safety framework elements began with the authoring of the draft element by an RTG employee hired specifically for this purpose. We have been informed that this individual is a former deputy Minister of Transport, and is extremely familiar with Transport Canada standards and requirements. This draft was then forwarded to OC Transpo via OLRT for review, and subsequently returned to RTG for response. This back-and-forth continued until all parties' comments and concerns were satisfactorily addressed. We are satisfied that the development and review process was comprehensive, and ensured that every element was thoroughly reviewed by individuals from both RTG and OC Transpo, and OLRT when required. Comments and responses were documented, followed-up on, and addressed via a formal tracking tool which captured all correspondence. All parties were required to sign off on completed documents prior to final acceptance of the element from RTG for content by OC Transpo.

Once an element was formally accepted by OC Transpo, it was subject to further internal review of format and style for institutional consistency and training purposes. The specific internal process followed by any given element varied depending on its content and intended audience. This process was not standardized or clearly described, and the review details within OC Transpo were generally not documented. This creates a risk that the City would not be able to demonstrate that a proper internal review of the element took place if required.

We were told that OC Transpo consulted many sources during the development and review of the SMS elements, including but not limited to the American Public Transportation Association's SMS Guidelines, Transport Canada's Railway Safety

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Management System Regulations, Transport Canada's Safety Management System Industry Guidance, the Canada Labor Code, the existing O-Train Trillium Line SMS, and comparator operators in other North American Municipalities. We were able to view some specific examples where the consultation of such sources was documented, however this was not performed in a structured or consistent manner. Ultimately, all elements of the safety framework were reviewed and approved by the Chief Safety Officer (or a member of his team, in the case of some detailed operational procedures).

At the beginning of audit fieldwork, we were provided with a list of approximately 250 elements constituting the SMS and the Security Management System (SeMS). A statistically representative sample size for testing a population numbering between 200 and 1000 items is 25. Based on the relative sizes of the SMS and SeMS, 15 samples were selected from SMS and 10 samples from SeMS for a total of 25 samples. The selection of specific samples from the list for testing was performed judgmentally by our SME.

Each of the 15 sample elements (see Appendix C) selected from the safety framework were tested for compliance with the delegation's requirement that it be based on industry standards. In all 15 cases we were able to clearly link the content of the element to at least one industry standard. In addition, 5 of the 15 sample elements were supported by specific information obtained from comparator cities, and the tracking tools of 5 of 15 samples explicitly referenced at least one industry standard considered during the document development process. Source documents were not tracked when the elements were being originally being developed, however OC Transpo was able to compile sufficient documentation to satisfactorily demonstrate compliance for each sample selected.

In addition to the above-noted testing of traceability to industry standards, the content of the same 15 samples, and a further 5 sample elements (see Appendix D) was reviewed by our SME. He was of the opinion that the content of each of the 20 samples was appropriate and consistent with industry practices. No safety gaps were identified in any of the samples reviewed.

We interviewed safety professionals from light rail operations in other Canadian municipalities and they indicated that it is not common industry practice to specifically link safety regulation documentation elements to the sources consulted during their development. Our SME was also of this opinion. The City's legal services employee who was involved in drafting the delegation agreement, advised that he did not believe

the intention of the delegation was that every element of the framework necessarily be directly linked to its source documentation.

**Recommendation #1**

That the City improve the tracking and documentation of the sources consulted during the development/review/updating of all safety documents which are subject to the delegation agreement.

**Management response:**

Management agrees with this recommendation.

The Safety and Compliance Branch within the Transportation Services Department will follow the document management program (referred to in the response to Recommendations 2 and 3) when amending/updating the SMS. This program includes processes for tracking and logging all sources consulted during the development of OC Transpo documentation, including the annual review and revision of the SMS. Each source utilized will be referenced and logged as each component, or supporting component, of the SMS is created or updated. This program is expected to be finalized by the end of 2017 and implemented in Q1 2018.

**Recommendation #2**

That the City document the high-level document development/review process to reflect the controls in place, defining each step in the process and the links between them.

**Management response:**

Management agrees with this recommendation.

