IN THE MATTER a Public Inquiry Respecting the Ottawa Light Rail Transit Project
by Order in Council 1859/2021

Closing Submissions of Alstom Transport Canada Inc.
12 August 2022

Commissioner:
The Honourable C. William Hourigan

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1.0 Executive Summary

1. On December 16, 2021, the Ottawa Light Rail Transit Public Inquiry was established, under Order in Council 1859/2021, to investigate the commercial and technical circumstances that led to breakdowns and derailments of the Ottawa Light Rail Transit System (the "Project").

2. The Commission interviewed 87 witnesses from various Project stakeholders, and held Public Hearings between June 13, 2022, and July 7, 2022, during which 39 witnesses gave evidence under oath. On July 28, 2022, the Commission assembled a panel of experts to discuss various aspects of the public-private partnership model of project delivery, but these experts did not provide an opinion or draw any conclusions regarding the Project, or the performance of any of the stakeholders involved.

3. Prior to the Commission of Inquiry, Alstom Transport Canada Inc. ("Alstom") was constrained from speaking publicly about its role on the Project because of confidentiality obligations under its Subcontracts. Consequently, until this Inquiry, a majority of the information available to the public about the Project has come directly from the City of Ottawa (the "City"). Alstom has welcomed this Inquiry and the opportunity to contribute to the public's understanding of this important Project. Alstom produced more than 86,000 documents in response to a Summons to Produce documents issued by the Commission, and nine of Alstom's project personnel were interviewed by Commission counsel, five of whom were called to give evidence at the Public Hearings.

4. Many issues were explored, and facts unearthed during the Inquiry, but one of the most prevalent and consistent themes to emerge was of the detrimental impact of micromanagement by the City, a party candidly inexperienced in major infrastructure development projects, particularly in light rail. To make up for this inexperience, the City retained an army of expert consultants to guide them through every aspect of the Project, from design and construction to operations and maintenance. Yet, the City often failed to heed its experts' advice. Instead, under extreme public scrutiny in

Ottawa, the City was pressured to make short sighted decisions, to "act tough" with its contractor partner, and, ultimately, to put the System into service before it was ready.

5. The Project was also hampered by a lack of clear scope allocation at the design-build level within the Ottawa Light Rail Transit Constructors ("OLRTC") consortium, and, in particular, a failure to identify and provide to the Project a dedicated system integrator. The Commission heard evidence regarding the critical importance of the system integrator role and how OLRTC failed to appoint a system integrator until it was too late, with important negative consequences to key design interfaces like the one between Alstom and Thales Canada Inc. ("Thales"). One of the results of OLRTC's lack of integration management, in the case of Alstom, was the necessity for extensive retrofits to its Light Rail Vehicles ("LRV" or "Vehicle"), very late in the schedule, which had numerous knock-on effects for the Vehicles and System.

6. Extensive Vehicle retrofits were required to be made to the Vehicles, not just because of late Thales / Alstom integration, but also because of early delays to the Project, which forced a change to Alstom's validation and serial manufacturing plan. To mitigate delays, Alstom performed its validation testing in parallel with Vehicle manufacturing, which meant a much greater likelihood of retrofits at the end of manufacturing. Alstom, Rideau Transit Group General Partnership ("RTG"), OLRTC and the City were aware of this risk, and took the decision to run testing and manufacturing of Vehicles in parallel because all agreed that the schedule benefit outweighed the retrofit risk.

7. Alstom remained completely transparent with OLRTC, RTG and the City throughout the Project with respect to the state of the Vehicles and the status of the fleet. In particular, as Substantial Completion and the Revenue Service Availability ("RSA") Date approached, Alstom kept the City and RTG fully apprised of the reliability issues facing the Vehicles, and the backlog of retrofits to be performed. Yet, for the City, the pressure to open the System to public service apparently outweighed the Vehicle reliability risk. That evaluation and decision was the City's alone.

8. Public pressure was another key theme that arose again and again during the hearing. The City's response to public pressure during construction, as the public facing party, was not to protect its partners or the Project, but to point fingers. After the Sinkhole, the City preferred to publicly maintain the fiction of its planned May 2018 RSA date and refused to accept an extension of time to the schedule, forcing OLRTC's work to be completed in an impossible race against time, rather than under an organized, thoughtful re-baselined timetable. When it was time to declare Substantial Completion, achieve RSA, and start passenger service, the City again was motivated by concern for its public image: rather than extend the time for curtailed System Integration, and extend the time available to perform required Vehicle retrofits, the City instead modified the Trial Running criteria to make it easier to pass and put the System into full passenger service, two weeks later, against the advice of its deeply experienced consultants.

9. When Revenue Service started in September 2019, the System was set up to fail. Simulated service with multi-unit Vehicles had been cut from a planned period of months to a handful of weeks; system reliability, measured by Aggregate Vehicle Kilometre Availability Ratio ("AVKR"), was known to be below Project Agreement expected levels; required Vehicle figures had been reduced by agreement from 15 to 13; the list of known retrofits to be performed on the Vehicles was extensive, and required already limited space in the Maintenance and Storage Facility ("MSF") necessary for preventative and corrective maintenance; the Supervisory Control and Data Acquisition ("SCADA") management system was not properly commissioned; unmanned train operation in the Yard was not yet ready; and no Yardmaster controlled activities in the maintenance yard. Add to this the undisclosed lack of maintenance to the infrastructure during the three-year construction period leading up to RSA, and it should have been clear that the System needed more time to mature before starting passenger service.

10. The evidence from the City's expert maintenance consultant was that Alstom's maintenance team was staffed appropriately for a properly tested, integrated, and non-

degraded system, but not for the System as it was turned over. In contrast to Alstom's consistent transparency, OLRTC actively subverted Alstom Maintenance's efforts to understand the state of the infrastructure before Revenue Service and did not disclose the total lack of maintenance performed on the infrastructure leading up to Revenue Service. In other words, Alstom was set up to fail by circumstances out of its control.

11. Once Service started, rather than give RTG the space and time to ramp up Service, the City sent its "field observation team" to "shake the tree" in September 2019, overwhelming the nascent operations and maintenance teams with thousands of superfluous work orders that ostensibly had to be addressed "immediately". The effect was to distract the maintainers from their primary task of running the new system, with their new teams. The City, though, was content to assess more than $19 million in deductions, levied after the first month of Service.

12. All these factors conspired to make a difficult start to a brand-new LRT system in Ottawa even more challenging. Yet, no direct line can be drawn between any of these issues, and the first derailment in August 2021. The fact is that the axle hub failure that caused the first derailment could not have been foreseen at the time the Vehicles were designed, at the time they were tested, nor when the System entered Revenue Service. The failure was the result of excessive transversal loads on the wheel hub assembly, which create an unacceptable level of aggregate stress on the Vehicle component. There is no single cause of the failure, no single source of excess stress, but rather it is the combination of specific conditions that exist in Ottawa, including tight radii curves, Vehicles operated at high speed, under Automatic Train Control to achieve performance targets, and the wheel rail interface, that, acting together, have resulted in the excess stress.

13. Today, all stakeholders agree that the System is safe to operate. Alstom, in collaboration with Rideau Transit Maintenance General Partnership ("RTM"), RTG, and the City has put in place a rigorous containment plan, involving thorough inspections of the Vehicle axle hubs every 7,500 km, until a permanent mitigation plan can be developed. The

work to find a permanent solution is ongoing, and the subject of intensive investigation and analysis by Alstom's expert engineers, and other qualified consultants.

2.0 Alstom's role on the Confederation Line

14. Alstom plays two important roles on the Project: it was responsible for the design and supply of 34 LRVs for Stage 1 of the Project, and it is responsible for Vehicle maintenance and a majority of infrastructure maintenance services for a 30-year term.

15. Alstom initially sought to be a pre-qualified proponent in order to bid for the Project as part of a P3 consortium with civil contractors but was not successful.[1]

16. In June 2012, Alstom was re-engaged in the Project when RTG invited Alstom to submit a Proposal to become its rolling stock supplier, because its original vehicle supplier, CAF, had been disqualified by the City. In July 2012, Alstom met with RTG and the City to present, in part, Alstom's proposed vehicle solution, which was derived from Alstom's Citadis line of light rail vehicles delivered for projects in Istanbul and Paris. Alstom presented the Citadis Spirit as an "evolution" of Citadis that would have to be adapted for North America, and the City's particular project requirements, based on "service proven" subsystems.[2]

17. The City's specific performance requirements necessitated several changes to Alstom's Citadis platform. First, the LRVs had to meet American Public Transportation Association (APTA) standards, which meant changes to fire safety standards, shell design, and height and weight dynamics, for example. Second, the City wanted an LRV with metro/subway level passenger capacity, which did not exist anywhere. Typical LRV capacity is about 10,000 passengers per hour per direction ("PPHPD"). The City required 24,000 PPHPD. That requirement necessitated longer LRVs, to fit more passengers, and faster speeds with significantly reduced headway (the distance between two trains

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1 Public Hearing, Transcript, Vol. 4, Y. Declercq, 9:1-19. (Translated – TRN00000210)

2 Rideau Transit Group, *Ottawa Light Rail Transit Project: Tunney's Pasture to Blair* Station, July 18, 2012, at slides 31 – 32. (Exhibit 40 – ALS0058776)

operating on the line). The short headways could only be achieved by a fully automated train control system, with a highly aggressive acceleration and braking profile.

18. No supplier in the world had an LRV that met the City's requirements "off the shelf". All the proponents for the Project would have had to modify their existing vehicle designs to meet the City's goals, which are at the absolute edge of what an LRV can do.[3]

19. Given the late stage of the procurement process when Alstom was re-engaged, Alstom's proposal was constrained by design choices required by RTG to address the City's specifications and cost parameters.

20. Alstom had only three months to prepare a full vehicle supply bid to be incorporated into RTG's Project bid to the City, which is much less than industry norms. The short timeline was in part mitigated because Alstom had never actually stopped development work on the Citadis Spirit after its first failed bid as a part of a P3 consortium for the Project. It continued the engineering work required to adapt Citadis to North American standards and requirements, and its global procurement team continued to explore the US and Canada for local suppliers that could meet its strict requirements for key Vehicle components.

21. Alstom continued to refine its bid proposal for RTG after the July 2012 meeting with the City and on September 10, 2012, RTG submitted its proposal to the City, including Alstom as its supplier. On December 19, 2012, the City awarded the Project to RTG and on February 12, 2013, the City and RTG executed the Project Agreement to design, build, finance and maintain the Project.

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[3] Public Hearing, Transcript, Vol. 4, Y. Declercq, 118:1-5 (Translated – TRN00000210)

3.0 Contractual framework and Project organization

22. After the City and RTG entered the Project Agreement,[4] RTG entered into separate agreements with OLRTC for the design and construction[5] of the System and RTM for the maintenance [6]of the System for 30 years.

23. OLRTC subcontracted the design, manufacture, and supply of 34 LRVs to Alstom,[7] and RTM subcontracted with Alstom for the performance of certain maintenance, rehabilitation and lifecycle obligations for a 30-year term from the start of RSA.[8]

24. In June 2017, the City exercised an option to purchase an additional 38 LRVs (Stage 2). This was implemented by way of a Subcontract Variation between OLRTC and Alstom. The Maintenance Subcontract, as between RTM and Alstom, was also amended and restated, for a second time, to reflect the expanded scope of maintenance to be performed by Alstom on the additional 38 LRVs.

25. Both of Alstom's subcontracts, are "back-to-back," such that many of the contractual rights and obligations as between RTG, OLRTC and RTM are flowed down to and/or assumed by Alstom.[9]

26. Alstom therefore has two contracts, which are separate and distinct from one another, yet closely related. Though technically one company, Alstom's organization for the Project is divided between a vehicle design, assembly, retrofit, and warranty team on

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4 City of Ottawa and Rideau Transit Group General Partnership, *Amended and Restated Project Agreement: Ottawa Light Rail Transit Project*. (Exhibit 299 - COW0000280)

5 Rideau Transit Group General Partnership and OLRT Constructors, *Ottawa Light Rail Transit Project: Construction Contract*, February 12, 2013. (ALS0006570)

6 Rideau Transit Group General Partnership and Rideau Transit Maintenance General Partnership, *Ottawa Light Rail Transit Project: Maintenance Contract*, February 21, 2013. (COM0001277)

7 OLRT Constructors and Alstom Power & Transport Canada Inc., *Subcontract Agreement Relating to the Supply of Rail Vehicles for the Ottawa Light Rail Transit Project*, February 12, 2013. (Exhibit 048 – PRRR0000120)

8 Rideau Transit Maintenance General Partnership and Alstom Transport Canada Inc., *Second Amended & Restated Maintenance Subcontract Articles of Agreement*, September 16, 2019. (Exhibit 151 – PRRR0000119)

9 OLRT Constructors and Alstom Power & Transport Canada Inc., Subcontract Agreement Relating to the Supply of Rail Vehicles for the Ottawa Light Rail Transit Project, February 12, 2013, Article IV – Back-to-Back Principle. (Exhibit 048 – PRRR0000120)

the one hand and a maintenance team on the other. The Vehicle team and maintenance team are each led by their own Project Manager, and each have distinct technical, supervisory and other levels of staffing.

