

***Amend LRV Fleet Expansion Project
Baseline Budget, Project Completion
Milestone, and Name***

R2023-35

System Expansion Committee

11/09/23

Why we are here

Seek approval to **amend** the Light Rail Vehicle (LRV) Fleet Expansion Project's:

- 1) **Baseline budget,**
- 2) **Project completion milestone,** and
- 3) **Project name.**

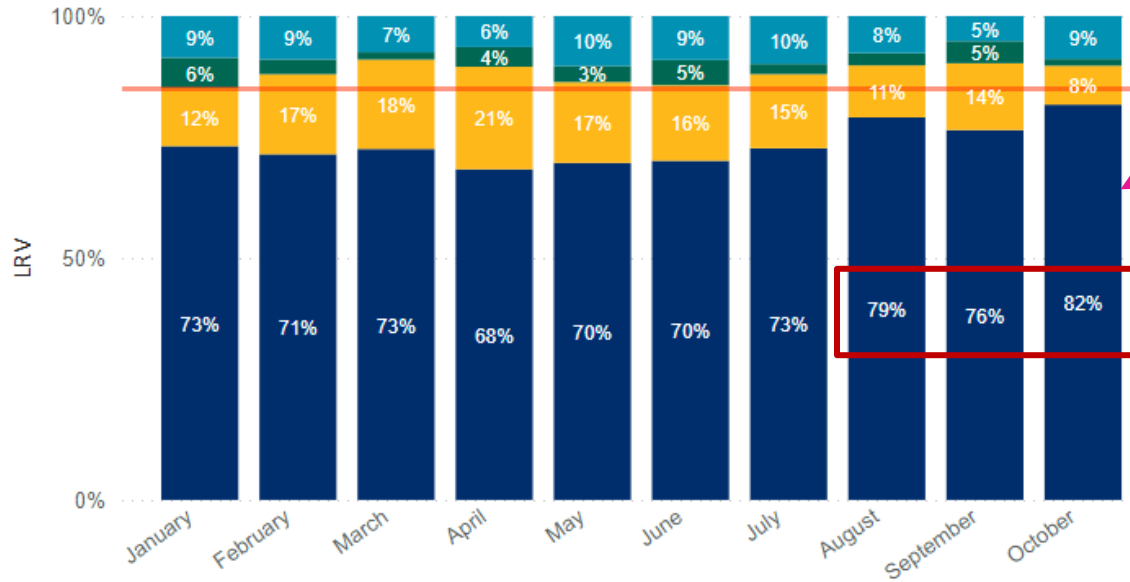
If this resolution is approved by the SEC and the Board of Directors:

- It will **send a signal** to Siemens that Sound Transit is ready to enter negotiations for the potential purchase of 10 additional Series 2 LRVs.
- In the big picture, we'll be **accelerating the purchase of 10 LRVs from the Series 3 plan** (already funded) by taking advantage of a small window of opportunity (~3 months) available under the Series 2 LRV project.
- The 10 cars will allow Link Light Rail system to carry more passengers for 4-5 years before Series 3 cars enter revenue service.

Background – Series 2 LRV Project

- Project baselined in 2016 with project completion date of March 2024 for 152 LRVs.
- Overall Project Budget = \$740.7M.
- Design and Manufacturing phase went as planned.
- Onsite Commissioning phase started in 2nd half of 2019.
- Qualification phase had **significant delays (~1.5 years) in 2020 and 2021.**
- Final acceptance milestone delayed by 2+ years to Q4 2026.
- 96 Series 2 LRVs entered revenue service as of Nov 1, 2023.

Background – Series 2 LRV Availability Trends



The dark blue bars indicate the % of Series 2 LRV fleet that were AVAILABLE to go into revenue service at the start of a day (monthly average).