A document management program is currently being developed by document control leads from Transit Operations, Transit Fleet Maintenance and Rail Operations within the Transportation Services Department, to incorporate/replace current OC Transpo document management procedures. The document management program will outline the responsibilities of managers, document authors and document control administrators during the development (writing and research), review, revision, approval, communication, distribution and record keeping of OC Transpo documents. The document management program will ensure that controls are in place, define each step in the process, and the links

between them. This program is expected to be finalized by the end of 2017 and implemented in Q1 2018.

### **Completeness of security regulatory framework and compliance with delegation agreement**

The audit expected to find that the regulatory framework developed for the operational **security** of the Railway meets the requirements of the Transport Canada Delegation. As such, we expected it to be comprehensive and based on codes, standards, practices, design references, security principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations. As no single authoritative industry reference exists, we did not attempt to provide assurance on the completeness of the security regulatory framework.

The structure of OC Transpo's system-wide Security Management System (SeMS) is based largely on the existing OC Transpo SeMS for Trillium line, which has been accepted by Transport Canada. The changes to security that are required for OC Transpo to transition from the existing transit system to one including the Confederation Line are relatively minor. This is because security is generally not mode-contingent, and therefore security issues related to the Confederation Line are similar to those of the existing Trillium Line. The development and review process for the updating of the SeMS began with a thorough review of all elements, as well as the consideration of the requirement for new elements, by a team including the Chief Special Constable and key staff of OC Transpo. Our SME reviewed the structure and list of elements included in OC Transpo's SeMS, and it is his opinion that all required elements for the system are captured. He did not identify any gaps.

OC Transpo's content review process for the SeMS tracked source documents more closely than the SMS process did. As noted, this was aided by the fact that there were already many elements in place and there are recognized standards in the Railway Association of Canada memorandum of understanding, of which OC Transpo is a signatory. We were advised that the Chief Special Constable sought out updates to industry standards and practices through discussions with colleagues in other municipalities among other approaches. Records of this process were not documented, however interviews with staff of other municipalities demonstrated a culture of sharing of best practices within the community.

All content was then reviewed by the Chief Safety Officer and the Director of Transit Operations, as required. Edits were made to the content based on their feedback, but

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this correspondence was relatively informal and not completely documented. All SeMS content had been reviewed and effectively approved by the Chief Safety Officer by the time of completion of audit field work.

As noted above, 10 sample elements from the security framework were selected (see Appendix E) to test compliance with the delegation's requirement that it be based on industry standards. Of these, in all 10 cases we were able to clearly link the content of the element to at least one industry standard. The linking of SeMS elements to industry standards was more straightforward than with the SMS standards. The content of the 10 SeMS samples was also reviewed by our SME. He was of the opinion that the content of each was appropriate and consistent with industry practices. No security gaps were identified in any of the 10 samples.

As described above in the context of the light rail safety framework, there is no one comprehensive set of criteria that serve as the ultimate authority for a security framework. Consequently, while no gaps were identified, it is not possible to provide assurance on the completeness of the content of the SeMS. As with the SMS, this finding is not to imply that the SeMS is incomplete.

### **Recommendation #3:**

That the City improve its documentation of the review process for the development/review/updating of all security documents which are subject to the delegation agreement.

### **Management response:**

Management agrees with this recommendation.

A document management program is currently being developed by document control leads from Transit Operations, Transit Fleet Maintenance and Rail Operations within the Transportation Services Department, to incorporate/replace current OC Transpo document management procedures. The document management program will outline the responsibilities of managers, document authors and document control administrators during the development (writing and research), review, revision, approval, communication, distribution and record keeping of OC Transpo documents. This program is expected to be finalized by the end of 2017 and implemented in Q1 2018.

The development/review/updating of all security documents will follow all processes outlined in the OC Transpo document management program.

## **Procedures related to incidents**

The audit expected to find that procedures had been developed to ensure that any occurrences or incidences of non-compliance with the regulatory framework are identified, reported on and appropriately managed are adequate, comprehensive and useful.

We found significant and comprehensive documentation in place at OC Transpo related to incident identification, classification and escalation policies, and procedures and guidelines for incidents related to railway operation and maintenance. Our SME reviewed the relevant documentation and did not identify any gaps. Similarly, accident investigation assessment and reporting policies, as well as procedures and guidelines for response and recovery for potential accidents were found to be well documented. As OC Transpo has had such procedures in place for their existing transit system for many years, the degree of change required to account for the addition of the Confederation Line was minimal.