4.0 Canadian Content requirements achieved their purpose and were successful

27. The City obtained funding for the Project, in part, from the Provincial and Federal governments, which funding was conditional on the Vehicles meeting a 25% Canadian Content requirement. Canadian Content requirements are a common feature of public procurement and serve an important function to bolster local labour markets, encourage specialization and training, and generate local economic benefits.

28. To meet the local content requirement, RTG and Alstom proposed assembling the Vehicles at the MSF as a cost saving innovation, as doing so would not require paying to rent or purchase a production site.[10] The MSF was an appropriately sized facility to build the Vehicles, and prior to the start of Revenue Service, it was not otherwise planned to be in use.

29. Using a remote facility, such as an MSF or a rented warehouse space, for final assembly of vehicles is not uncommon in the industry.[11] Additionally, Alstom had previous experience transferring its technology to facilitate local assembly outside of its Centres of Excellence, including LRV manufacturing of more than 70 vehicles in Barcelona for Madrid, and 37 vehicles built in Katowice, Poland, for Istanbul.[12]

30. Alstom's initial plan was to build the first two Vehicles in Valenciennes, France, to validate its design, performance and industrial process, and then transfer the required knowledge and tooling to Ontario, where local personnel would be trained in assembly

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[10] Public Hearing, Transcript, Vol. 1, R. Cosentino, 118:4-8, and Public Hearing, Transcript, Vol. 4, Y. Declercq, 118:1-5 (Translated – TRN00000210)

[11] Commission of Inquiry, Formal Interviews, L. Goudge, April 6, 2022, 35:5-17. (TRN00000020)

[12] Rideau Transit Group, Ottawa Light Rail Transit Project: Tunney's Pasture to Blair Station, July 18, 2012, at slide 64. (Exhibit 40 – ALS0058776)

and serial production would commence.[13] Ultimately, Alstom executed its plan, but built its first prototype Vehicle in Hornell, NY, where it had an existing manufacturing facility, instead of Valenciennes, France. Alstom then transferred all its tooling from Hornell to the MSF, for serial manufacturing.

31. Alstom's Citadis Vehicle is specially designed to facilitate remote assembly, away from Alstom's Centres of Excellence. In particular, its modular design means that the Vehicles can be assembled with minimal tooling and there are no special processes required such as welding, painting, cutting, machining or drilling required at the local assembly site.[14]

32. Performing final assembly of the Vehicles in Canada introduced an element of risk to the Project because of the quality and experience of the local labour market. While Alstom's Vehicles are designed for modular assembly, there is still some degree of technical expertise required to perform the work. The Ottawa region lacked an available pool of experienced technicians, and, in fact, one of the very purposes of the Canadian Content requirements is to facilitate and encourage labour market growth, technical training and job creation.

33. Alstom was prepared to and did invest significant resources in order to train a new technical workforce in Ottawa. Alstom's staff in Ottawa included key experienced personnel from Alstom's global Centres of Excellence and other projects, that were brought in to manage the Project and execute Alstom's recruitment and training plan.[15]

34. In 2014, Ms. Zaari and Alstom's then-Project Manager, Derek Hurst, prepared a staffing plan for the transfer of resources and knowledge from Valenciennes to Hornell, then

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[13] Rideau Transit Group, Ottawa Light Rail Transit Project: Tunney's Pasture to Blair Station, July 18, 2012, at slide 64. (Exhibit 40 – ALS0058776)

[14] Rideau Transit Group, Ottawa Light Rail Transit Project: Tunney's Pasture to Blair Station, July 18, 2012, at slide 61, (Exhibit 40 – ALS0058776); and Commission of Inquiry, Formal Interviews, L. Goudge, April 6, 2022, 39:2-22, (TRN00000020); and Public Hearing, Transcript, Vol. 7, L. Goudge, 10:24 – 11:9, (TRN00000191); Commission of Inquiry, Formal Interviews, J. Bergeron, April 27, 2022, 95:12-22. (TRN00000093)

[15] Arbitration of Alstom Transport Canada Inc. and OLRT Constructors, *Responding Witness Statement of Nadia Zaari*, June 29, 2020, para 17. (ALS0007252)

from Hornell to Ottawa.[16] To assist with the transfer of resources and knowledge from Valenciennes to Hornell and then to the MSF, Alstom relocated experienced personnel to Ottawa. These key individuals brought their knowledge of the industrial process, quality and manufacturing.[17]

35. Alstom's new Ottawa resources started with shadow training at Alstom's facility in Hornell to ensure new hires at the MSF were given proper training on Alstom industrial processes and standards in vehicle assembly.[18]

36. Notwithstanding higher turnover than anticipated in its local labour force, Alstom's training program was successful. Many of the individuals trained for the assembly of the Vehicles successfully transitioned to Alstom's warranty and retrofit teams or maintenance teams, and the Project continues to benefit from their expertise.

37. The benefits of Alstom's investments in training are not Alstom's alone, but the entire region, as many Alstom-trained technicians have since left Alstom and continue to work in the Ottawa area, exactly the kind of positive externality intended by the Project's Canadian Content requirements.

5.0 Alstom was prepared to assemble the Vehicles at the MSF but faced challenges from construction delays and deficiencies at the facility

38. OLRTC was responsible for designing, building, and equipping the MSF.[19] Alstom provided OLRTC with its space requirements for its assembly line and other specifications so OLRTC could adapt its design to accommodate assembly activities.

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16 Arbitration of Alstom Transport Canada Inc. and OLRT Constructors, *Responding Witness Statement of Nadia Zaari*, June 29, 2020, paras 18-19. (ALS0007252)

17 Arbitration of Alstom Transport Canada Inc. and OLRT Constructors*, Responding Witness Statement of Nadia Zaari*, June 29, 2020, paras 18. (ALS0007252)

18 Arbitration of Alstom Transport Canada Inc. and OLRT Constructors, *Responding Witness Statement of Nadia Zaari*, June 29, 2020, paras 28-29. (ALS0007252)

19 Arbitration of Alstom Transport Canada Inc. and OLRT Constructors, *Witness Statement of Nadia Zaari*, May 28, 2020, para 43. (ALS0007244)

Once construction was complete and all of Alstom's tooling installed, the MSF was sufficient in size, well organized, and "agile".[20]

39. Construction delays to the MSF was a known risk of locating final Vehicle assembly there since the facility was not yet built at the time the decision was taken. The parties evaluated the risk and determined that it was outweighed by the benefits to the Project through the savings realized by not having to procure a separate facility.

40. Contractually, OLRTC was required to turn over the finished MSF to Alstom in July 2015. Due to various Project delays, OLRTC and Alstom agreed that, for the benefit of the Project, Alstom should get access to the MSF early to accelerate Vehicle assembly to mitigate delays. Ultimately, OLRTC failed to meet the earlier date, but provided Alstom with access to the MSF in phases. By November 30, 2015, approximately 95% of the Final Vehicle Assembly area of the MSF had been turned over to Alstom, however, other necessary areas such as the Light Maintenance Bay ("LMB"), the storage shed and the MSF yard, were still not turned over to Alstom.

41. When Alstom began its assembly work, the MSF was still an active construction area, under OLRTC control. In that environment, Alstom and other subcontractors had to obtain work permits from OLRTC in order to complete work in areas that had not yet been turned over. This work permit process impacted Alstom's efficiency until OLRTC completed construction and fully turned over the MSF to Alstom.

42. Similarly, OLRTC's late turnover of the LMB impacted Alstom's ability to perform necessary testing and commissioning of the Vehicles. The LMB was used by Alstom to perform certain static serial tests on the Vehicles, including functionality of the traction and brake system before the train is moved onto the mainline to complete necessary dynamic tests. Not only did OLRTC hand over the LMB in a piecemeal fashion, but when OLRTC initially handed over the LMB, it did not have the power necessary for testing.

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[20] Commission of Inquiry, Formal Interviews, A. Lacaze, May 20, 2022, 100:2 – 101:11. (TRN00000161)

This delayed handover, and delayed access to the necessary power, impacted not only Alstom's testing programme, but the Vehicle production line as well.

43. While the MSF, as planned, was sufficient for Alstom to perform final assembly of the Vehicles, OLRTC failed to properly maintain the facility and equipment such as the Overhead Catenary System ("OCS"), stingers, and train car movers, that were critical to Alstom's Vehicle production. As the Final Award in Alstom's and OLRTC's arbitration found:[21]

> [T]he late, and at times limited, delivery of and access to the MSF and various portions of the MSF yard, and difficulties with some of the equipment in it, had ongoing impacts on Alstom's ability to progress its work in a logical and orderly fashion, especially as the need to implement retrofits in respect of Thales's design changes were introduced, in addition to Alstom's own necessary retrofits.

6.0 Alstom overcame the challenges of building a new supply chain

44. Alstom was already in the process of identifying qualified partners in North America as part of its broader development work to bring Citadis to the market here, and once it joined the RTG bid team in July 2012, Alstom focused in particular on identifying suppliers in Canada. Despite Alstom's concerted efforts to help its new suppliers meet its quantity, quality, and schedule demands, certain suppliers struggled to meet Alstom's expectations.

45. As a sophisticated vehicle manufacturer, Alstom has established processes for identifying and qualifying new suppliers. Alstom investigates and qualifies new suppliers based on their capacity and quality practices, but this detailed process had not yet started in the pre-bid period.[22] During the bid period, Alstom performed an overall

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[21] Arbitration of Alstom Transport Canada Inc. and OLRT Constructors, Award, at para 205. (Exhibit 057 – ALS0009613)

[22] Public Hearing, Transcript, Vol. 4, Y. Declercq, 23:8-21. (Translated – TRN00000210)

evaluation of the industries present in the Canadian market,[23] but much work was left to do on the procurement front following the award of the Subcontract.

46. In the first month after award of the LRV supply contract, Alstom identified, investigated and evaluated short listed suppliers.[24] Alstom's global procurement team then performed site visits of leading supply proponents to validate, in person, that each had the necessary quality programs in place, and to perform audits of each supplier's production capacity. Even after a supplier is chosen, and the overall programme progresses to a point where the definition of the particular component or product is more defined, Alstom continues to evaluate its suppliers from a quality, capability and reliability standpoint.[25]

47. Creating a new supply chain, in a new market, carries certain risks, which is why Alstom, globally, and in Canada, has robust processes in place for the identification and evaluation of new suppliers. Alstom took great care in the selection of its key suppliers for the Project, not just with a short-term view of the Project, but also a long term view toward building up its supply chain in North America for future projects. Yet, despite its considerable efforts to chose qualified, capable partners for key Vehicle components, some struggled to deliver on their promises.

48. Alstom's supply chain issues arose because Alstom's partners failed to perform as expected, for many different reasons. Many, if not most, failures were standard teething or growth issues that are to be expected of suppliers manufacturing new components for a new customer for the first time and were resolved quickly and efficiently without any impact to the Project. Others had more of an impact, and ultimately resulted in Alstom replacing the supplier altogether, as in the case of the APS units.

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[23] Public Hearing, Transcript, Vol. 4, Y. Declercq, 174:13-18. (Translated – TRN00000210)

[24] Public Hearing, Transcript, Vol. 4, Y. Declercq, 174:18-22. (Translated – TRN00000210)

[25] Public Hearing, Transcript, Vol. 4, Y. Declercq, 174:1 – 176:19. (Translated – TRN00000210)

49. One of the most important challenges for Alstom was building new relationships, for the first time, with new, and in some cases previously untested, suppliers, on a very compressed timetable, imposed by the City's Project timelines. While Alstom took all reasonable steps to vet its new partners, and to help bring them up to Alstom's international standards, certain suppliers stumbled along the way. This risk is part of the process for building new supply chains, and the fact that the risk materialized was not because of anything that Alstom did, or failed to do.

50. Today, Alstom's Canadian supply chains are well established, because of the work and effort by Alstom to foster strong Canadian relationships and facilitate the development of its Canadian supply partners.

7.0 Project delays compressed the schedule with significant impacts down the road

51. It is well known that the overall Project was late, and these delays had an impact on the performance of Alstom's work. In particular, early delays and a lack of alignment and integration of key subcontractors resulted in a significant number of retrofits to the Vehicles very late in the schedule and compressed the testing and system integration of the Vehicles and the infrastructure.

52. By 2019 Alstom had delivered the 34 Vehicles required of the Stage 1 Subcontract, but it was well understood by all parties that there was a significant list of retrofits required to be done, as a result of several important early delays. Many retrofits were required to be completed at the same time the parties were under significant pressure to put the System into service. The scope of retrofits was known to all parties, and the City chose to defer many of them to after the start of Revenue Service, which decision increased the risk to the reliability of the System during that time.

7.1 City's delayed design choices delayed validation testing

53. Alstom's design of the LRVs required certain decisions to be taken by the City during the design review process, which is typical for any LRV supply. However, the City was more

than a year late finalizing its design choices. The City's delay directly impacted the start of production for Alstom's first prototype Vehicles by about 12 months.

54. To mitigate the City's early delays, Alstom, OLRTC, RTG, and the City agreed to start serial manufacturing and validation testing in parallel. As a result of these parallel activities, engineering issues that were identified after the Vehicles were already produced necessarily required retrofits. This outcome was a known and accepted risk by all the parties.