For example, if there were 100 LRVs at the OMF, 82% availability would mean that on an average 82 LRVs were available for service that month. The remaining 18 trains were either in the shop for repairs or routine maintenance, or used as a test train

● Available ST2 LRV ● OOS ST2 LRV for WA ● OOS LRV for CM ● OOS LRV for PM ● SIT LRVs

Notes: OOS = Out of Service, WA = Warranty repair, CM = Corrective Maintenance, PM = Preventive Maintenance, SIT = System Integration Tests.

Background – Series 2 LRV Project

- Series 2 LRVs have lower than the 85% daily availability target.
 - However, daily availability improving steadily in 2023 and is expected to **reach the 85% target consistently by mid-2024 before LLE opens.**
- Reliability impacted by three major systems:
 - Brakes, communication system, and trucks.
 - Focusing on these three systems to identify and fix the root causes.
- Strategy envisioned for managing long-term availability and obsolescence issues **after achieving 85% availability** include:
 - Increase the spares of key parts such as trucks to 6% from the planned 4%.
 - Purchase more spares for technology such as communication systems.

Background – ST2 Service Planning

- Actual service levels with all 214 LRVs deployed (152 Siemens and 62 KI) will be lower than service levels modeled in 2016 due to: **1) Longer run times, and 2) the need for higher LRV spare ratio.**
- Series 3 LRVs are projected to start entering revenue service in 2032.
- Potential Mitigation: Accelerate the purchase of 10 LRVs from Series 3 (already planned and funded) to Series 2 contract with Siemens.
- Key constraint for the accelerated purchase of 10 additional LRVs is storage space.