Authorities and responsibilities for accident investigation, assessment, and reporting were found to be clearly established and documented, as stated by our SME. Detailed protocols exist, and substantial effort is invested by OC Transpo into collecting incident data and using it to inform future actions to improve customer and employee safety.

OC Transpo's Director of customer systems and planning described that, as the opening of the Confederation Line will represent a significant change, initial communications will be focused on ensuring a safe transition. The plan is to then regularly assess the messaging and have it evolve over time. This approach was deemed reasonable and appropriate by our SME. OC Transpo staff interviewed throughout the audit were consistent in their focus on the importance of ensuring that regulatory documentation be user-friendly, noting that a technically perfect document has no value if it is not understood or followed by users.

## **Risk of delay in delivery**

The audit expected to find mechanisms in place to identify and address delays in delivery of the SMS and/or SeMS. We found that at the time of the audit detailed testing of these mechanisms was not necessary as there was very low/no risk related to a possible delay in the delivery of the SMS and/or SeMS.

The final training-ready version of the SMS is complete and was approved by the Chief Safety Officer and presented to OC Transpo senior management in April 2017. This SMS has been in use for training bus and other employees since May 2017. Train-the-

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trainer LRT training is scheduled to commence in August 2017, with operator training planned for October 2017. As described by the Chief Safety Officer, the SMS is an evergreen document that will be continuously updated throughout its lifetime, and a working group is in place to perform this duty.

Mechanisms were in place to identify and address potential delays in delivery of the SMS, including the Confederation Line Regulations Timetable which tracks the key dates (transfer of responsibility, approval, revenue ready, etc.) and the status of every element of the SMS. This timetable was updated regularly over the course of content development.

At the time of completion of audit work, all SeMS content had been reviewed and approved by the Chief Safety Officer.

## Appendix A – Audit objectives and criteria

### Overview of the audit objectives and criteria

<p>Criterion # 1: To assess whether the regulatory framework developed for the operational <b>safety</b> of the Railway has met the requirements of the Transport Canada Delegation and is complete and comprehensive based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations.</p>	
1.1	<p>The regulatory framework developed for the operational <b>safety</b> of the Railway is based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations.</p>
1.2	<p>Mechanisms are in place to ensure that all required operational <b>safety</b> related standard operating procedures (SOPs) and practices that will be applicable to system are captured within the Safety Management System (SMS).</p>
1.3	<p>Mechanisms are in place to identify and address delays in delivery of the SMS.</p>
<p>Criterion # 2: To assess whether the regulatory framework developed for the operational <b>security</b> of the Railway has met the requirements of the Transport Canada Delegation and is complete and comprehensive based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations.</p>	
2.1	<p>The regulatory framework developed for the operational <b>security</b> of the Railway is based on codes, standards, practices, design references, security principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations.</p>
2.2	<p>Mechanisms are in place to ensure that all required operational <b>security</b> related standard operating procedures (SOPs) and practices that will be applicable to system are captured within the Security Management System (SeMS).</p>

2.3	Mechanisms are in place to identify and address delays in delivery of the SeMS.
<p>Criterion # 3: To assess the adequacy, comprehensiveness and utility of procedures developed to ensure that any occurrences or incidences of non-compliance with the regulatory framework are identified, reported on and appropriately managed.</p>	
3.1	<p>Incident identification, classification and escalation policies, procedures and guidelines that are to be applied and followed in respect of incidents that may occur in relation to the operation and maintenance of an LRT Railway are fully documented.</p>
3.2	<p>Accident investigation, assessment, and reporting policies, procedures and guidelines for response and recovery that are to be applied and followed in respect of potential accidents that may occur in relation to the operation and maintenance of an LRT Railway are fully documented.</p>
3.3	<p>Authorities and responsibilities for accident investigation, assessment, and reporting are clearly established and documented.</p>

## Appendix B – Transport Canada – City of Ottawa Agreement

**THIS AGREEMENT** made effective as of the 1<sup>st</sup> day of October, 2011 FOR REGULATION OF THE DESIGN, CONSTRUCTION, OPERATION, SAFETY AND SECURITY OF OTTAWA LIGHT RAIL TRANSIT SYSTEM.