55. The delay to the start of validation testing was exacerbated by delay to the Project's Test Track. Initially, Alstom intended to perform certain dynamic validation testing at a dedicated test track facility in Pueblo, Colorado. However, OLRTC suggested that to simplify logistics, enhance the testing programme, and mitigate early delays to the project, Alstom move its testing to a Test Track in Ottawa, which was a specially designated section of new Confederation Line track. This plan was scrutinized from both a technical and commercial perspective, and approved by all parties, including the City.

56. Unfortunately, due to other construction delays, OLRTC failed to provide the Test Track to Alstom in a timely manner to allow Alstom to advance its validation testing. Once again, this had the impact of delaying necessary validation testing and, in turn, delaying the identification of any necessary retrofits, thus requiring them to be performed later in the programme. During the hearing, OLRTC's Director of Integration, Jacques Bergeron, candidly acknowledged that the unavailability of the Test Track was one of the "big hiccups in the testing program",[26] and that this had a "knock-on effect" in terms of delay to the Project.[27]

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[26] Public Hearing, Transcript, Vol. 7, J. Bergeron, 118:22 – 119:2. (TRN00000191)

[27] Public Hearing, Transcript, Vol. 7, J. Bergeron, 156:16 – 157:3. (TRN00000191)

57. Other validation tests that required access to the entire mainline were delayed even further because of the late completion of System infrastructure. The result was a compressed testing and integration period for not only the LRVs but the entire System.

7.2 Late and compressed integration Testing

58. Robust and comprehensive integration testing is crucial for two reasons. First, it allows stakeholders to recognize, diagnose, and correct defects related to the Vehicles, infrastructure, and systems integration to ensure all sub-systems work seamlessly together. Second, it provides stakeholders with an idea of the System, and its operations, that they are going to inherit so they can properly plan and resource their maintenance activities.

59. OLRTC created a comprehensive Testing and Commissioning Plan ("T&C Plan") that outlined critical testing and commissioning phases and activities, which would demonstrate the performance, safety, and reliability of the System infrastructure.[28] OLRTC's T&C Plan went through several iterations and was ultimately finalized in 2015.[29] The T&C Plan represented what everyone thought testing and commissioning ought to have been to complete the Project.[30]

60. OLRTC's final T&C Plan contained three phases of Systems Integration Testing. The first phase was to be 24 weeks, and encompassed testing of the Alstom Vehicles on a test track, and integration of the Alstom and Thales systems. Phase 2 was 26 weeks and included integration testing between the Vehicles and the track, stations integration, and simulated trial running with OC Transpo drivers. Finally, phase 3 was 35 weeks, and encompassed integration testing of the entire line, with headway confirmations and emergency drills. Only after the three phases of Systems Integration Testing would the 12-day Trial Running commence.

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[28] OLRT Constructors, *Testing & Commissioning Plan*, December 4, 2015. (COW0003617)

[29] Public Hearing, Transcript, Vol. 9, R. Holder, 94:3-8. (TRN00000198)

[30] Public Hearing, Transcript, Vol. 9, R. Holder, 92:17-21. (TRN00000198)

61. The finalized T&C Plan recognized the importance of true integration testing through several levels of testing, going from individual component testing to full system integration testing to simulated service.[31] Each level of testing serves to add the necessary complications that come with running a complex and sophisticated transit system to ensure system reliability. There is a fundamental difference between simply running trains on portions of the line in a test setting and running trains on the entire line under simulated service: external sources of stress and urgency. For example, you can train an operator on how to overcome basic door faults, but that operator does not "get a sense of [the] pressure of trying to overcome these problems when there's 14 other trains out on the line and there's delays going on to passengers."[32]

62. Full system access, which includes access to 15 Vehicles, was important for two reasons: (1) operators need to develop a rhythm and a sense of urgency and (2) the effectiveness of operating rules and procedures needs to be verified by conducting live drills and exercises.[33] A sense of urgency would develop through running the System to simulate revenue service.[34]

63. In addition to the operations practice, full system integration testing and simulated service provides more opportunities for stakeholders to identify and rectify systemic issues that would not otherwise be discovered through one-off or limited testing.

64. As outlined in OLRTC's T&C Plan, prior to Trial Running there was to be more than a year of multi-vehicle and multi-station testing such that "[m]aintenance staff […] will be fully trained and will be familiar with the operation of the [S]ystem prior to Trial Running."[35] Thus, Trial Running was meant as a final demonstration to the stakeholders that the

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31 OLRT Constructors, *Testing & Commissioning Plan*, December 4, 2015, at p 10. (COW0003617)

32 Public Hearing, Transcript, Vol. 16, L. Gaul, 21:8-15. (TRN00000205)

33 Public Hearing, Transcript, Vol. 16, L. Gaul, 9:26 – 10:3. (TRN00000205)

34 Public Hearing, Transcript, Vol. 16, L. Gaul, 9:6-17. (TRN00000205)

35 OLRT Constructors, *Testing & Commissioning Plan*, December 4, 2015, at p 57. (COW0003617)

System was ready for Revenue Service commencement[36] or, in other words, "ensure that at the railway level that the systems that had been tested by RTG and confirmed to be functional could be used effectively and efficiently by the City's operations team."[37]

65. As a result of a variety of factors, the period for testing and commissioning was compressed, an important departure from the original, finalized T&C Plan.[38] Additionally, the program was altered because of the sinkhole event, which meant OLRTC could not test sequentially across the System, but had to jump over the entire centre portion of the Project.[39]

66. Deviating from OLRTC's accepted T&C Plan resulted in several issues. First, train control system testing and the integration of the Vehicle with the train control system was affected.[40] Frequently, Alstom and Thales would require the same sections of track to perform testing operations.[41] The compression of the testing and commissioning schedule along with other infrastructure and Vehicles meant many "unsuccessful testing programs, because [Alstom and Thales] just could not complete the work in the time that had been allocated to them."[42]

67. Second, because of the departure from the methodical and sequential testing sequences laid out in the T&C Plan, lower level component tests (i.e. Post Installation Check Out or PICO tests) would not be fully completed or accurately completed prior to moving onto the higher level Systems Acceptance Testing (SAT tests).[43] This sort of non-sequential testing meant that issues arising during the SAT tests could not be easily

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36 OLRT Constructors, *Testing & Commissioning Plan*, December 4, 2015, at p 57, (COW0003617) and Public Hearing, Transcript, Vol. 9, R. Holder, 8:4-5. (TRN00000198)

37 Public Hearing, Transcript, Vol. 9, R. Holder, 7:21-24. (TRN00000198)

38 Public Hearing, Transcript, Vol. 9, R. Holder, 14:25-26. (TRN00000198)

39 Public Hearing, Transcript, Vol. 9, R. Holder, 16:8-13. (TRN00000198)

40 Public Hearing, Transcript, Vol. 9, R. Holder, 16:20-22. (TRN00000198)

41 Public Hearing, Transcript, Vol. 9, R. Holder, 16:26 – 17:2. (TRN00000198)

42 Public Hearing, Transcript, Vol. 9, R. Holder, 17:14-15. (TRN00000198)

43 Public Hearing, Transcript, Vol. 9, R. Holder, 17:26 – 18:6. (TRN00000198)

identified as being a component issue or a system issue by OLRTC,[44] resulting in further delays as the testers would have to redo PICO tests to diagnose the problem.[45]

68. Third, with respect to Vehicles, validation testing (testing the vehicle design itself) and serial testing (testing the vehicle against the design) were squeezed together and done in parallel.[46] The compression of Vehicle testing in conjunction with the delayed receipt of portions of the MSF to perform certain tests resulted in testing inefficiencies and delays because of space constraints.[47]

69. In addition to the further delays, the departure meant that some higher level integration tests were being completed and passed while some lower level component tests failed.[48] Some of these tests would be passed with minor deficiencies that would carry over into Revenue Service.[49] In this context, a pass with a minor deficiency indicated that there was "a failure in the functioning of the system".[50] In other instances, higher level tests did not receive a pass prior to Substantial Completion; in these cases the City and RTG agreed that a pass was not required for Substantial Completion if there was a sufficient work around.[51] These issues were, thus, carried into Trial Running and Revenue Service. Had there been sufficient time, as planned, these issues would have been addressed prior to Revenue Service, improving reliability when service began.

70. Despite the delays to Substantial Completion and RSA, the final two stages of testing and commissioning did not reach a level of prolonged capacity that simulated post-RSA service levels. In other words, the simulated service that was contemplated in OLRTC's

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44 Public Hearing, Transcript, Vol. 9, R. Holder, 18:7-9. (TRN00000198)

45 Public Hearing, Transcript, Vol. 9, R. Holder, 18:23. (TRN00000198)

46 Public Hearing, Transcript, Vol. 10, Y. Liu, 148:22-27. (TRN00000199)

47 Public Hearing, Transcript, Vol. 10, Y. Liu, 153:24 – 154:9. (TRN00000199)

48 Public Hearing, Transcript, Vol. 9, R. Holder, 21:16 – 22:9. (TRN00000198)

49 Public Hearing, Transcript, Vol. 9, R. Holder, 25:14-16. (TRN00000198)

50 Public Hearing, Transcript, Vol. 9, R. Holder, 25:7-13. (TRN00000198)

51 Public Hearing, Transcript, Vol. 9, R. Holder, 23:7-19. (TRN00000198)

T&C Plan prior to Trial Running never occurred.[52] Although operators had longer times to train using simulators,[53] they could not learn to deal with the urgency that comes with running a full complement of trains. Leading up to Substantial Completion and Trial Running, access to the entire System and the full complement of two-car consists was not available.[54]

71. It was not until about a week before Trial Running that 15 two-car trains were run on the line,[55] and even then there were no practice runs leading up to Trial Running.[56] Up until this point, OC Transpo operators had no real world, in-train experience of what they were going to do when they went into Revenue Service.[57]

72. The testing and commissioning stage was not long enough to surface many of the issues that manifested themselves after Revenue Service, as there simply was not enough multi-unit Vehicles running at sufficient frequency.[58] That is why OLRTC's original T&C Plan called for months of simulated service: "The more things you have running and moving and working, the more probability you have with discovering problems."[59]

73. Throughout the ultimate testing and commissioning process, there were concerns "that the level of testing had not been completely thorough and that there may well, as a result, be bugs that have not been discovered or completely ironed out."[60]

74. These bugs, that ought to have been caught throughout a robust testing and commissioning regime, were not dealt with until after Substantial Completion. There were concerns that despite the systems and Vehicles passing all necessary tests "their

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52 Public Hearing, Transcript, Vol. 9, R. Holder, 97:1-4. (TRN00000198)

53 Public Hearing, Transcript, Vol. 10, M. Slade, 110:5-7. (TRN00000199)

54 Public Hearing, Transcript, Vol. 16, L. Gaul, 9:6-8. (TRN00000199)

55 Public Hearing, Transcript, Vol. 16, L. Gaul, 17:10-11. (TRN00000199)

56 Public Hearing, Transcript, Vol. 10, M. Slade, 58:15-22. (TRN00000199)

57 Public Hearing, Transcript, Vol. 16, L. Gaul, 11:16-18. (TRN00000199)

58 Public Hearing, Transcript, Vol. 7, L. Goudge, 18:15-21. (TRN00000191)

59 Public Hearing, Transcript, Vol. 7, L. Goudge, 18:22-23. (TRN00000191)

60 Public Hearing, Transcript, Vol. 8, J. Hulse, 127:25-27. (TRN00000197)

reliability was probably quite a way short of where [OLRTC was] hoping that they would be at [Substantial Completion and Trial Running]."[61]

75. In certain instances, retrofits for bugs found shortly prior to Substantial Completion were deferred until after Substantial Completion and, in certain cases, after Revenue Service. These bugs did not prevent operation of the Vehicles but may have impacted reliability in Revenue Service. Despite the impact, these retrofits were not included on the Minor Deficiencies List.[62]

76. The gaps in OC Transpo's operational training, as explained above, meant that operators, supervisors, and controllers "lacked experience operating in a revenue-service environment due to track and [V]ehicle access issues."[63]

77. Finally, maintenance readiness was impacted in two ways. First, the infrastructure and Vehicle bugs and issues that were not caught during testing manifested themselves during full operation, adding to RTM and, Alstom's maintenance burden. Second, the lack of opportunities to simulate service meant that Alstom was unable to train its maintenance staff under revenue-service conditions. Although Alstom, like OC Transpo, provided simulations and training drills to its staff,[64] it could not provide a full experience that recreates the urgency and pressure of maintaining the System at full capacity.

8.0 OLRTC failed to align and integrate key subcontractors

78. The evidence from the inquiry, consistent with findings of fact made in a previous private arbitration, was that OLRTC failed in its role as System Integrator. This failure resulted in consequences for both the project schedule and system reliability.