2026

Peak service with available fleet

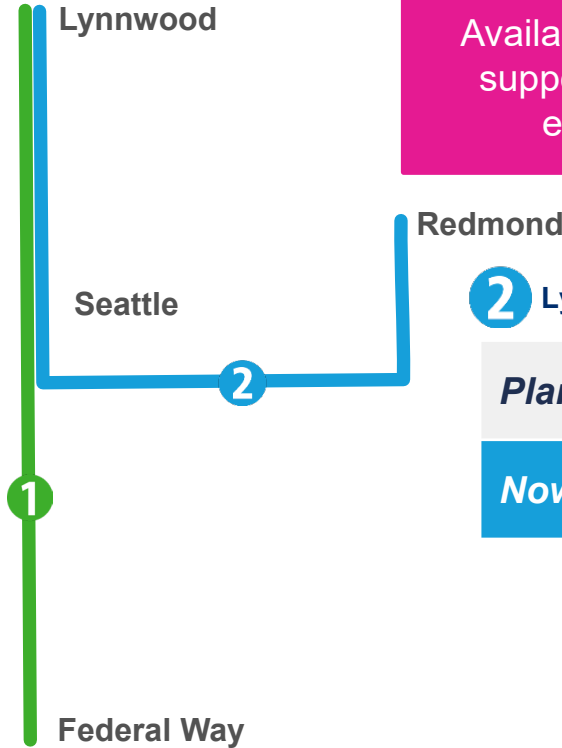
1 & 2

Combined service
Lynnwood to IDS

<i>Planned</i>	4 min	4 cars
<i>Now possible</i>	5 min	3-4 cars

1 Lynnwood to Federal Way

<i>Planned</i>	8 min	4 cars
<i>Now possible</i>	10 min	4 cars



Available fleet will not support 4 car trains everywhere

2 Lynnwood to Downtown Redmond

<i>Planned</i>	8 min	4 cars
<i>Now possible</i>	10 min	3 cars

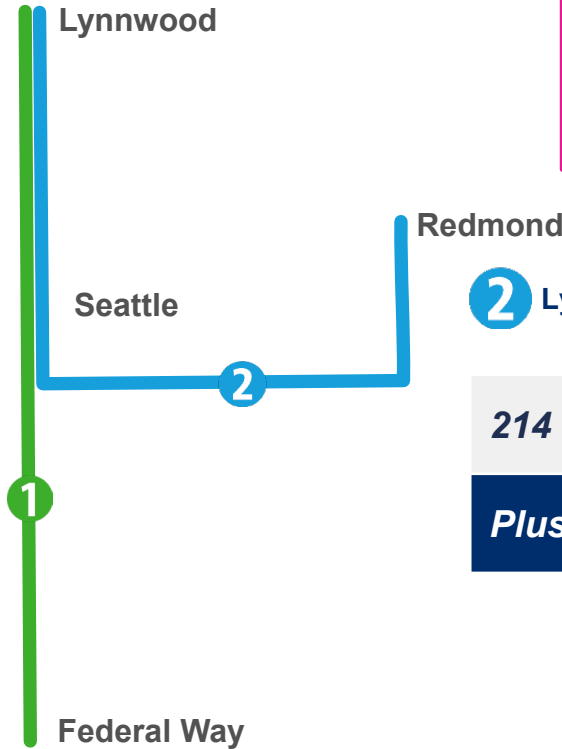
Strategy: accelerate purchase of 10 LRVs

1 & 2 Combined service
Lynnwood to IDS

214 LRV fleet	4-5 min	3-4 cars
Plus 10 LRV	4-5 min	3-4 cars

1 Lynnwood to Federal Way

214 LRV fleet	8-10 min	4 cars
Plus 10 LRV	8-10 min	4 cars



10 additional LRVs = more 4 car trains on 2 Line

2 Lynnwood to Downtown Redmond