**BETWEEN:**

**HER MAJESTY THE QUEEN IN RIGHT OF CANADA (“CANADA”)**, as represented by the Minister of Transport

**OF THE FIRST PART**

**AND:**

**CITY OF OTTAWA** (hereinafter referred to as “**CITY**”)

**OF THE SECOND PART**

**WHEREAS**, the CITY is planning the design, construction and operation of a light rail transit system, including the regulatory oversight of related safety and security matters (as defined below; the “**RAILWAY**”);

**AND WHEREAS** the planned RAILWAY is a “*railway*” within the meaning of the *Canada Transportation Act*, S.C. 1996 c. 10 (“**CTA**”);

**AND WHEREAS**, Section 158 of the CTA provides the MINISTER with the authority to enter into an agreement with a provincial authority to authorize the provincial authority to regulate the design, construction, operation, safety and security of a railway as well as the rates and conditions of service in the same manner and to the same extent as it may regulate a railway within its jurisdiction;

**AND WHEREAS**, pursuant to section 12.17 of the *City of Ottawa Act*, 1999, S.O. 1999, c. 14, Sched. E and the *Municipal Act*, 2001, S.O. 2001, c. 25, the CITY has authority to operate and maintain a passenger transportation system;

**AND WHEREAS**, CANADA and the CITY, a provincial authority, agree that the CITY should be authorized to regulate the design, construction, operation, safety and security of, as well as the rates and conditions of service of, the RAILWAY in the same manner and to the same extent as the CITY may regulate a railway within its jurisdiction;

**NOW THEREFORE THIS AGREEMENT WITNESSETH THAT** in consideration of the mutual terms and conditions hereinafter specified, the PARTIES agree as follows:

## 1. DEFINITIONS

- 1.1. “**CAPITAL RAILWAY**” (O-Train) means the railway owned and operated by the CITY, for which the CITY has been issued a Certificate of Fitness under the CTA.
- 1.2. “**MINISTER**” means the Minister of Transport.
- 1.3. “**MINISTER’S DELEGATE**” means the Deputy Minister, the Assistant Deputy Minister, the Associate Deputy Minister, the Assistant Associate Deputy Minister, the Director General responsible for rail security or the Director General responsible for rail safety.
- 1.4. “**PARTY**” means CANADA or the CITY.
- 1.5. “**PARTIES**” means CANADA and the CITY.
- 1.6. “**RAILWAY**” means any light rail transit system designed, constructed, operated and/or maintained by, or on behalf of, the CITY, including any expansions or modifications made thereto, and located generally within the CITY and between any point in the CITY and any point outside the CITY including any point outside Ontario. For greater certainty for the purposes of this Agreement, RAILWAY does not include the CAPITAL RAILWAY.
- 1.7. “**REGULATIONS**” means the bylaws, guidelines, policies, regulations, rules, standards, safety management systems and/or security management systems, or similar, adopted by the CITY from time to time in relation to the regulation of the design, construction, operation, safety and security of, as well as the rates and conditions of service of, the RAILWAY as provided for in Section 2.2

## 2. AUTHORIZATION

2.1. The CITY is authorized to regulate any matters covered by Part III and IV of the *Canada Transportation Act* as well as the *Railway Safety Act* relating to the design, construction, operation, safety and security of the RAILWAY as well as the rates and conditions of service in the same manner and to the same extent as the CITY may regulate a railway within its jurisdiction.

2.2. For greater certainty, and without limiting the generality of section 2.1, the CITY may exercise any of the following:

- (a) adopt, enact, modify and administer the Regulations for the RAILWAY as the CITY determines appropriate from time to time;

(b) approve the design, construction and operation from time to time of any new, supplemental or modified RAILWAY including any extension or modification, crossing, grade separation, tunnel or other RAILWAY related facilities or works; and

(c) apply the REGULATIONS to any person involved in the design, construction, operation, safety and security and/or use of the RAILWAY including any contract operators, suppliers, contractors or service providers.

2.3. Until this Agreement is terminated, section 2.1 has, for the purpose of the application of the RSA and Parts III and IV of CTA, the effect of treating the RAILWAY as if the Railway is not a “railway” within the meaning of the CTA and RSA.