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61 Public Hearing, Transcript, Vol. 10, M. Slade, 97:10-15. (TRN00000199)

62 Public Hearing, Transcript, Vol. 7, L. Goudge, 19:19 – 20:25. (TRN00000191)

63 City of Ottawa, *O-Train Line 1: State of Operational Readiness*, February 13, 2019, at slide 6, (COW0555762) and Public Hearing, Transcript, Vol. 16, L. Gaul, 9:18-25. (TRN00000199)

64 Public Hearing, Transcript, Vol. 17, R. France, 7:11-13. (TRN00000207)

79. The role of system integrator on an LRT project, where a myriad of subsystems must work in perfect harmony for the System to properly function, is absolutely critical. For the first three years of the Project, OLRTC focused more on the construction of the System, not on systems integration, and did not have a system integrator until it was too late. Neither the RTG Engineering Joint Venture ("RTGEJV"), OLRTC's design engineering subcontractor, nor OLRTC, wanted to take on the integrator's role, at first, though OLRTC ultimately accepted it as part of its scope. Even then, OLRTC acknowledged that they had difficulty identifying personnel to fill that role.[65]

80. OLRTC's Manuel Rivaya confirmed that a dispute arose between RTGEJV and OLRTC about who was responsible for system integration, which led to delays in system integration, through 2016, 2017, and into 2018.[66]

81. For Alstom, a key interface to be managed by OLRTC was the interface between the Vehicles and the train control system, in particular the CBTC/VOBC system[67], designed and supplied by Thales. Due to the importance of this interface, Alstom's Vehicle Subcontract required, in part, that OLRTC provide Alstom a "frozen" CBTC specification by no later than April 26, 2013.[68] Alstom needed a frozen CBTC/VOBC specification in order to progress the design of the LRVs.

82. As it turned out, there was a misalignment between the scheduling obligations in Thales's subcontract, and the dates set out in Alstom's. Thales's Project Manager, Michael Burns, confirmed that Thales's subcontract did not require Thales to have a frozen design until August or September 2014,[69] a full year-and-a-half after the freeze

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65 Public Hearing, Transcript, Vol. 5, R. Holloway, 110:15 – 111:21. (TRN00000189)

66 Public Hearing, Transcript, Vol. 4, M. Rivaya, 130:2 – 131:6. (TRN00000186)

67 Meaning, Communication Based Train Control System / Vehicle On Board Controller

68 OLRT Constructors and Alstom Power & Transport Canada Inc., *Subcontract Agreement Relating to the Supply of Rail Vehicles for the Ottawa Light Rail Transit Project*, February 12, 2013, Appendix K – Interfaces. (Exhibit 048 – PRRR0000120)

69 Public Hearing, Transcript, Vol. 6, M. Burns, 86:24-87:27. (TRN00000190)

date in Alstom's Subcontract. In other words, OLRTC was never going to be able to provide Alstom with a sufficiently detailed CBTC specification by April 26, 2013.

83. A prudent system integrator should have recognized this misalignment and attempted to rectify it before any consequences were realized. Unfortunately, that did not happen, in part, because OLRTC did not have anyone overseeing the integration of this critical interface until January 2014.[70]

84. Early on, OLRTC struggled to integrate Thales's and Alstom's designs, from both a technical and commercial perspective. Arbitrator Stephen Morrison found in his Final Award to the Stage 1 arbitration between OLRTC and Alstom that OLRTC's clear mismanagement of the interface between Alstom and Thales, hindered and interfered with Alstom's ability to plan and execute its work in an efficient way.[71]

9.0 The System was put into Revenue Service prematurely

9.1 Substantial Completion was achieved through waivers

85. After months of delay to the Project, the City was eager to launch the System and demonstrate to the public that it had successfully built and managed the City's first LRT system. This gradually led to an increasing amount of pressure placed on all stakeholders.

86. The City rejected RTG's first application for Substantial Completion, submitted on April 29, 2019, based on several outstanding items that the City did not consider to be minor deficiencies. For example, the City identified the lack of effective configuration of the SCADA system (an integrated system that provides alarms and messages about the status of various subsystems to the System operators) as a basis for rejecting RTG's application for Substantial Completion.

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70 Public Hearing, Transcript, Vol. 7, J. Bergeron, 91:17-92:4. (TRN00000191)

71 Arbitration of Alstom Transport Canada Inc. and OLRT Constructors, *Award*, at para 208. (Exhibit 057 – ALS0009613)

87. On April 29, 2019, the system recorded 1768 SCADA alarms,[72] significantly more than the anticipated number of alarms in one day. Not only would this number of SCADA alarms overwhelm the operation and maintenance of the System, but the excessive number of alarms also raised the question of whether the SCADA system had been fully tested and commissioned.

88. On July 22, 2019, when RTG submitted its second application for Substantial Completion,[73] there were still a number of open items that could not be placed on the minor deficiencies list, including issues with alarm management, intrusion access control, and Vehicle availability, though SCADA was not identified on the open item list. Yet, as of August 2019, the daily number of SCADA alarms were still in the same order of magnitude, and the management plan for SCADA alarms, prepared by the City's independent consultant, Parsons, was only issued the day before Revenue Service started.

89. Parsons SCADA Management Plan noted that "many of these alarms are due to the fact that specific systems are not fully commissioned and are not representative of the expected behaviour during normal revenue service."[74] Mr. Palmer of Parsons testified that "the City were aware that alarms were an issue and an obstruction to opening".[75]

90. While SCADA was a recorded impediment to achieving Substantial Completion in May 2019, it was not considered to be one when Substantial Completion was granted in July 2019, even though no material improvements had been made to the SCADA system, and the City knew that SCADA was an obstruction to opening. In fact, the issue of SCADA

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72 Altus Group, *Independent Certifier's Report on Substantial Completion*, May 13, 2019, at p 23. (Exhibit 120 – RTG00010893)

73 Altus Group, *Independent Certifier's Report on Substantial Completion #2*, July 27, 2019. (Exhibit 121 – RTG00332042.0001)

74 City of Ottawa, *O-Train SCADA Alarm Strategy Plan*, September 10, 2019, (Exhibit 124 – PAR0003446) and Public Hearing, Transcript, Vol. 9, R. Holder, 81:18 – 82:4. (TRN00000198)

75 Commission of Inquiry, Formal Interviews, M. Palmer, May 4, 2022, 96:12-13, (TRN00000079) and Public Hearing, Transcript, Vol. 9, R. Holder, 78:4-28. (TRN00000198)

alarms continued, and in November 2021, OLRTC had still not implemented a permanent solution to the SCADA management issue.[76]

91. On the Vehicle side, at the time of Substantial Completion, the City knew that the System could not "meet service standards due to reliability of subsystems" and could not "meet fleet requirements due to ongoing defects/deficiencies."[77] Yet, the City granted Substantial Completion, anyway.

92. The City did this by unilaterally exercising its discretion to waive any requirements for Substantial Completion, provided for by section 26.4(d) of the Project Agreement,[78] so that Substantial Completion could be achieved. On cross-examination, Mr. Holder agreed that "if the City hadn't agreed to defer or waive these requirements, RTG would not have met substantial completion."[79] This was a decision made by the City, with no involvement from Alstom.

9.2 Trial Running was made easier to help achieve RSA

93. After Substantial Completion was achieved, Trial Running commenced nearly immediately, but ultimately the City was required to ease the criteria for Trial Running in order to get to RSA. Consequently, passenger service started before the System was truly ready.

94. The Project Agreement ("PA") defines Trial Running as a 12 consecutive day period that may commence upon the successful completion of testing and commissioning.[80] Upon the successful completion of Trial Running, the System is deemed ready for Revenue

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76 OLRT Constructors, *Alarm Management; Reference Outstanding issues item P9*, November 9, 2021. (RTG00011288)

77 Public Hearing, Transcript, Vol. 9, R. Holder, 40:19-27, (TRN00000198) and Altus Group, *Independent Certifier's Report on Substantial Completion #2*, July 27, 2019. (Exhibit 121 – RTG00332042.0001)

78 City of Ottawa and Rideau Transit Group General Partnership, *Project Agreement*, February 12, 2013. (Exhibit 79 – IFO0000375)

79 Public Hearing, Transcript, Vol. 9, R. Holder, 37:17 – 39:23. (TRN00000198)

80 City of Ottawa and Rideau Transit Group General Partnership, *Amended and Restated Project Agreement: Ottawa Light Rail Transit Project – Schedule 15-1*. (Exhibit 280 - COW0000295)

Service. The PA did not provide any specific criteria or guideline for measuring performance of the System in order to successfully complete Trial Running.

95. The purpose of Trial Running is to validate that the System is capable of operating reliably at or above the performance requirements of the PA. The PA requires the System to operate at or above 98% reliability. Operation below that level results in exponentially increasing Deductions to RTG, RTM and Alstom, in turn. While Deductions start to accrue just below 98%, by 70.8% availability (measured in actual km / planned km), RTG's Deduction equals the full amount of its Monthly Service Payment, meaning it is paid nothing. For Alstom, its Monthly Service Payment is completely wiped out at 86.8% availability.

96. The City, RTG, and OLRTC developed the criteria for Trial Running over many years, without input from Alstom. In April 2016, the Trial Running Test Procedure set the Vehicle availability at 98%.[81] Appendix B to the April 2016 Trial Running Test Procedure highlights that when availability is 98%, the deduction factor is zero.

97. In May 2017, the City initiated, and OLRTC accepted, RFI-O-266 which set out the 12 day Trial Running criteria.[82] The RFI set out the following AVKR:

a) Minimum daily availability: 90%;

b) Minimum peak availability: 88%;

c) Average daily of 96% or higher over 9 of 12 days, evaluated over a 12 day moving window of "passing" days; and

d) No three consecutive days below 94%.[83]

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81 OLRT Constructors, *Trial Running Test Plan*, April 20, 2016. (COW0250939)

82 Infrastructure Ontario, *Request for Information by Owner, sent to Project Co (RFI-O)* - 266. (COW0442401)

83 Infrastructure Ontario, *Request for Information by Owner, sent to Project Co (RFI-O)* - 266. (COW0442401)

98. Subsequently, in July 2019, RTG, OLRTC, and the City agreed on the final Trial Running Test Procedure, revising the required AVKR to 98%, over 12 days.[84] Since a key objective of Trial Running is to confirm the operating reliability of the System, and the Project Agreement threshold for deductions is set at 98% availability, it made sense that the parties chose to set the AVKR requirement at 98%.

99. Alstom was not a party to the development of the Trial Running Test Procedure, but, as the primary maintenance subcontractor, Alstom reasonably expected that the System, when turned over, would be in a functioning and reliable state to be able to meet the 98% availability target.

100. Trial Running started on July 29, 2019, three days after the achievement of Substantial Completion, and did not get off to a good start. The System failed to meet the required criteria on the first three days.[85] AVKR for each of these days was below 90%, the level at which "we've ruined somebody's commute to work that day".[86] Moreover, and as explained below, at this level of service, Alstom's entire Monthly Service Payment would be nearly wiped out by Vehicle availability deductions.

101. The fourth day of Trial Running was recorded as a pause, an exceptional and serious situation.[87] In fact, of the first ten days of Trial Running, the System achieved only four passes.

102. Faced with this abysmal start, the City and RTG jointly decided to ease the Trial Running criteria by reverting to RFI-O-266, in order to make it easier to achieve RSA.

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84 OLRT Constructors, *Trial Running Test Procedure*, July 31, 2019. (Exhibit 122 – OTT3177178)

85 Altus Group, *The Confederation Line Project (Ottawa Light Rail Transit Project) Validation of Trial Running Acceptance*, August 23, 2019. (COW0270758)

86 Public Hearing, Transcript, Vol. 11, M. Morgan, 46:23 – 47:7. (TRN00000200)

87 Public Hearing, Transcript, Vol. 13, P. Lauch, 28:5-8. (TRN00000200)

103. While RTG had decided that it was "better off stopping the bleeding on the OLRTC side, and if it means we have to suffer a bit of bleeding on the RTM side then so be it",[88] Alstom was not consulted.

104. Multiple City witnesses testified that a change from 98% to 96% AVKR is not significant.[89] First, that view ignores that RTG would incur deductions during Revenue Service below 98% AVKR. Second, it ignores the other important deviations from the Trial Running Test Procedure, including the reduction of trains for peak service from 15 to 13 and reduction of pass days to 9 out of 12. Ultimately, four of the "pass" days were weekend days, when the System is under considerably less strain. Even after the criteria was lowered, on at least one occasion, the City exercised its discretion to pass a day.[90]

105. The fact is, Trial Running as it unfolded, did not accurately reflect the level and intensity of simulated service expected during passenger service.

106. Faced with an unproven, unreliable System, the City and RTG entered into a RSA Term Sheet to reduce the number of Vehicles for peak service from 15 to 13 for the months immediately following Revenue Service.[91] City witnesses said the reduction was the result of lower service level requirements due to reduced passenger forecasts, not concern for service reliability, but that rationale is not credible.[92] The Term Sheet required RTG to submit a plan for increasing Vehicles to 15 as soon as possible, suggesting that the City intended to increase service levels as soon as the Vehicles were

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88 Commission of Inquiry, Formal Interviews, M. Slade, May 5, 2022, 139:5-7. (TRN00000103)

89 Public Hearing, Transcript, Vol. 11, M. Morgan, 45:1-4, (TRN00000200) Public Hearing, Transcript, Vol. 15, S. Kanellakos, 117:22 – 118:2, (TRN00000204) and Public Hearing, Transcript, Vol. 16, T. Charter, 190:10-18. (TRN00000205)

90 Public Hearing, Transcript, Vol. 16, T. Charter, 156:18 – 157:22. (TRN00000205)

91 City of Ottawa and Rideau Transit Group General Partnership, *Term Sheet regarding Revenue Service Availability*, August 30, 2019. (Exhibit 141 – RTG00151032)

92 Public Hearing, Transcript, Vol. 16, T. Charter, 188:28 – 189:10, (TRN00000205) and Public Hearing, Transcript, Vol. 12, J. Manconi, 174:1-17. (TRN00000201)

available, which is inconsistent with the City's position regarding lower service level requirements.