214 LRV fleet	8-10 min	3 cars
Plus 10 LRV	8-10 min	3-4 cars

Total Planned LRV Fleet: Series 1 + Series 2 + Series 3

LRV Series	Status	Current Plan	Accelerated Approach
1 - Kinkisharyo	In service	62	62
2 - Siemens	In service / In delivery thru 2025	152	162
Subtotal (fleet available until Series 3 cars are available)		214	224
3 - TBD	To be procured 2030+	246	236
Total (planned fleet to support ST3 buildout)		460	460

This resolution:

1. **ACCELERATES** the purchase of 10 LRVs from Series 3 to Series 2 project and makes them available to carry passengers 4-5 years ahead of Series 3 LRVs.
2. **DOES NOT** increase the overall size of already funded long-term fleet.

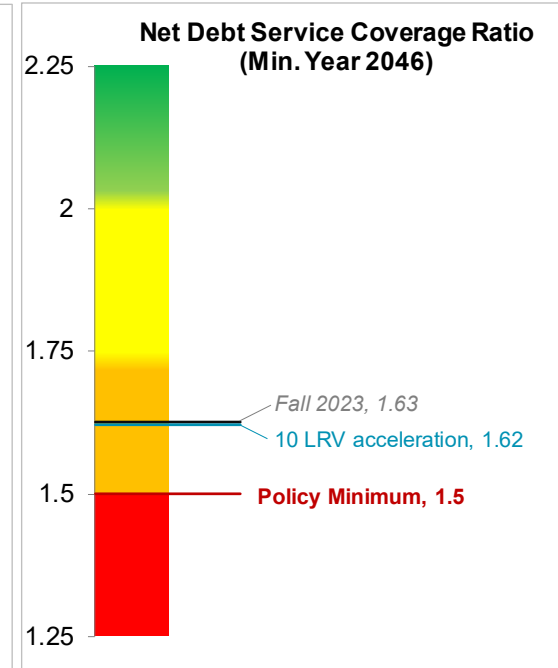
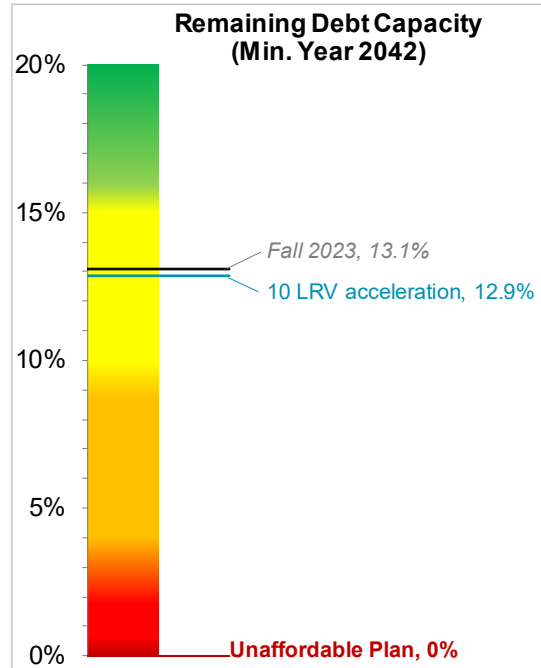
Cost of Accelerating 10 LRVs

