

Link Light Rail - Systemwide

The capital cost estimates included in this document were developed for the maintenance facilities, vehicles, and operations activities that will support extensions of Link Light Rail Transit (LRT) under Sound Transit 2.

The cost estimates were developed from prototypical sites and layouts for the maintenance facilities that would be needed to support LRT extensions in the North, South, and East corridors. Cost estimates were also developed for acquisition of vehicles and operations activities that would support the LRT extensions. The prototypical sites and layouts for the maintenance facilities were defined for the purpose of cost estimating and do not presume that preferred sites and layouts have been selected.

The project information and cost estimate are described in the following project template:

[SYS-LRT Maintenance Bases, Vehicles and Operations for ST2 Expansion](#)

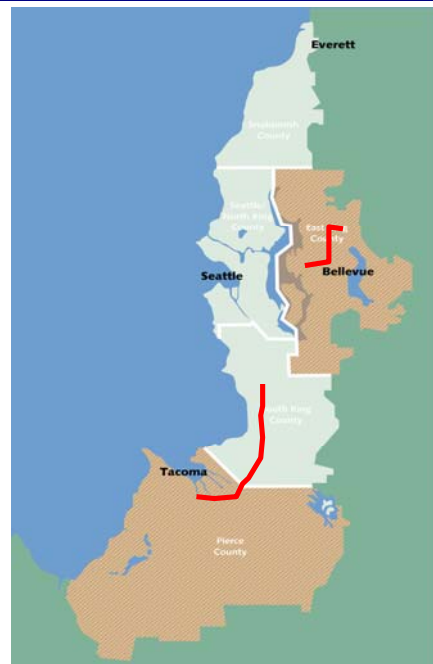
It is anticipated that this initial layout and cost estimating effort will be supplemented by environmental studies, alternatives analyses and additional engineering as the project advances.

ST has developed scope definitions for ST2 project proposals for the purposes of developing cost estimates, phasing of investments, a financial plan, and the estimation of project benefits. The scope definition(s) should not be construed as a commitment that all defined features will be included in the final developed project(s).

Link LRT: Maintenance Bases, Vehicles and Operations for ST2 Expansion

Project Number	SYS-LRT
Subareas	All
Primary Mode Impacted	Link
Facility Type	Link Service
Version Number	2.1
Date Last Modified	5/24/2007

Project Locator Map



Short Project Description

Construct new light rail maintenance and operations facility capacity to accommodate light rail vehicle fleet. Purchase vehicles for light rail operations. Operate and maintain expanded light rail service between 164th SW/Ash Way, Overlake TC, and Tacoma Dome Station.

Project Purpose: Provide systemwide elements to support expansion of Link light rail service.

Cost in Millions of 2006 \$

East Base	Low	High
Agency Admin	\$17.9	\$20.5
Environmental Clearance and PE	\$2.0	\$2.3
Final Design, Specs, Permitting	\$5.0	\$5.8
ROW Acquisition	\$80.7	\$92.7
Construction	\$43.6	\$50.1
Contingency	\$4.0	\$4.6
Total	\$153.1	\$176.1

South Base	Low	High
Agency Admin	\$37.1	\$42.6
Environmental Clearance and PE	\$5.6	\$6.4
Final Design, Specs, Permitting	\$13.9	\$16.0
ROW Acquisition	\$40.8	\$46.9
Construction	\$120.8	\$138.9
Contingency	\$11.1	\$12.8
Total	\$229.3	\$263.6

Total	Low	High
Agency Admin	\$54.9	\$63.1
Environmental Clearance and PE	\$7.6	\$8.7
Final Design, Specs, Permitting	\$18.9	\$21.8
ROW Acquisition	\$121.5	\$139.7
Construction	\$164.3	\$189.0
Contingency	\$15.2	\$17.4
Maintenance Bases	\$382.4	\$439.7
Maintenance Base Program		
Contingency	\$100.0	\$115.0
Vehicles for LRT System	\$736.0	\$846.4
Total Bases, Vehicles and Program Contingency	\$1,218.3	\$1,401.1

Annual Added O&M*	\$109.5
<i>Design Basis</i>	Conceptual

* Includes maintenance facility operations

Link LRT: Maintenance Bases, Vehicles and Operations for ST2 Expansion

Environmental Documentation Required

- Environmental Impact Statement Required
- Environmental Assessment Required
- Environmental Checklist Required

Relationships to Other Projects

<i>Relationship</i>	<i>Project</i>
Dependent on	Link LRT extensions and all associated projects that they are dependent on or impacted by

Project Partners

<i>Agency</i>	
King County jurisdictions	Bellevue, Redmond, SeaTac, Des Moines, Kent, Federal Way and/or King County
Pierce County jurisdictions	Milton, Fife, Tacoma and/or Pierce County
WSDOT	
BNSF Railroad	
KC Metro	

Long Description

This capital project scope, and the companion capital cost estimate, are intended to include the entire project development cycle (agency and project administration, environmental clearance, design, all aspects of property acquisition, permits, agreements, construction, testing, commissioning and contingencies) from project initiation through the start-up of the revenue operations.

Description:
 This project includes three systemwide components to support Link LRT system expansion:

- Purchase light rail vehicles (LRV) for service expansion.
- Ongoing operations and maintenance of expanded light rail service.
- Construct two maintenance facilities to accommodate the future light rail vehicle fleet. One facility will be located along the LRT alignment in East King county, and one along the LRT alignment in South King county south of Sea-Tac Airport.

Vehicles: Up to 177 new light rail vehicles will be purchased (includes spares).