107. Throughout this period, the state of Vehicles and Vehicle reliability was always transparently reported to OLRTC, RTG, and the City, by Alstom. Alstom prepared and presented weekly reliability reviews, with the primary goal of ensuring that all stakeholders were aware of all events on the System.[93] In the days leading up to Revenue Service, Alstom was transparent about the extant technical issues to be addressed, including with respect to the HPU, line contactors, cab doors, and the auxiliary power units.[94]

108. The City's decisions to reduce the Trial Running criteria, and to put the System into service two weeks after Trial Running finished were made with full awareness of the System's status, and all of the issues yet to be resolved. The decision was also made without any regard to the impact on Alstom.

109. The City and RTG's decision to start Revenue Service before the System was ready, before it proved it could reliably achieve 98% AVKR, also created a significant financial burden for Alstom because of how the payment mechanism is structured. While Vehicle availability deductions are intended under the Subcontract to be applied equally (flowing down from RTM) to Alstom, in practice, they are not.

110. RTM treats Vehicle availability deductions as a full pass through to Alstom, even though RTM's Monthly Service Payment is five times larger than Alstom's Monthly Service Payment. Because the City's Deductions are a function of RTM's Monthly Service Payment, RTM may pass through deductions to Alstom that far exceed Alstom's Monthly Service Payment in any given month. For example, if the System achieves 85% availability, RTM incurs a 30% deduction to its Monthly Service Payment, while Alstom

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93 Public Hearing, Transcript, Vol. 8, B. Bouteloup, 31:8 – 34:11. (TRN00000197)

94 Public Hearing, Transcript, Vol. 8, B. Bouteloup, 35:9 – 39:22. (TRN00000197)

incurs a 99% deduction to its Monthly Service Payment; at 80% availability, the deduction is 54% of RTM's payment, and 185% of Alstom's.

111. Moreover, because RTM carries over excess deductions against Alstom to following months, it can be months before Alstom receives another payment after one bad month of service, while RTM is fully indemnified.

10.0 Alstom was prepared for what it expected to receive: a completed, tested and fully integrated System

112. Under the Maintenance Subcontract, Alstom is responsible for preventative and corrective maintenance of the Vehicles and most of the infrastructure, starting at RSA.[95] However, as the Commission heard, Alstom's planning and preparation for maintenance service started much earlier.[96]

113. Alstom was prepared to maintain a completed, tested and fully integrated system. Unfortunately, that is not what was handed over at RSA. Instead, Alstom received a degraded and immature system with myriad deficiencies, particularly in key parts of the infrastructure such as the track and overhead catenary system.

114. As Alstom discovered the true state of the System, it added resources to its maintenance team to address the expected increase in service requirements.[97] Still, the unanticipated volume of activities created a negative feedback loop that made it very challenging for RTM and Alstom to get ahead of this bow wave of corrective maintenance, in addition to the planned preventative maintenance.

115. Alstom's maintenance services were also impacted by the ongoing inoperability of certain maintenance facilities and equipment, like the wheel lathe, and the number of

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95 Rideau Transit Maintenance General Partnership and Alstom Transport Canada Inc., *Second Amended & Restated Maintenance Subcontract Articles of Agreement*, September 16, 2019. (Exhibit 151 – PRRR0000119)

96 Public Hearing, Transcript, Vol. 9, R. Holder, 85:11-26, (TRN00000198) and Public Hearing, Transcript, Vol. 17, R. France, 7:6-16 & 8:10-24. (TRN00000207)

97 Alstom, *Notice of Default - Contestation of allegation of breach*, March 20, 2020, (ALS0014240) and Public Hearing, Transcript, Vol. 17, R. France, 43:28 – 44:14. (TRN00000207)

Vehicle retrofits required to be performed after the start of Revenue Service. Retrofit work competed for limited space in the MSF, and could only occur on out of service Vehicles, that were not otherwise in preventative or corrective maintenance. Had Revenue Service been delayed, retrofits could have been performed systematically across the entire fleet before the start of service.

10.1 Alstom maintenance's planning and staffing levels were appropriate

116. Alstom started planning for maintenance activities with a view to being ready for the initial RSA date of May 2018. As part of its planning, Alstom gathered information, from both internal and external sources, prepared certain documentation, planned its organizational structure and allocated resources accordingly. Those efforts continued up to and beyond the actual RSA date.

117. During the hearing, the City's consultant, Tom Fodor of Parsons, testified that in July 2019, at the time of Substantial Completion, the maintenance organizations were ready to maintain the System, as described in the Project Agreement.[98] In other words, there had been adequate planning and staffing undertaken for both RTM and Alstom to be able to commence maintenance of a reliable system.

118. Similarly, Alstom's Project Manager, Richard France, testified that when he arrived on the Project in June 2019, Alstom had more than enough technicians to perform maintenance of the infrastructure.[99] In fact, Mr. France equated the number of technicians in Ottawa to what he had in Dublin, Ireland, a system three times bigger.[100]

119. The problem, as highlighted above, is that no one from Alstom could have anticipated the sheer number of deficiencies in the infrastructure at RSA.[101]

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98 Public Hearing, Transcript, Vol. 8, T. Fodor, 113:8-24 & 134:12-27. (TRN00000197)

99 Public Hearing, Transcript, Vol. 17, R. France, 5:5-14. (TRN00000207)

100 Public Hearing, Transcript, Vol. 17, R. France, 5:5-14. (TRN00000207)

101 Public Hearing, Transcript, Vol. 17, R. France, 46:26 – 47:22. (TRN00000207)

10.2 Alstom maintenance was set up to fail from the start

120. Unfortunately, Alstom's maintenance team was set up to fail by circumstances out of its control, including a lack of transparency and information sharing from OLRTC leading up to and during RSA, and RTG's decision to shift the burden of a highly degraded and immature system from OLRTC to RTM and Alstom.

121. While Mr. Slade[102] and Mr. Nadon[103] testified that Alstom refused to go out onto the infrastructure prior to Trial Running, contemporaneous records tell a different story.[104] Indeed, it wasn't until Trial Running that Alstom was afforded any meaningful opportunity to "get out there".[105] This prevented Alstom from gaining valuable hands-on experience and plan for what would eventually be handed over at RSA.

122. To compound Alstom's challenge, OLRTC was late or delinquent in sharing critical as-built information about the condition of the infrastructure. This lack of information sharing continued into RSA and still persists today as Alstom has never received a complete set of handover documentation for the infrastructure despite repeated requests through both formal and informal correspondence. As both Mr. France[106] and Mr. Guerra[107] explained, such information is critical for both RTM and Alstom to be able to carry out certain maintenance activities in an efficient and effective manner.

123. The City and RTG's decision to start Revenue Service before the System was 100% ready presented enormous challenges for RTM and Alstom, as anticipated by RTG.[108]

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[102] Commission of Inquiry, Formal Interviews, M. Slade, May 5, 2022, 110:4 – 111:8. (TRN00000103)

[103] Commission of Inquiry, Formal Interviews, S. Nadon, April 21, 2022, 68:7 – 69:25. (TRN00000169)

[104] Alstom, *Email from Dean Gorman to Crossley Denison et al. Re: CCTV troubleshooting*, January 10, 2019, (Exhibit 146 – COMH0000025) Alstom, *Letter from Justin Bulpitt to Claude Jacob Re: Support Maintenance Activities prior to Handover*, March 28, 2019, (Exhibit 148 – ALS0014029) Alstom, *Email from Dean Gorman to Richard France et al Re: Infra - What we can do*, June 14, 2019, (Exhibit 147 – ALS0056191) and Public Hearing, Transcript, Vol. 10, M. Slade, 111:1 – 115:6. (TRN00000199)

[105] Public Hearing, Transcript, Vol. 17, R. France, 7:7-15 & 12:22-28.

[106] Public Hearing, Transcript, Vol. 17, R. France, 31:19 – 35:16. (TRN00000207)

[107] Public Hearing, Transcript, Vol. 18, M. Guerra, 38:27 – 40:14. (TRN00000208)

[108] Commission of Inquiry, Formal Interviews, M. Slade, May 5, 2022, 139:5-8. (TRN00000103)

124. Had it not been for the handover of a degraded and immature system, Alstom's planning and staffing levels would have been sufficient. In addition, had OLRTC been more transparent about the as-built condition of the infrastructure leading up to Trial Running, Alstom would have had more time to plan for what would eventually be handed over. Instead, Alstom was left in the dark and could only plan for what it was supposed to get: a completed, tested and fully integrated system.

10.3 Alstom maintenance was overwhelmed by the unanticipated amount of work

125. OLRTC did not perform any maintenance of the infrastructure, like track and OCS, in the three years leading up to RSA. Indeed, this was highlighted by OLRTC's own Project Director, Mr. Slade, in a letter he "ghost wrote" for Mr. Guerra, which was sent by RTM to OLRTC.[109]

126. This lack of maintenance before Revenue Service required Alstom to perform far more corrective maintenance in the first three years of Revenue Service. The fact is Alstom could not have reasonably anticipated this, nor planned for it, in the absence of greater transparency from OLRTC.

127. Moreover, as Mr. France described during his testimony, Alstom reasonably expected that OLRTC would have a warranty team in place during the first two years of service to address the warranty issues and required corrective maintenance.[110] Instead, OLRTC fled the scene, leaving Alstom to pick up the slack, and to seek indemnity from OLRTC for its significant costs for having to do so, which, to date, have not been paid.

128. During the hearing, RTG's former Bid Director and current Board Member, Richard Cosentino, acknowledged the peculiarity of Alstom picking up the tab for all the extra

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[109] Rideau Transit Maintenance General Partnership, *Email from Mario Guerra to Tania Seely Re – Track work*, August 14, 2019. (Exhibit 149 – PRR00000182)

[110] Public Hearing, Transcript, Vol. 17, R. France, 4:12 – 6:23 & 46:26 – 47:22. (TRN00000207)

work and absorbing the risk of deductions, even though Alstom had no input into the negotiation to open the System to Revenue Service.[111]

129. To address the degraded condition of the System at Revenue Service, Alstom diligently added resources as quickly as possible, including, but not limited to, adding more supervisors, technicians and service operators, at its own cost.[112] In total, from July 2019 to November 2019, Alstom's maintenance organization increased from 90 to 130 staff:

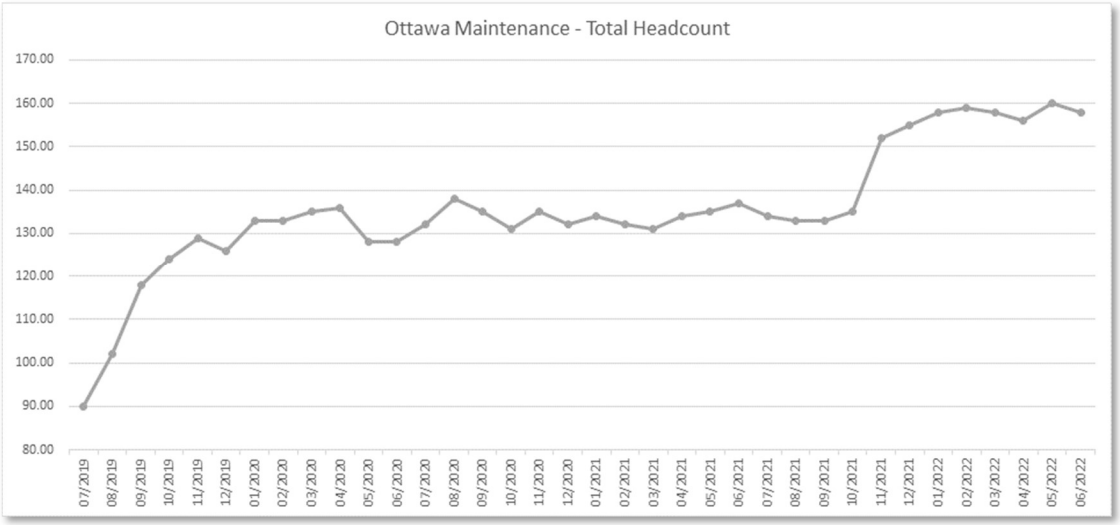

Figure 1: Alstom Maintenance Staffing from July 2019 to July 2020

130. Still, even with more resources, Alstom's maintenance activities have been hindered by issues with maintenance and storage facilities and equipment. First, MSF 2 was not available at the start of Revenue Service, limiting available space to perform warranty and retrofit work, corrective, and preventative maintenance. Second, even as more space became available at the MSF, the unreliability of certain equipment supplied and maintained by RTM caused problems for Alstom.[113] For example, the lack of a

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111 Public Hearing, Transcript, Vol. 1, R. Cosentino, 171:15 – 176:1. (TRN00000178)

112 Public Hearing, Transcript, Vol. 17, R. France, 4:12 – 6:23 & 52:9-21. (TRN00000207)

113 See e.g., Alstom, *Email from Richard France to Steve Nadon Re: Non-Performance of Facilities*, February 10, 2021, (ALS0065390) Alstom, *Letter from Richard France to Mario Guerra Re: Non-Performance of Interface – Wheel lathe*, February 5, 2021, (ALS0016611) Alstom, *Letter from Richard France to Mario Guerra Re: SIW sand pump inoperable*, June 23, 2020, (ALS0017550) Alstom, *Letter from Richard France to James Messel Re: Railcar event*, January 31, 2020, (ALS0014119) Alstom, *Letter from Richard France to James Messel Re: Non-Performance of Interface - Failure in Windhoff Lifting Jack No.9*, September 3, 2020, (ALS0014412) Alstom,

functioning wheel lathe had a significant impact on Vehicle availability during the first two years of Revenue Service, when over aggressive operation of the Vehicles led to many premature wheel flats.[114]

131. All these factors combined to place an unreasonable and unanticipated burden on Alstom maintenance during Revenue Service.