- Because the Series 2 LRVs have a qualified design and established production sequence, it would provide cost advantages.
- This cost advantage would be offset somewhat by a small decrease in financial capacity and coverage due to earlier spending.

Impact on affordability metrics

Cost of 10 LRVs accelerated from Series 3 LRV Project:

- **0.2% decrease** in debt capacity (from 13.1%)
- **0.01 decrease** in net debt coverage ratio (from 1.63X)



Accelerated purchase of 10 LRVs: Summary

- **10 Series 2 LRVs will be cheaper than 10 Series 3 LRVs of same length**
- Supports more 4-car trains
 - Does not improve frequency.
 - However, each 2 Line train would be able to carry more passengers.
- Storage options for the 10 additional cars are being assessed
 - OMF Central and OMF East will be full.
 - However, there are temporary storage possibilities for the additional cars: Federal Way siding, OMFE stub tracks, OMFC runaround tracks are some examples.
- Small window of opportunity in Siemens production line for 2027 delivery
 - Approximately 3-month window to negotiate and implement a change order.
 - Long lead times for materials and sub-suppliers.

Today's Action #1

Increase the allocated project baseline budget of \$96,156,000 from \$740,718,000 to \$836,874,000.

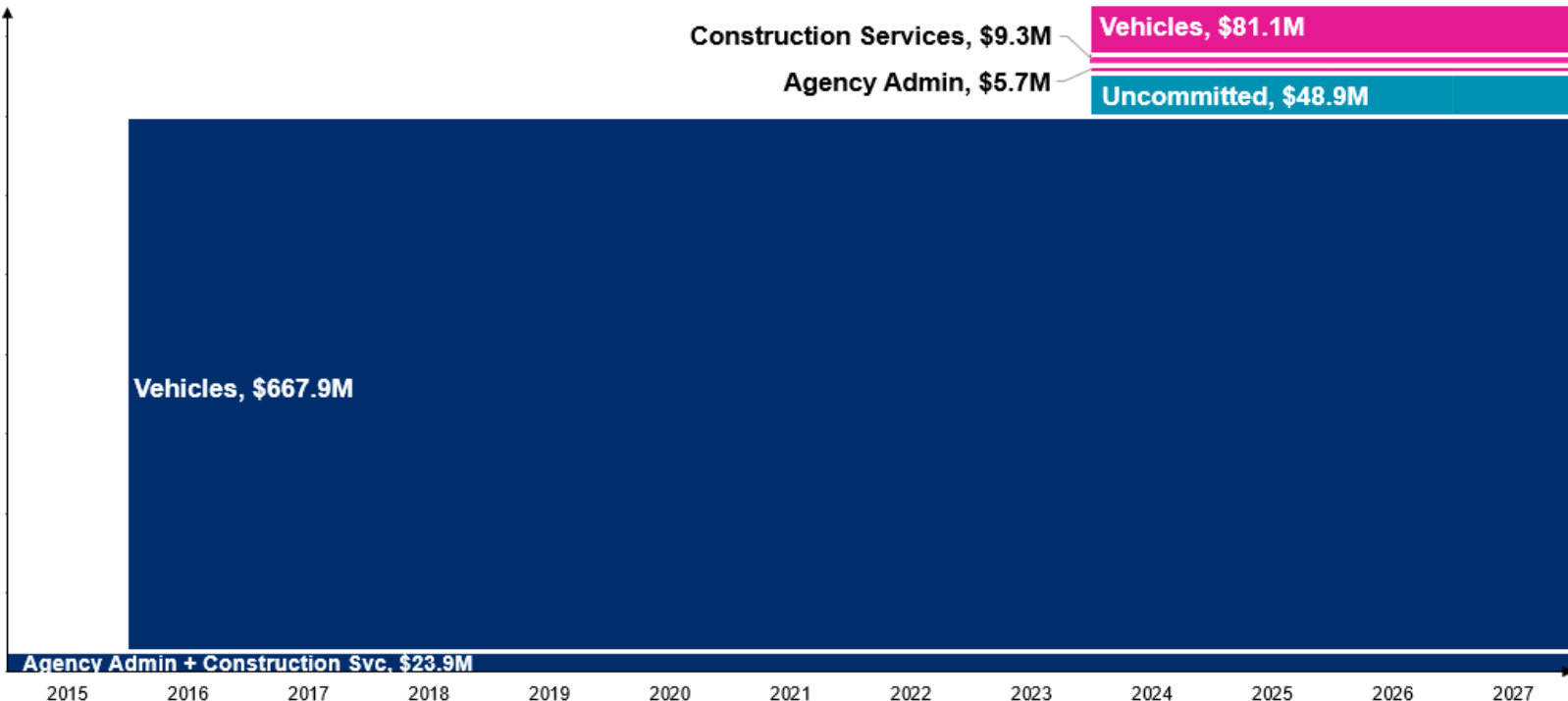
Key Features of this Action:

- Will fund the purchase of 10 additional Series 2 LRVs.
 - Includes commissioning labor costs, staff costs, taxes, contingency etc.
- Will replenish contingency for the remainder of commissioning 152 LRVs.
 - **Delays** experienced during the commissioning phase of the project **since 2020** and other challenges have resulted in a longer project duration and additional resources needed to complete the delivery of 152 LRVs.
 - Purchase **more spare parts** to help enhanced availability and **obsolescence management**.

LRV Fleet Expansion: Budget Amendment

ALLOCATION \$ COMMITMENTS

\$96.2M	Allocation Change
\$740.7M	Authorized Budget Allocation



Today's Action #2

Revise Project Completion Milestone from Q1 2024 to:

- Q4 2025 for Conditional Acceptance of all 152 LRVs, and
- Q1 2028 for Conditional Acceptance of all 10 additional LRVs.

Key Features of this Action:

- The Conditional Acceptance (CA) of vehicles allows the entry of vehicles into revenue service and therefore the most significant project milestone in support of the Link system expansion program and service delivery.
- Above CA milestones include approximately **6 months of schedule float**.

Today's Action #3

Revise the Project name from “LRV Fleet Expansion” to “Series 2 LRV Fleet Expansion”.

Key Feature of this Action:

- Allows to clearly distinguish Series 2 and Series 3 LRV Fleet Expansion projects.

Next Steps, if Board Approves Resolution

- Enter negotiations with the Series 2 LRV car-builder, Siemens Industry, Inc.
- **If negotiations are successful and the price of the cars is reasonable,** staff will:
 - Bring a separate action for Board approval in Q1 2024 to exercise a sole source change order with Siemens Industry, Inc. for the additional 10 LRVs.
 - Bring a separate action for Board approval in Q1 2024 to amend Sound Transit's contract with Hatch Associates Consultants Inc. for LRV Engineering and Inspection services due to
 - ❖ The longer than planned duration of the project for the 152 LRVs, and
 - ❖ For delivery of additional 10 LRVs.

Thank you.



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