Operations: This project includes annual operating funds to operate and maintain all light rail system extensions built under the ST2 program. The operating plan supporting the light rail system in service between 164th SW/Ash Way, Overlake TC, and the Tacoma Dome Station at the completion of ST2 is anticipated to be as follows:
 Line 1: Northgate to Tacoma Dome Station. 4-car trains running every 9 minutes peak, 10 minutes off-peak.
 Line 2: 164th SW/Ash Way to Kent-Des Moines Road. 3-car trains running every 9 minutes peak only.
 Line 3: 164th SW/Ash Way to Overlake Transit Center. 4-car trains running every 9 minutes peak, 10 minutes off-peak.

Maintenance Bases
 The two new maintenance bases, combined with the Forest Street LRT base, will provide light rail vehicle maintenance and storage capacity for the entire Link LRT system, including expansion during ST2. In addition to maintenance capacity for the light rail system between the University of Washington and South 200th Street, the Forest Street base will provide communications and control systems and selected heavy maintenance functions for the entire LRT system. Forest Street base expansion to accommodate and service 75 LRVs is already programmed in *Sound Move*. Project N6 to extend the Central Link system from the University of Washington to Northgate includes further expansion to the maximum 104 LRVs at this site. Link LRT system expansion beyond that level requires new maintenance base capacity, which will be provided at the proposed new bases.

Link LRT: Maintenance Bases, Vehicles and Operations for ST2 Expansion

Description (cont.):

The East base will store and maintain up to 40 LRVs, and the South base will store and maintain up to 105 LRVs during ST2 to support expansion of the light rail system to 164th SW/Ash Way, Overlake Transit Center, and the Tacoma Dome Station. Representative sites were used to develop cost estimates for each of the new maintenance facilities. The final site for each base would be determined through project level design and environmental review. The basic cost estimates include design allowance contingency, construction change order contingency, and unallocated contingency.

Project Elements Included (for each base unless otherwise noted):

- Sites centrally located within the East and South light rail corridors, large enough to accommodate the maximum foreseeable vehicle storage capacity necessary at each during ST2, and to provide room to expand storage and/or maintenance facilities during possible future phases of Sound Transit light rail expansion.
- Lead track to/from the LRT guideway (South base only)
- Service and storage track and switches
- Vehicle barn
- Train washer
- Maintenance of way facilities
- Administration offices
- Operator reporting, dispatching and break areas
- LRV parking and storage area
- Employee/visitor parking
- Environmental mitigation
- 1 percent for art per ST policy
- Allowances for:
 - Site circulation
 - Site landscaping / setbacks
 - Stormwater detention
- Equipment: Cost estimate for the South Base equipment is based on the following types of equipment (includes "heavy" equipment) that are provided at Sound Transit's Forest Street Link Base:
 - Underfloor wheel profiling system
 - Jib cranes
 - Rail yard shuttle
 - Turntables - 60,000 lbs.
 - Turntables - 16,000 lbs.
 - Monorail cranes system
 - Compressed air equipment
 - Vehicle lifts
 - Truck lift with turntable
 - Truck repair lift
 - Bridge crane - 10 ton (for maintenance of equipment)
 - Bridge crane - 2 ton (for maintenance of way)
 - Dock lifts
 - LRV washer system
 - Sand distribution equipment
 - Industrial waste system
 - Parking control equipment
 - Spray paint booth
 - Portable rail car lifts
- Equipment: Cost estimate for the East Base equipment is a pro-rated amount (30%) for light/routine maintenance functions only and is based on the types of equipment listed above for South Base.
- Maintenance base program contingency to provide flexibility to respond to specific site constraints and unforeseen risks in locating, permitting and building these large industrial facilities.

Project Elements Included (vehicles):

- Up to 177 90-foot low-floor light rail vehicles

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Utilities:

Utility investigations have not yet been carried out. Relocation of standard utilities along the alignment has been assumed as part of the scope and has been estimated using an average per route foot allowance. Standard public utilities will be provided at each base.

Right-of-Way and Property Acquisition:

Property interests required for the prototypical alignment include fee acquisitions, partial takes, easements and interagency agreements. Right-of-way requirements include construction staging and contractor laydown areas. No specific provisions are made for contractor parking. Cost estimates include associated relocation, administration and legal costs, and contingency.

Mitigation:

The final project scope will include all mitigation(s) committed to by ST in pertinent, future project-level environmental documents.

Exclusions:

- Maintenance base capacity necessary to serve the light rail system between Northgate and South 200th Street (see project N6).

Permits Required:

- Building, electrical, mechanical, utility, construction-related, and land use permits by local jurisdictions
- BNSF permits / easements for access to the East base

Agreements Required:

- Transitway agreements with jurisdictions in east and south King County
- Potential operating agreement with King County Metro

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Evaluation Measures

Measure	Measurement/ Rating	Notes
Average Weekday Ridership	N/A	
Capital Cost	\$1,218.3 - \$1,401.1	in Millions of 2006 \$
Annual Added O&M Costs	\$109.5	in Millions of 2006 \$
Travel Time & Reliability	N/A	
Connectivity & Integration	N/A	
Land Use & Development	N/A	
Customer Experience	N/A	
Risk Avoidance	Low	

Key Issues and Benefits

Issues:

- There is limited availability of land parcels in east and south King County near the light rail corridors to accommodate new LRT maintenance facilities.

Benefits:

- Facilities and additional fleet are necessary to support the light rail service expansion under ST2
- Additional maintenance facilities increase light rail operations efficiency and flexibility