10.4 Alstom maintenance reasonably performed its maintenance services

132. In executing its maintenance services, Alstom has reasonably adapted to the degraded status of the System, adopted and performed the increased maintenance requirements set out in OLRTC's Operational Restrictions Document, and overcome numerous challenges.

133. The Operational Restrictions Document was prepared by SEMP Ltd., a consultant to OLRTC, and its adoption was a condition of entering passenger service. That document imposed operational restrictions and additional maintenance requirements like more frequent grinding and Ultrasonic Testing of the rails, among other things, which were extra to Alstom's scope.[115]

134. Derek Wynne of SEMP described the level of increased maintenance and operational restrictions on the System as "very disappointing" given that this was a brand-new

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pump inoperable, June 23, 2020, (ALS0017550) Alstom, *Letter from Richard France to James Messel Re: Railcar event*, January 31, 2020, (ALS0014119) Alstom, *Letter from Richard France to James Messel Re: Non-Performance of Interface - Failure in Windhoff Lifting Jack No.9*, September 3, 2020, (ALS0014412) Alstom, *Letter from Richard France to Mario Guerra Re: Non-Performance of Interface - Train Wash*, November 13, 2020, (ALS0015397) and Alstom, *Letter from Richard France to Mario Guerra Re: Non-Performance of Interface – 1.5T LMB Monorail Crane Alstom reply*, February 26, 2021, (ALS0014997). See also (ALS0014972), (ALS0017534), (ALS0014777), (ALS0017425), (ALS0014829), (ALS0016411), (ALS0015044), (ALS0017510), (ALS0015003), (ALS0017385), (ALS0014702), (ALS0016162), (ALS0016305), (ALS0013511), (ALS0014540), (ALS0017493), (ALS0017441), (ALS0017633), (ALS0013459), (ALS0014145), (ALS0014320), (ALS0016513), (ALS0016636), (ALS0013667), (ALS0014582), and (ALS0016427).

[114] Alstom, *Letter from Richard France to James Messel* Re: Performance of Maintenance Facilities, (ALS0014096) and Public Hearing, Transcript, Vol. 15, S. Kanellakos, 68:7 – 73:7. (TRN00000204)

[115] OLRT Constructors, *Operational Restrictions Document*, at sections 6.1.2 & 6.4.1. (Exhibit 089 – COW0459399)

railroad.[116] He also candidly acknowledged that this increased burden was placed on RTM and Alstom maintenance.[117]

135. Alstom incorporated and carried out the requirements in OLRTC's Operational Restrictions Document, as it related to their work, including:

a) Increasing rail wear visual inspections and ultrasonic testing;[118]

b) Monitoring wheel profile wear rates through increased visual inspection or non-destructive tests;[119]

c) Monitoring the effectiveness of LRV mounted lubricators and evaluating the potential to install more;[120] and

d) Increasing preventative rail grinding frequency across the whole system to reduce the risk of Rolling Contact Fatigue.[121]

136. Moreover, contrary to what's been suggested by the City, Alstom's maintenance activities have not resulted in a growing backlog of deferred maintenance. First, the allegation that deferred maintenance is an issue was made in a report prepared by the City's consultant, Mott Macdonald, based solely on Mott Macdonald's review of limited documentation and without any discussion whatsoever with Alstom personnel.[122] Second, deferred maintenance activities are typical and of no concern so long as they are properly tracked and managed. One of the primary functions of any maintainer is

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116 Public Hearing, Transcript, Vol. 14, D. Wynne, 15:10 – 16:11. (TRN00000203)

117 Public Hearing, Transcript, Vol. 14, D. Wynne, 47:7-9. (TRN00000203)

118 Public Hearing, Transcript, Vol. 10, Y. Liu, 174:15-28, (TRN00000199) and Public Hearing, Transcript, Vol. 17, R. France, 22:28 – 31:20, (TRN00000207) and Public Hearing, Transcript, Vol. 14, D. Wynne, 97:8 – 102:19. (TRN00000203)

119 Public Hearing, Transcript, Vol. 10, Y. Liu, 174:28 – 175:3, (TRN00000199) and Public Hearing, Transcript, Vol. 17, R. France, 29:13-21. (TRN00000207)

120 Public Hearing, Transcript, Vol. 10, Y. Liu, 175:3-7. (TRN00000199)

121 Public Hearing, Transcript, Vol. 17, R. France, 30:13-28. (TRN00000207)

122 Public Hearing, Transcript, Vol. 16, T. Charter, 162:4 – 164:9. (TRN00000205)

to prioritize its activities based on criticality. Third, the list of deferred maintenance has been steadily decreasing.

137. The Mott Macdonald report identified a listing of deferred maintenance tasks and assumed that the deferred maintenance would prevent the Vehicles from operating.[123] However, the listed activities were for unsold Stage 2 Vehicles that are not even in service.

138. Additionally, as explained by Mr. Guerra, it is common in the industry that a maintainer will track preventative work orders that are not yet due.[124] Both Mr. Guerra and Mr. Truchon explained that the backlog of maintenance is "entirely under control",[125] and the number of outstanding work orders, excluding preventive maintenance work orders, is in the 100 to 200 range,[126] which is "good" in a system with this many vehicles and an extensive amount of infrastructure.[127]

139. Alstom maintenance reasonably anticipated that it would be provided with a fully tested and reliable system. Instead, it was provided with a system that had received limited to no maintenance during the construction period and a system that had undergone compressed integration testing. Nevertheless, Alstom's maintenance practices have been consistent with industry best practice, and Alstom has and continues to make strides in addressing many of the issues that once plagued the reliability of the System.

11.0 City's misapplication of the Deduction scheme disproportionately impacted Alstom

140. During the maintenance term of the Project, the City is required to pay RTG for its maintenance services in accordance with the Payment Mechanism in the Project

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123 Mott Macdonald, *Ottawa LRT Independent Review Report*, April 2022, at p 147 section 3.1.2.3 – Backlog of Deferred Maintenance. (Exhibit 157 – COM0010116)

124 Public Hearing, Transcript, Vol. 18, M. Guerra, 91:8-17. (TRN00000208)

125 Public Hearing, Transcript, Vol. 18, N. Truchon, 217:21-22. (TRN00000208)

126 Public Hearing, Transcript, Vol. 18, M. Guerra, 91:20-21 & 92:10-13. (TRN00000208)

127 Public Hearing, Transcript, Vol. 18, M. Guerra, 139:24-27. (TRN00000208)

Agreement. The Payment Mechanism consists of a complex formula to arrive at a Monthly Service Payment which is the payment to be made on a monthly basis. The City's administration of the Project Agreement in this respect has been punitive and counterproductive. The City's decisions have focused on maximizing deductions to the Monthly Service Payment in an effort to recover its own economic losses.

141. At the Project Agreement level, the Monthly Service Payment is calculated through a complex formula, which includes a fixed monthly amount (i.e. the Annual Service Payment, divided by twelve), plus other variable fees, less Deductions due to failure to achieve Vehicle availability kilometres, and Quality and Service Failures. The Deductions applicable for Quality and Service Failures vary for severity, criticality and time.

142. The Deduction scheme in the PA is calibrated relative to RTG's Monthly Service Payment, and is meant to incentivize performance of the maintenance obligations which in turn results in reliability of the System.[128] Infrastructure Ontario ("IO") uses this deduction scheme on other projects and its operation is intended to be well understood and predictable to contractors in the industry.

143. Calibrating the Deductions is necessary to ensure that they incentivize behaviour, but are not overly punitive. An IO presentation to the City described the payment mechanism as "not a tool that entirely recovers any economic loss suffered by the sponsors for a particular event"[129] and is not a "way to overly penalize Project Co behavior."[130] Yet that is how the City has used it on this Project.

144. The Subcontract between RTG and RTM, and similarly the Subcontract between RTM and Alstom each have a Payment Mechanism based on the PA Payment Mechanism. As

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[128] Public Hearing, Transcript, Vol. 3, J. Traianopoulos, 31:17 – 31:4. (TRN00000185)

[129] Infrastructure Ontario, *City of Ottawa Lessons Learned Workshop: Revenue Service and the Maintenance Team*, July 29, 2015, at slide 51. (IFO0064265)

[130] Infrastructure Ontario, City of Ottawa Lessons Learned Workshop: Revenue Service and the Maintenance Team, July 29, 2015, at slide 51. (IFO0064265)

Alstom is responsible for a substantial portion of the maintenance services, RTM passes through Deductions assessed by the City to Alstom that relate to Alstom's scope.

145. While Alstom is responsible for about 70% of all maintenance activities, RTG's Monthly Service Payment is much greater than Alstom's Monthly Service Payment because RTG's includes a significant component of capital repayment under the P3 arrangement with the City. As a result, deductions passed down to Alstom have an outsized impact, that is out of proportion to the carefully calibrated Deduction scheme prepared by IO.

146. The City's punitive approach to Deductions was evident as early as Trial Running. During Trial Running and into the early days of passenger service, the City had a field team in various stations, directed to "shake the tree" and "press buttons" to find issues with the System. For each issue, the City opened a work order attracting KPM deductions, many of which issues were known to the City and on the Minor Deficiencies List.

147. This not only overwhelmed the operations and maintenance staff, but also resulted in Deductions levied by the City in excess of $19 million after the first month of service. RTG and RTM passed down these Deductions to Alstom under the Maintenance Subcontract. These deductions are the subject of dispute between RTG and the City, and have still not been resolved, almost three years later.

148. The City applied the same punitive approach in at least two other instances. First, instead of entering work orders, as issues were identified, the City held onto them and entered them as batches of unrelated work orders all at once, at the end of the night, without any regard for the practical impact to the maintenance teams required to address these issues.[131] Since a batch of different work orders cannot all be dealt with at the same time, they would be corrected over the course of the next day (or longer), which meant that many could not be responded to and rectified within the mandatory

[131] Public Hearing, Transcript, Vol. 9, R. Holder, 72:15 – 74:11. (TRN00000198)

minimum time periods, artificially driving up the Deductions that accrued to the maintainers.

149. Second, the City retrospectively applied KPM deductions to work orders that were not allocated a KPM when they were first opened. Not all work orders are subject to KPM deductions. RTM assigns a KPM Deduction in the first instance, only if it believes, in good faith, that one applies to the particular work order to be completed; however, the City often overrides RTM's decision and applies a KPM after the fact. Often, the City does this after a work order is closed, and assesses Deductions against RTG for the entire duration the work order was opened. [132]

150. This approach, of course, is contrary to the purpose of the Payment Mechanism, because it is impossible to incentivize timely completion of work after the work has been completed. It is also patently unfair to penalize a party for failing to a complete work within a time limit, when no such time limit was communicated in the first place. The only purpose of the City's approach was for its own financial benefit.

151. The City's punitive approach has had an obvious financial impact on RTG, RTM, and Alstom, but more importantly, it has had a detrimental impact on the parties' relationship. This lack of partnership, and in particular, the resulting adversarial relationship between the parties, has had demonstrable, negative impact on System reliability.

12.0 Alstom diligently resolved Vehicle reliability issues

152. This Commission was created in part to investigate the circumstances giving rise to the reliability issues faced by the System since the start of Revenue Service. In performing that mandate, the Commission has elicited evidence of the diligent work performed by Alstom to resolve the most challenging unanticipated Vehicle issues.

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[132] Public Hearing, Transcript, Vol. 18, M. Guerra, 137:13 – 138:9. (TRN00000208)

153. As Alstom has argued throughout this hearing and in these closing submissions, the most important cause of the System's reliability issues during the first few years of Revenue Service was the prematurity with which it was started. Reliability growth is a feature of any new system, but here, that reliability growth started from much lower than reasonably anticipated. Reliability was most impacted by piecemeal and out of sequence system integration, a significant reduction in planned simulated service prior to Trial Running, and the City's lowering the standards of Trial Running and, ultimately, for starting service.

154. The System's early growing pains and teething issues were significantly exacerbated by the negative feedback loop created by the System's premature start, the number of retrofits to be executed, and the constrained space in the MSF.

