



**Massachusetts Bay  
Transportation Authority**

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## **Green Line Type 7 - Engineering Services**

**September 26, 2016**



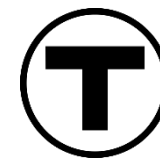
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## **CH2M Contract Background**

### **Red Line No. 2 and Green Line Type 7 Overhaul Base Award**

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- MBTA recognized a need for interim overhaul plans to extend reliable service until fleet replacement on the Red and Green Lines
- Base Contract NTP March 3, 2008 for Phase 1 – Condition assessment, program planning, and specification development for overhaul of Red Line No. 2 Heavy Rail Cars and Green Line Type 7 Light Rail Vehicles (both fleets delivered in the mid 1980's)
- Phase II - Future work scope to be authorized and funded based on specific program plans
  - Red Line – In-house overhaul
  - Green Line – Competitively bid by outside car builders



## CH2M Contract Award Summary

	Description	Green Line SSO Amount	Red Line SSRP Amount	NTP
<b>Base Contract</b>	Phase I – Assessment and Scope Recommendations for Red & Green Line fleets	\$750,000	\$899,036	Mar. 2008
<b>Amend 1</b>	Phase II - Red Line SSRP: Engineering, material procurement, procedural development and project management	\$0	\$3,632,658	Aug. 2009
<b>Amend 2</b>	Structural Assessment of Green Line cars	\$98,075	\$0	Nov. 2010
<b>Amend 3</b>	Extension – Red Line SSRP support	\$0	\$982,165	Nov. 2011
<b>Amend 4</b>	Phase II – Green Line SSO: Engineering, carbuilder contract management, and inspections	\$7,039,066	\$0	Jul. 2012
<b>Amend 5</b>	Completion – Red Line SSRP support	\$0	\$3,511,817	Dec. 2012
<b>Amend 6 Proposed</b>	<i>Completion – Green Line SSO support</i>	<i>\$4,088,533</i>	<i>0\$</i>	<i>TBD</i>
	<b>Subtotals</b>	<b>\$11,975,674</b>	<b>\$9,025,676</b>	
	<b>V40PS01 TOTAL</b>	<b>\$21,001,350</b>		



## Background

### Red Line No. 2 Scope and Status

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- In order to extend the service life of the No. 2 fleet, the Selective Systems Replacement program (SSRP) was developed and focused on the following systems which demonstrated poor reliability or required modernization:
  - HVAC
  - Trucks
  - DC to DC converter
  - Brake System
  - Propulsion
  - Air Compressor
  - Lighting
  - Couplers
  - Electrical Controls
  - Door System
  - Car Body/Paint
- Underway at Cabot Carhouse since August of 2009, 56 of 58 trains have been returned to revenue service
- The last 2 trains were long term out of service vehicles and are projected to be completed Fall 2016



## Background

### Green Line Type 7 Fleet Condition

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- Fleet Condition
  - Green Line Type 7 vehicles entered service in 1986 and 1987
  - Vehicles have never been overhauled which is typically done at 15 years, and show signs of significant wear
  - Many of the vehicle's major systems and subsystems are experiencing high failure rates and include components and parts that are obsolete





## Background

### Green Line Type 7 Program Focus

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- Program Focus
  - Restore the reliability of the fleet
  - Preserve the integrity of the vehicle structure, roof, and exterior, which has experienced water damage and corrosion
  - Targeted systems replacement or overhaul to ensure the vehicles can continue to provide safe and reliable operation
  - Improve passenger comfort
- GL Selective System Overhaul (SSO) scope for targeted systems and not intended as a complete overhaul





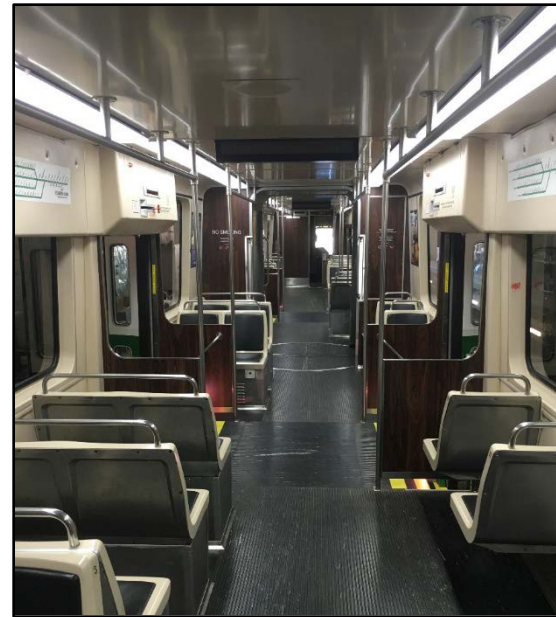


## Background

### Green Line Type 7 Scope

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- Alstom's scope of work includes:
  - New design of obsolete and outdated equipment
  - Upgraded interior passenger areas
  - Heavy repair of roof, side skin, structure, and wheel sets
  - Scheduled maintenance of major subassemblies





## Alstom Change Orders

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- Seven Change Orders have been executed with Alstom, three of which include significant additional work with related time extensions:
  - Added abatement for discovered asbestos, overhauling of traction motors and gearboxes, LED lighting, and a coupler anchor replacement
  - Added the replacement of the existing pantograph with a new and improved design
  - Added the **3700 Fleet Option Vehicles**, additional spares, and increased Hidden Damage
- Total current time extension for Alstom is 19 months



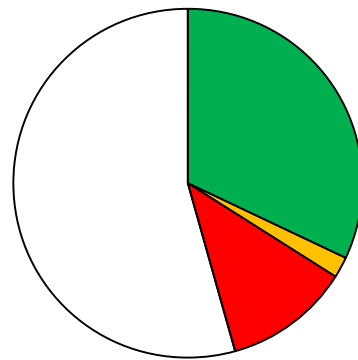


## Status

### Green Line Type 7

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- Total of 103 vehicles will be sent to Alstom (Hornell, NY)
  - 3600 fleet (86 vehicles)
  - 3700 fleet (17 vehicles)
- Current status:
  - 33 vehicles have returned to Revenue Service
  - 2 vehicles are in Commission Testing in Boston
  - 12 vehicles are in Production in Hornell
  - 56 vehicles are left to enter the program



**Of 103 Vehicles**

- Return to Service
- At Riverside
- In Hornell
- Cars to Enter



## Alstom Schedule and Program Challenges

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- Alstom is behind the original Contract schedule of one vehicle per week. Contributing factors include:
  - Complexity of integrating overhauled aging systems
  - Retained parts being reinstalled after stripping entire vehicle ("touching everything")
  - Higher than expected out of scope 'Hidden Damage'
- Previously revised schedule forecast for end of March 2016 was 25-30 vehicles delivered. 24 vehicles were delivered in that time frame.
- Contractual delivery schedule is not applied to repairs of "out-of-scope" items.
- Schedule recovery now being addressed with Alstom, with intent of Liquidated Damages applied per contract terms.
- Anticipated delivery of all 103 vehicles by July 2018.



## Proposed Amendment 6 to CH2M Contract

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- Recognizing Alstom's expanded work scope and time extensions, additional program support is required
- Proposed scope includes:
  - Engineering and testing
  - Program and contract management
  - Inspection services (Alstom Plant and Riverside)
- Proposed contract amendment for support through the end of 2018