2.4. This Agreement does not modify, limit or restrict in any way the powers and authorities of the CITY under provincial and municipal legislation, including by way of illustration and for further clarification, the power and authority of the CITY to apply, use and rely upon provincial expropriation legislation for its Railway and related purposes.

### **3. TERMS AND CONDITIONS**

3.1. Prior to construction of the RAILWAY, the CITY shall develop, implement and enforce a comprehensive regulatory framework for the safety of the RAILWAY based on codes, standards, practices, design references, safety principles and guidelines generally recognized and/or adopted by other municipal light rail system operators in respect of similar systems and/or by established professional or technical railway associations, including the American Public Transportation Association (APTA) or International Railway Industry Standard (IRIS) as adapted to North American operating conditions.

3.2. Prior to construction of the RAILWAY, the CITY shall develop, implement and enforce a comprehensive regulatory framework for the security of the RAILWAY based on codes, standards, practices, design references, construction standards, security principles and guidelines recognized and/or adopted by other municipal light rail operators in respect of similar systems and/or by established professional or technical railway associations, including American Public Transportation Association (APTA) or International Railway Industry Standards (IRIS) as adapted to North American operating conditions.

3.3. Prior to construction of the RAILWAY, the CITY as operator of the RAILWAY will become a signatory to the Memorandum of Understanding on Security, as renegotiated from time to time, between Transport Canada and the Railway Association of Canada.

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3.4. The CITY shall assume all responsibility and accountability in respect of the development, implementation and enforcement of the REGULATIONS.

3.5. The CITY shall establish procedures that require that compliance with the REGULATIONS be monitored and reported on to the City Manager or designate by an independent internal auditor or other responsible CITY official. The CITY shall ensure that any occurrences or incidences of non-compliance with the Regulations are appropriately managed.

3.6. The RAILWAY shall not include any crossings at grade with federally regulated railways without the prior written approval of the MINISTER or the MINISTER'S DELEGATE, who may, at their sole discretion, refuse to provide such approval.

### **4. REPORTING**

4.1. The CITY shall:

(a) ensure that a Safety Management System (SMS) audit, based on ISO 19011 Guidelines for Quality and Environmental Management Systems Auditing, or equivalent international standards with respect to all oversight matters related to the safety of the RAILWAY is conducted one year after the RAILWAY's initial operation and thereafter at least every 3 years by a qualified person or organization operating independently from the CITY;

(b) within 60 days of each SMS audit, provide the MINISTER with a report, satisfactory in content and form to both PARTIES as determined at least 6 months before the RAILWAY's initial operation and consistent with common industry practice for such audit forms, on the results of the SMS audit; and

(c) within 90 days of each SMS audit, provide to the MINISTER a plan for corrective measures the CITY intends to take as a result of the SMS audit, if any, as well as timeline for the implementation of those corrective measures.

4.2. The CITY shall:

(a) ensure that a Security Management System (SeMS) audit with respect to all oversight matters related to the security of the RAILWAY is conducted one year after the RAILWAY's initial operation and thereafter at least every 3 years by a qualified person or organization operating independently from the CITY;

(b) within 60 days of each SeMS audit, provide the MINISTER with a report, satisfactory in content and form to both PARTIES as determined at least 6 months prior to the

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RAILWAY's initial operation and consistent with common industry practice for such audit forms on the results of the SeMS audit; and

(c) within 90 days of each SeMS audit, provide to the MINISTER a plan for corrective measures the CITY intends to take as a result of the SeMS audit, if any, as well as timeline for the implementation of those corrective measures.

### 4.3. The City shall:

(a) file with the MINISTER an annual safety and security report (the ANNUAL REPORT) with respect to the RAILWAY, to be first filed one year after the RAILWAY's initial operation and thereafter on or before every March 31 after this Agreement is made; and

(b) the ANNUAL REPORT will: (i) summarize the safety and security accidents and incidents relative to the RAILWAY from the period since the last ANNUAL REPORT; (ii) outline any changes made by the CITY to the REGULATIONS to specifically address these matters; (iii) describe other remedial measures taken in respect of these matters since the last ANNUAL REPORT; and (iv) generally provide an evaluation of the effectiveness of the Regulations in protecting the safety and security of the public in relation to the RAILWAY.