155. Notably, the primary vehicle issues that have been the subject of evidence in this inquiry were not matters that would have been addressed or mitigated by extended Trial Running, for example. Except for APS failures, which was a known issue with a containment plan in place at the start of Revenue Service, all other major service interrupting vehicle issues like door faults, line inductors, wheel flats, wheel cracks, and derailments, could not have been anticipated or guarded against prior to Revenue Service. In each case, Alstom responded thoroughly and expeditiously to implement the necessary containment plans to allow the safe return to service, while undertaking detailed root cause evaluations in order to develop safe, sustainable, and long-term solutions.

12.1 Auxiliary Power Systems (APS)

156. The Auxiliary Power System (APS) is part of the traction control system on the Vehicles. The system is a redundant system, meaning that each train carries two APS units but can continue to operate with only one unit.[133]

157. There were known reliability issues with the APS system that were discovered prior to Substantial Completion,[134] and the APS system was placed on the Minor Deficiencies List.[135]

158. Alstom had sufficient spares to return the trains to service and keep them running to minimize the impact to service availability at the start of Revenue Service. Following the start of Revenue Service, Alstom introduced a software update to protect the APS, which significantly reduced the number of failures in service.[136] As a long-term solution, Alstom has worked with a new supplier, ABB, to develop and procure all new APS for the fleet, which APS are now in the process of being produced, delivered, and installed.[137]

12.2 Door Faults

159. Door issues are problematic on all rail transit systems, and are recognized in the industry as being one of the most common and frequent issues that plague rail operations.[138] The Confederation Line is no different.

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133 Public Hearing, Transcript, Vol. 7, L. Goudge, 24:17-19 & 24:21-22, (TRN00000191) and STV Inc., *WhatsApp Chat Log 24 April 2019 to 24 December 2020*, at p 147 chats 3413-3415. (Exhibit 185 – STV0002030)

134 Public Hearing, Transcript, Vol. 7, L. Goudge, 24:6-7. (TRN00000191)

135 Commission of Inquiry, Formal Interviews, J. Manconi, May 5, 2022, 80:1-2, (TRN00000076) and Public Hearing, Transcript, Vol. 7, L. Goudge, 24:14. (TRN00000191)

136 Alstom, *Letter from Remy Adnot to Dr. Sharon Oakley Re: Stage 1 & 2 – Request for updated APS/ CVS Action Plan and Reports*, July 20, 2021. (ALS0059508)

137 Commission of Inquiry, Formal Interviews, J. Manconi, May 5, 2022, 100:1-3, (TRN00000076) and Public Hearing, Transcript, Vol. 7, L. Goudge, 25:12-13. (TRN00000191)

138 Public Hearing, Transcript, Vol. 10, Y. Liu, 164:22-24. (TRN00000199)

160. Door issues are prevalent because of the high level of interaction that users have with the doors. Train doors are required to be in proper adjustment to function properly.[139] Users, if not properly educated, may interact with the doors in ways that cause unalignment or other mechanical failings. For example, users can inhibit doors from closing either intentionally, by holding or forcing a door open,[140] or unintentionally, by blocking a door with their body or with an object.[141]

161. Even prior to Revenue Service, Alstom found that lifting and unlifting the cars during the assembly process would make the doors "become out of adjustment", which would require corrective adjustment.[142]

162. Aside from these common adjustment issues, there were retrofits done to address other issues.[143] For example, the originally chosen door-software design approved by the City, did not allow an attempted reclosing of a door if a passenger had blocked the door from closing the first time, thus requiring a technician to reset the door before service could resume.[144] Even though the design decision was known and the system often responded correctly, OC Transpo soon realized that it wanted the design changed.

163. While a software update to permit multiple re-closings was completed before Revenue Service, it could not be safety certified in time for use at the start of Revenue Service. Doors are classified as Safety Integrity Level (SIL) 2,[145] which requires substantial testing to ensure safe operation. The necessary safety testing was constrained by the limited

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139 Public Hearing, Transcript, Vol. 10, Y. Liu, 163:1-3 & 163:24-26. (TRN00000199)

140 Public Hearing, Transcript, Vol. 18, M. Guerra, 135:13-17. (TRN00000208)

141 Public Hearing, Transcript, Vol. 6, M. Burns, 99:7-10. (TRN00000190)

142 Public Hearing, Transcript, Vol. 10, Y. Liu, 163:22 – 164:8. (TRN00000199)

143 Public Hearing, Transcript, Vol. 10, Y. Liu, 164:11-13. (TRN00000199)

144 Public Hearing, Transcript, Vol. 8, B. Bouteloup, 37:9-23. (Translated – TRN00000211)

145 Alstom, *Letter from Alexandre L'Homme to Dr. Sharon Oakley Re: Door Systems – DCU 1.3 SIL*-2, October 21, 2019. (ALS0005673)

engineering hours available to test, which pushed the completion of safety certification to late October.[146]

164. Prior to the updated software's certification, the door system was rolled back to a prior certified version, which resulted in "more door faults than you would want" for the first two months or so.[147] This rollback of the system, until the newer version was certified, was agreed to by the City prior to Revenue Service.[148]

165. Until the new software was rolled out, Alstom wanted its technicians to attend and diagnose the reasons for the door faults, so that Alstom could investigate the root cause before any intervening remediation measures were made. As the System and the operators matured, Alstom, RTM, and OCTranspo developed checklists so that operators could attend to door faults in certain circumstances and reset the door to minimize any impact to service, without waiting for intervention from an Alstom tech.

166. Today, door faults are mainly caused by the wear and tear of normal use. When these door faults happen, a technician simply needs to go and "tune the door so that it fits better mechanically", resulting in the door working fine.[149]

12.3 Line Inductors

167. The line inductors are electrical components on the roof of the Vehicles, which started to exhibit issues during the first winter of Revenue Service, in 2019-2020. The line inductor failures were resolved before the start of the next winter.[150]

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146 Alstom, Letter from Alexandre L'Homme to Dr. Sharon Oakley Re: Door Systems – DCU 1.3 SIL-2, October 21, 2019, (ALS0005673) and Public Hearing, Transcript, Vol. 7, L. Goudge, 23:6-10. (TRN00000191)

147 Public Hearing, Transcript, Vol. 7, L. Goudge, 25:10-12. (TRN00000191)

148 Altus Group, *Independent Certifier's Report on Revenue Service Availability*, August 31, 2019, at p 9. (Exhibit 141 – AGG0000129)

149 Public Hearing, Transcript, Vol. 10, Y. Liu, 164:26-28. (TRN00000199)

150 Public Hearing, Transcript, Vol. 7, L. Goudge, 8:8, (TRN00000191) and Public Hearing, Transcript, Vol. 10, Y. Liu, 162:10-12. (TRN00000199)

168. The line inductor issue was idiosyncratic to Ottawa and would not likely have been discovered earlier than Revenue Service, because of the nature of the failure. The root cause was discovered to be saltwater runoff, from de-iced automotive overpasses, combining with carbon dust from the pantograph seeping into equipment through the inductor's vent.[151] Together, the salt and carbon created a conductive mist that caused short circuits.[152]

169. Initially, Alstom's maintenance plan included inspection and cleaning of the roof every 25,000 km. The Vehicles had not yet reached this maintenance interval at the time the issue was discovered, and the failures had nothing to do with any lack of preventative maintenance.[153]

170. When the issue with the line inductor surfaced, Alstom performed a root cause analysis to ascertain the source of the problem, which allowed it to implement a small design change, modifying the inductor casing,[154] to eliminate the problem all together. Since the implementation of the fix, there have been no new failures.[155] Alstom has also introduced additional seasonal inspections and cleanings to the rooftops of the Vehicles.[156]

12.4 Wheel Flats

171. Wheel flats are common on any rail system, and are typically addressed through periodic preventative maintenance, however, in the winter of 2019 and 2020, the

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151 Public Hearing, Transcript, Vol. 7, L. Goudge, 8:15-19, (TRN00000191) and Public Hearing, Transcript, Vol. 10, Y. Liu, 162:8-19. (TRN00000199)

152 Public Hearing, Transcript, Vol. 10, Y. Liu, 162:20. (TRN00000199)

153 Public Hearing, Transcript, Vol. 10, Y. Liu, 162:25-26. (TRN00000199)

154 Public Hearing, Transcript, Vol. 7, L. Goudge, 8:20-21. (TRN00000191)

155 Public Hearing, Transcript, Vol. 7, L. Goudge, 8:8-10, (TRN00000191) and Public Hearing, Transcript, Vol. 10, Y. Liu, 163:7-11. (TRN00000199)

156 Public Hearing, Transcript, Vol. 10, Y. Liu, 162:27 – 163:2. (TRN00000199)

Project suffered a much higher number of wheel flats than expected, requiring Vehicles to be reduced from service for corrective wheel truing.

172. The term "wheel flat" refers to a worn section of the train wheel that has flattened relative to the proper rounded profile. Much like when a motor vehicle has a "flat-spot" on a tire, a wheel flat can cause occupant discomfort and produces a thumping noise while the train is traveling.[157] When a wheel flat becomes significant enough according to established criteria, the affected train is removed from service to have its wheel re-profiled.[158]

173. The abnormally high number of wheel flats on the Project in the first winter of 2019/2020 prompted the creation of a Wheel Flats Task force, comprised of members from Alstom, RTM, Thales, and JBA, a third party.[159]

174. The Task Force found that a major contributor to the wheel flats was the high frequency of emergency brake events during Service.[160] Emergency brakes lock the wheel, without the benefit of the anti-slip of typical braking, which results in wheel slides along the rail, which in turn creates flat spots on the wheels.[161]

175. The frequent emergency brakes were caused by four main issues: faulty detections of the Guideway Intrusion Detection System ("GIDS"); software bugs in the Automatic Train Control (ATC); operator error; and improper systemic brake rate selections.[162]

176. The GIDS is meant to prevent collisions with intruders on the guideway. When the GIDS is triggered all trains entering its zone will automatically emergency brake.[163] The Task

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157 Public Hearing, Transcript, Vol. 10, Y. Liu, 167:3-9. (TRN00000199)

158 Public Hearing, Transcript, Vol. 10, Y. Liu, 169:9-12. (TRN00000199)

159 Public Hearing, Transcript, Vol. 7, L. Goudge, 85:7-25. (TRN00000191)

160 Public Hearing, Transcript, Vol. 7, L. Goudge, 86:25-27. (TRN00000191)

161 Public Hearing, Transcript, Vol. 7, L. Goudge, 87:1-3. (TRN00000191)

162 Public Hearing, Transcript, Vol. 7, L. Goudge, 87:5 – 88:4, (TRN00000191) and see Public Hearing, Transcript, Vol. 16, T. Charter, 136:10-14, (TRN00000205) for operator error.

163 Public Hearing, Transcript, Vol. 7, L. Goudge, 87:7-9. (TRN00000191)

Force found that there were excessive false activations of the GIDS; for instance, the software was interpreting snowflakes or other flying detritus as intruders entering the guideway.[164] Those issues have been resolved.[165]

177. The ATC system had a software problem such that as trains went through different alignments, unexpected speed restrictions would be introduced, causing the train to emergency brake.[166] The software was corrected by Thales for the unintentional over-speeds caused by the unexpected speed restrictions, eliminating this issue.[167]

178. The wheel flats Task Force also identified OC Transpo operator error as a source of wheel flats. Operators, still unfamiliar with operating the system, would switch between manual and automatic modes improperly, precipitating an emergency brake.[168] To make this switch, operators must temporarily coast the train while braking to enter the station. By the time the switch occurred, the train had gone too far or too fast for the automatic mode, which would cause an emergency brake.[169] The understanding and operation of the train modes improved as the operators interacted more frequently with maintenance staff, and significantly reduced the number of these instances.[170]

179. Finally, overly aggressive acceleration and brake profiles in freezing temperatures or during inclement weather resulted in excessive emergency braking.[171] Despite changing weather conditions, the City was not utilizing the Vehicles' available alternative brake profiles to match the conditions; "[the City was] always driving in all-out performance."[172]

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164 Public Hearing, Transcript, Vol. 7, L. Goudge, 88:8-12. (TRN00000191)

165 Public Hearing, Transcript, Vol. 7, L. Goudge, 88:12-13. (TRN00000191)

166 Public Hearing, Transcript, Vol. 7, L. Goudge, 87:10-14. (TRN00000191)

167 Public Hearing, Transcript, Vol. 7, L. Goudge, 88:13-14. (TRN00000191)

168 Public Hearing, Transcript, Vol. 7, L. Goudge, 10:11-14. (TRN00000191)

169 Public Hearing, Transcript, Vol. 7, L. Goudge, 10:16-23. (TRN00000191)

170 Public Hearing, Transcript, Vol. 16, T. Charter, 136:15-21. (TRN00000205)

171 Public Hearing, Transcript, Vol. 7, L. Goudge, 87:21-23. (TRN00000191)

172 Public Hearing, Transcript, Vol. 7, L. Goudge, 87:24-27. (TRN00000191)

180. The Task Force recommended that the City use the tools available to it and adjust brake rates during cold or inclement weather conditions,[173] but the City was hesitant to accept the recommendation.[174] It was not until mid-winter of 2021 and 2022 that the recommendation was implemented by the City.[175] Additional flats could have been avoided had the City made the change earlier.[176] Once implemented, the issue was resolved.