(c) Upon the request of the MINISTER, the CITY shall provide to the MINISTER any other reports or information related to the RAILWAY to which the MINISTER would, but for this agreement, be lawfully entitled to request or receive.

## 5. SECURITY THREATS

5.1. If the MINISTER becomes aware of a significant security threat to the RAILWAY or the public in any way resulting from or relating to the Railway the PARTIES shall collaborate to ensure that the CITY takes appropriate action to address the risk.

5.2. Where the risk has not been addressed to the satisfaction of the MINISTER or the MINISTER'S DELEGATE, the MINISTER or the MINISTER'S DELEGATE may provide instructions to the CITY to address the risk and the CITY shall comply with those instructions from the MINISTER or one of these delegates.

## 6. LIABILITY AND INDEMNIFICATION

6.1. CANADA, its officers, servants, employees and/or agents shall not be held liable by the CITY, or its officers, servants, employees and/or agents for any injury, including death to any person, for any loss or damage to property of any person or the environment, or for any obligation of the CITY or anyone else, by reason of this

Agreement or the performance or non-performance by the CITY of its obligations, or the exercise or the non-exercise of its rights, under this Agreement.

6.2. The CITY shall at all times indemnify and save harmless CANADA and its officers, servants, employees and/or agents, from and against all actions, whether in contract, tort, or otherwise, claims and demands, losses, costs, damages, suits or other proceedings by whomsoever brought or prosecuted in any manner against CANADA, its officers, servants, employees and/or agents based upon, or occasioned by any injury to any person, including but not limited to damage to or loss or destruction of property, economic loss or infringement of rights caused by, in connection with, or arising directly or indirectly by reason of this Agreement or the performance or non-performance by the CITY of its obligations, or the exercise or non-exercise of the CITY's rights, under this Agreement, including but not limited to:

(a) the development, adoption, implementation or omission thereof, or the compliance or non-compliance with, or the enforcement (or lack thereof), or the manner of enforcement of, the Regulations;

(b) any negligent omission, willful misconduct, or negligent act or other unlawful or actionable conduct or behaviour of the CITY, its officers, servants, employees and/or agents; and

(c) any actions taken or not taken by the MINISTER or the MINISTER'S DELEGATE pursuant to section 5 (Security Threats) of this Agreement.

except to the extent to which such claims, demands, losses, costs, damages, actions, suits, or other proceedings relate to, arise from, are caused by or are otherwise connected to any negligent omission, willful misconduct, or negligent or other unlawful or actionable conduct or behavior of an officer, servant, employee, or agent of the CANADA in the performance of his or her duties.

## **7. DISPUTE RESOLUTION**

7.1. The PARTIES shall attempt to resolve any disputes arising out of or pursuant to this Agreement through collaborative discussions between the PARTIES' representatives. Where the PARTIES' representatives cannot agree on a solution to the dispute, the matter shall be referred to the Assistant Deputy Minister or Deputy Minister of Transport and Deputy City Manager or City Manager for resolution.

7.2. If the PARTIES are not able to resolve the dispute pursuant to section 7.1 then the matter shall be referred to the MINISTER and to the City Mayor for resolution.

## **8. COMMUNICATIONS**

8.1. The PARTIES shall use reasonable efforts at all times to coordinate any press release or public announcement relating to this Agreement as early as possible with the other PARTY.

8.2. The PARTIES shall use reasonable efforts at all times to endeavor to ensure that the form and content of any press release or public announcement will be approved by the other PARTY.

8.3. Except in the event of an unforeseen and urgent circumstances, the PARTIES agree that all press releases and public announcements will be bilingual.

8.4. Each PARTY shall provide copies of all communications which have not been subject to the coordinated efforts described in 8.1 to the other PARTY as soon as possible after the issuance of the communication.

## **9. AGREEMENT**

9.1. This Agreement constitutes the whole Agreement and shall be binding upon both PARTIES as of the effective date of October 1, 2011. No prior document, negotiation, provision, undertaking or agreement in relation to the subject of the Agreement has legal effect.

## **10. AMENDMENTS**

10.1. Proposals for changes to this Agreement may be made at any time by either PARTY and appropriate amendments made as agreed upon by the PARTIES in writing.