181. RTM's failure to provide and maintain wheel lathes to address the flats greatly exacerbated availability issues created by the wheel flats.[177] Under Alstom's maintenance subcontract, RTM is required to provide two wheel lathes and is responsible for their maintenance,[178] yet RTM failed to provide the second wheel lathe and the one lathe that was provided was broken for extended periods of time.[179] The result was a queue of Vehicles that were out of service as they waited for access to the wheel lathe.[180]

182. RTM has since hired a fulltime millwright to, among other things, service the wheel lathe, resulting in an improvement in reliability so that there are no longer Vehicles out of service, waiting for the lathe.

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173 Public Hearing, Transcript, Vol. 7, L. Goudge, 88:14. (TRN00000191)

174 Public Hearing, Transcript, Vol. 16, T. Charter, 134:14-18. (TRN00000205)

175 Public Hearing, Transcript, Vol. 7, L. Goudge, 88:15-17. (TRN00000191)

176 Public Hearing, Transcript, Vol. 16, T. Charter, 135:17-21. (TRN00000205)

177 Public Hearing, Transcript, Vol. 10, M. Slade, 125:22-25. (TRN00000199)

178 Public Hearing, Transcript, Vol. 10, M. Slade, 123:25-28 & 124:19-21. (TRN00000199)

179 Public Hearing, Transcript, Vol. 10, M. Slade, 126:5-15. (TRN00000199)

180 Public Hearing, Transcript, Vol. 10, M. Slade, 126:16-19, (TRN00000199) and Public Hearing, Transcript, Vol. 10, Y. Liu, 168:21-26. (TRN00000199)

12.5 Wheel Cracks

183. Between July and August of 2020, cracked wheels were discovered while Alstom was performing a proactive bogie retrofit program.[181] Upon this discovery, Alstom grounded the entire fleet and began an analysis into containment actions and the root cause.[182]

184. Through a collaborative effort between Alstom, RTM, OC Transpo, and the Transportation Safety Board (TSB),[183] the root cause was found to be that certain jacking screws were protruding into the wheel hub and contacting the wheel face.[184] This was a factory defect that originated at the wheel supplier's (Lucchini) factory.[185]

185. Alstom's team at its Centre of Excellence in Le Creusot issued a safety risk assessment prescribing a containment measure of daily inspections of the wheels, which would permit the Vehicles to be run safely.[186] The containment measure continued while Alstom began replacing at-risk wheels.[187] Alstom hired many additional staff, at its cost, to implement the daily inspections.[188]

186. Despite Alstom's best efforts, replacement of at-risk wheels was severely impacted by the COVID-19 pandemic. Alstom's wheel supplier, situated in Italy, had to shut down completely. Although all wheels were not fully replaced until February, 2022,[189] Alstom continued to execute its labour intensive containment measures until the process was

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181 Public Hearing, Transcript, Vol. 17, R. France, 65:13-18, (TRN00000207) and Public Hearing, Transcript, Vol. 10, Y. Liu, 165:12-13. (TRN00000199)

182 Public Hearing, Transcript, Vol. 10, Y. Liu, 165:16-25. (TRN00000199)

183 See e.g., Alstom, *Email from B. Bouteloup to M. Slade et. al. Re: Saftey [sic] Note for wheel cracks*, September 7, 2020. (ALS0056530)

184 Public Hearing, Transcript, Vol. 7, L. Goudge, 81:15-28. (TRN00000191)

185 Public Hearing, Transcript, Vol. 7, L. Goudge, 82:1-5. (TRN00000191)

186 Public Hearing, Transcript, Vol. 10, Y. Liu, 165:20 – 166:2. (TRN00000199)

187 Public Hearing, Transcript, Vol. 10, Y. Liu, 166:3-20. (TRN00000199)

188 Public Hearing, Transcript, Vol. 10, Y. Liu, 166:3-5. (TRN00000199)

189 Public Hearing, Transcript, Vol. 17, R. France, 66:1-8, (TRN00000207) and Public Hearing, Transcript, Vol. 10, Y. Liu, 190:27 – 191:3. (TRN00000199)

completed. The containment measures, along with the reduced pandemic service after March 2021,[190] minimized the impact to the fleet.[191]

12.6 Derailment #1, August 2021

187. The derailment of August 2021 was unexpected, and was caused when an axle hub, and its bearings, failed, which lead to the wheel assembly separating from the axle.[192] Alstom's preliminary root cause analysis shows that there were excessive transversal loads or forces that were on the axle assembly.[193] These forces create microscopic movements within the assembly, known as fretting.[194]

188. Alstom's preliminary root cause analysis indicates that the cause of the fretting is a combination of forces arising from the track, the wheel rail interface, and the System's operating profile.[195] Due to the complicated nature of the wheel and rail system, "The only conclusion that [Alstom] could really draw absolute was that [the trains] were taking excessive loads in the curves."[196] Rather than the wheel taking the brunt of these loads, these forces are being transmitted deeper into the Vehicle and presenting at the wheel bearing, causing excessive heat.[197] Thus, further studies of the specific causes of the different forces are continuing.

189. The unanticipated loads experienced in Ottawa that have led to the axle hub failure are outside the specified operating parameters for the Project.[198]

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190 Public Hearing, Transcript, Vol. 18, M. Guerra, 86:26 – 87:22. (TRN00000208)

191 Public Hearing, Transcript, Vol. 16, T. Charter, 133:24-27. (TRN00000205)

192 Public Hearing, Transcript, Vol. 7, L. Goudge, 27:13-18. (TRN00000191)

193 Public Hearing, Transcript, Vol. 7, L. Goudge, 29:11-17. (TRN00000191)

194 Public Hearing, Transcript, Vol. 7, L. Goudge, 30:2-8. (TRN00000191)

195 Public Hearing, Transcript, Vol. 7, L. Goudge, 29:25-26. (TRN00000191)

196 Public Hearing, Transcript, Vol. 7, L. Goudge, 34:5-6. (TRN00000191)

197 Public Hearing, Transcript, Vol. 14, D. Wynne, 50:2-22 & 55:5-11. (TRN00000203)

198 Public Hearing, Transcript, Vol. 7, L. Goudge, 48:16-28. (TRN00000191)

190. A prior study had identified that the connection spline, which transfers torque from one wheel to another, was wearing at a rate faster than its expected life;[199] however, that "was not a cause of the bearing issue; it's independent of the bearing issue."[200] Alstom and Texelis, Alstom's axle supplier, do not believe based on their assessment of the splines, that these are part of the cause of the August 2021 derailment.[201]

191. Alstom has taken this incident very seriously and has prepared and is executing an intensive containment plan. The containment plan consists of several layers of mitigation. To ensure that the Vehicles are safe for use prior to the implementation of a long-term solution, Alstom has committed to a resource intensive inspection program, which inspects each Vehicle every 7,500 km to look for any signs of fretting or play in the axle assembly.[202] Any Vehicle that fails inspection is grounded until the issue is resolved.

192. In the short-term, Alstom is addressing any issues with track corrugation through an intensive grinding campaign and test track greasing solutions that should lower the stresses from the wheel rail interface. Additionally, Alstom is undertaking studies to create less stress-inducing speed profiles in specific areas identified by Alstom's experts at Le Creusot.[203] Most recently, on July 29, 2022, Alstom issued a safety memo mandating a 20% speed reduction in specific curves below a minimum radius to reduce excess stress arising from these particular areas.

193. Long-term mitigation efforts conducted by Alstom and RTM will include a full track grinding campaign for complete track reprofiling lead by RTM.[204] Alstom is continuing its studies and analysis to identify a satisfactory long term solution and will not cease

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199 Public Hearing, Transcript, Vol. 7, L. Goudge, 45:6-10. (TRN00000191)

200 Public Hearing, Transcript, Vol. 7, L. Goudge, 45:14-15. (TRN00000191)

201 Public Hearing, Transcript, Vol. 7, L. Goudge, 45:17-20. (TRN00000191)

202 Public Hearing, Transcript, Vol. 7, L. Goudge, 39:13-21. (TRN00000191)

203 Public Hearing, Transcript, Vol. 7, L. Goudge, 36:25 – 37:1 & 37:15-24 & 38:1-16. (TRN00000191)

204 Alstom, *LRV 1119 Derailment Investigation Report*, May 10, 2022, (Exhibit 91 – COM0010118) and Public Hearing, Transcript, Vol. 7, L. Goudge, 40:2-17. (TRN00000191)

any of its short term containment plans, including the 7,500 km inspection, until a long term solution is implemented.

194. Alstom has listened to and considered the suggestion of the TSB to install heat detectors on the wayside of the track or onto the Vehicles but does not believe this would be an effective mitigation. Although it is common for hard rail tracks, like long distance freight lines, to have heat detectors, it is the opinion of Alstom's safety expert that both trackside and vehicle heat detectors would be insufficient mitigation against a derailment caused by fretting. Any heat that would be detected by these systems would mean that the part is already at the point of failure and a derailment imminent.[205] Alstom is confident that "[t]here's not a risk of [the derailment] reoccurring with the mitigation we have in place."[206]

12.7 Derailment #2, September 2021

195. The derailment of September 2021 occurred at a time of immense pressure as Alstom was working to bring the service level up to 11 trains, the COVID-19 baseline fleet, while simultaneously executing the labour-intensive inspections that were part of Alstom's August 2021 derailment mitigation plan.[207]

196. During the routine inspection of Train 38, some play was identified in its axle, which resulted in its temporary grounding. During this time, certain tasks were performed on the Vehicle, which required bolts to be un-torqued and later re-torqued. This process was not fully completed, and bolts were left un-torqued. The train then re-entered revenue service.

197. To ensure that this type of quality issue never occurs again, Alstom, with oversight from RTM, has implemented mitigation in the form of enhanced Quality Assurance. Additional procedures, checks, and supervision have been implemented. For safety

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[205] Public Hearing, Transcript, Vol. 7, L. Goudge, 28:10-27 & 29:5-10. (TRN00000191)

[206] Public Hearing, Transcript, Vol. 7, L. Goudge, 45:21-27. (TRN00000191)

[207] Public Hearing, Transcript, Vol. 7, L. Goudge, 50:1-8. (TRN00000191)

critical tasks, steps have been taken to ensure continuity of procedure from start to finish; this includes prohibiting safety critical tasks from occurring during shift changes.

198. The damage caused by Derailment #2 was significantly exacerbated by operator error. In particular, the Vehicle operator failed to notice that the train had derailed and was causing significant damage to itself and the surrounding infrastructure for more than 1,400 feet. Yet, the cost of the extensive repairs to the infrastructure was borne by Alstom.

199. Vehicle operators are trained to be alert to and aware of their surroundings and are trained to recognize when there has been a deviation from the normal operations of the System. When departing a station, operators observe activities on the platform and beside the train by CCTV footage to ensure safe conditions during departure. Although other individuals, such as passengers or other project participants, may experience a derailment along with the operator, it is the operator who is trained to recognize when something is amiss.

200. The CCTV footage of derailment #2 not only showed the train dragging against the platform, but also extensive ballast and dust being thrown up onto it. Witness statements indicated the incident caused very loud noises, which were audible on the radio to operators in the Train Operations Control Centre (TOCC). Overall, RTM's Mr. Guerra was confident that the driver should have noticed the derailment and stopped the train sooner.

201. Even OC Transpo's own investigation of the incident found that the operator's preoccupation with a human waste smell may have distracted him from being aware of his surroundings. The operator failed to notice or did not appreciate (i) the ballast and dust getting kicked up by the Vehicle as displayed by the platform CCTV, (ii) the

abnormal noise coming from the infrastructure damage, which was heard on the other end of his cab radio, and (iii) the Vehicle's unexplained changes in speed.[208]

202. After the August 2021 derailment, OC Transpo provided operators with reorientation training with respect to situational awareness.

13.0 Positive changes to the parties' relationships have led to much improved system reliability

203. This inquiry has shown that the relationship of the various stakeholders from construction through Revenue Service, has at times been strained, fraught with difficulties, and adversarial. The evidence from multiple parties has been of a distinct lack of "partnership" between the parties, which has been identified as a source of numerous issues during the Project. With 27 years left in the maintenance and operations term, resolving these relationship issues is perhaps the Project's most pressing need to ensure a reliable transit system for the people of Ottawa.

204. Recently, many positive changes in the parties' approach to cooperation have resulted in a much-improved working relationship. Not coincidentally, the System has also achieved sustained levels of reliability, above 99% since March 2022. This is a direct result of the dedicated, hard work by all stakeholders, and the improved collaboration between all parties, committed to delivering the best service possible to Ottawa.

205. Alstom is grateful to the Commission for the opportunity to assist it in its mandate to better understand the commercial and technical circumstances that gave rise to issues faced by the System and is confident that the lessons learned arising from this Inquiry will benefit the people of Ontario and Canada.

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[208] OC Transpo, *Incident: 216785 (Current Revision # 3, 9/19/2021 12:36:18)*, September 19, 2021, at p 9 in Event Description. (TRN00000075)

206. Alstom also looks forward to serving the people of Ottawa over the next three decades, and continuing to provide safe, dependable, and reliable service, as the City grows, and the System grows with it.

All of which is respectfully submitted by Alstom Transport Canada Inc. this 12th day of August 2022.

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