## **11. BENEFITS**

11.1. This Agreement shall enure to the benefit of THE CITY OF OTTAWA and HER MAJESTY THE QUEEN in right of Canada. This agreement may not be assigned.

## **12. TERMINATION**

12.1. This Agreement shall terminate:

- (a) On a date determined by the MINISTER, in its sole discretion;
- (b) Upon the CITY providing 150 days written notice of termination to the MINISTER; or
- (c) On a date agreed upon by the PARTIES.

### **13. NOTICE**

13.1. All information or documents required or desired to be given pursuant to this Agreement may be given to the CITY by delivery or mail addressed to: Deputy City Manager Infrastructure Services and Community Sustainability 110 Laurier Avenue West Ottawa, ON K1P 1J1 Telephone: (613) 580-2424 (ext. 12230) Facsimile: (613) 560-6028

13.2. All information, reports or other documents required or desired to be given pursuant to this Agreement may be given to the MINISTER by delivery or mail addressed to: Director General Rail Safety Transport Canada 427 Laurier Avenue West, 14<sup>th</sup> Floor Ottawa, ON K1A 0N5 Telephone: (613) 998-2984 Facsimile: (613) 990-1169

13.3. Except for matters arising under Part V of the CTA, any enquiries, complaints, or other communications that may be directed to or otherwise received by CANADA or its representatives from any person in relation to the RAILWAY or the Regulations, including any noise or vibration or similar complaints received by the Canada Transportation Agency, shall be forwarded by CANADA to the CITY to the following address: Deputy City Manager Infrastructure Services and Community Sustainability City of Ottawa 110 Laurier Avenue West Ottawa, ON K1P 1J1 Tel: (613) 580-2424

### **14. GOVERNING LAW**

14.1. This Agreement shall be governed by and shall be construed in accordance with the Laws of Ontario, and the Laws of Canada applicable therein.

### **15. COUNTERPART SIGNING**

15.1. This Agreement may be signed in counterpart by the Parties.

IN WITNESS WHEREOF the parties here to have executed this Agreement.

**SIGNED, SEALED AND DELIVERED on behalf of the City of Ottawa in the presence of:**

*[original signed by Mayor, Jim Watson]*

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Witness The City of Ottawa; as represented by the Mayor

---

Date

**SIGNED, SEALED AND DELIVERED on behalf of Her Majesty the Queen in right of Canada in the presence of:**

\_\_\_\_\_  
Witness Her Majesty the Queen in Right of Canada as represented by the Minister of Transport

\_\_\_\_\_  
Date

## Appendix C – Audit sample of 15 safety framework elements

Audit sample of 15 safety framework elements

<b>Safety framework elements selected for traceability to industry standards test and SME content review</b>	
1	Introduction and Organizational Overview
2	Safety Goals, Targets and Initiatives
3	Risk Management
4	Policy to Report
5	Risk Assessment
6	Compliance with Regulations, Rules and Other Instruments
7	Safety Data Collection and Analysis
8	Monitoring and Continuous Improvement
9	Scheduling and Fitness for Duty
10	Training and Development
11	Maintenance and Storage Facility Shop Overhead Catenary System Safe Work Procedure
12	Light Rail Vehicle Shop Entry and Exit Procedures - Controlled Tracks
13	Rules Deviation Procedures
14	Light Rail Vehicle Door Fault Procedures
15	Inclement Weather Procedures

## Appendix D – Audit sample of 5 additional safety framework elements

Audit sample of 5 additional safety framework elements

<b>Additional safety framework elements selected for SME content review</b>	
1	Train Insertion and Removal
2	Sweep Trains
3	Passenger Emergency Intercom Response Procedure
4	Removal of Defective Trains from Service
5	In Service Track Failures

## Appendix E – Audit sample of 10 security framework elements

Audit sample of 10 security framework elements

<b>Security framework elements selected for traceability to industry standards test and SME content review</b>	
1	OC Transpo Security Management Policy
2	Threat and Risk Assessment Summary
3	Background Investigations
4	Access Control
5	Alert Levels
6	New Light Rail Operators
7	Record Keeping
8	Drills and Exercises: Program Schedule
9	Communication with Passengers
10	Investigations, Reporting and Evaluation