

A low-angle, close-up photograph of a Sound Transit train. The train is white with a teal and blue wave-like graphic along its side. Several windows are visible, reflecting the sky and the station structure. The train is positioned under a glass and steel station canopy. The overall scene is brightly lit, suggesting a sunny day.

# Capital Cost Estimation Methodology

 **SOUNDTRANSIT**

# General Estimating Methodology

- Standards
- Estimate Types
- Estimate Methods

# Standards

- **AACE Recommended Practice No. 17R-97**
  - Probable Construction Cost consistent with Class 4 level of Project Definition
- **Construction Specification Institute (CSI) Master Format 2004**
  - General Format Used for Individual Construction Cost Items
- **FTA Standard Cost Categories (SCC)**
  - 10 – Guideway and Track Elements
  - 20 – Stations, Stops, Terminals, Intermodal
  - 30 – Support Facilities: Yards, Shops, Administration Buildings
  - 40 – Sitework and Special Conditions
  - 50 – Systems
  - 60 – Right-of-Way
  - 70 – Vehicles
  - 80 – Professional Services
  - 90 – Unallocated Contingency
  - 100 – Finance Charges

# Estimate Types

- **Previous ST2 or HCT Study Cost Estimates - Unchanged**

- Project Definition Has Not Changed
- Construction Cost Escalated from Base Year to 4<sup>th</sup> Quarter 2014 using Sound Transit Construction Cost Index (CCI)
- Right-of-Way Cost Escalated from Base Year to 4<sup>th</sup> Quarter 2014 using Sound Transit ROW Cost Index (ROWI)
- Allocated Contingency, Professional Services and Unallocated Contingency revised per Current Methodology

- **New or Updated System Planning Projects**

- Develop Unit Cost Library (UCL) in 4<sup>th</sup> Quarter 2014 Dollars
- Develop Assemblies (Composite Sections) for Major Construction Elements based on Transit Modes and Alignment Definitions
- Prepare Quantity Takeoffs (QTO), by Assembly, for Identified Projects
- Prepare Cost Estimates for Identified Projects

# Estimate Methods

- **Unit Cost Library (SCC 10 – 50)**

- **Time & Material Unit Cost**

- Labor – Uses State of Washington Prevailing Wage Rates, includes Base Wage, Fringe Benefits, Payroll Taxes & Insurance
- Equipment – Uses Equipment Rental and Operating Rates published by RS Means
- Material – Uses multiple sources including RS Means, ENR Material Reports, Local Vendor Quotes
- Contractors Overhead and Profit – Typical markup allowances for contractors home and field office, field in-directs, sales tax, bond, general liability insurance, and profit .

- **Subcontract Unit Cost**

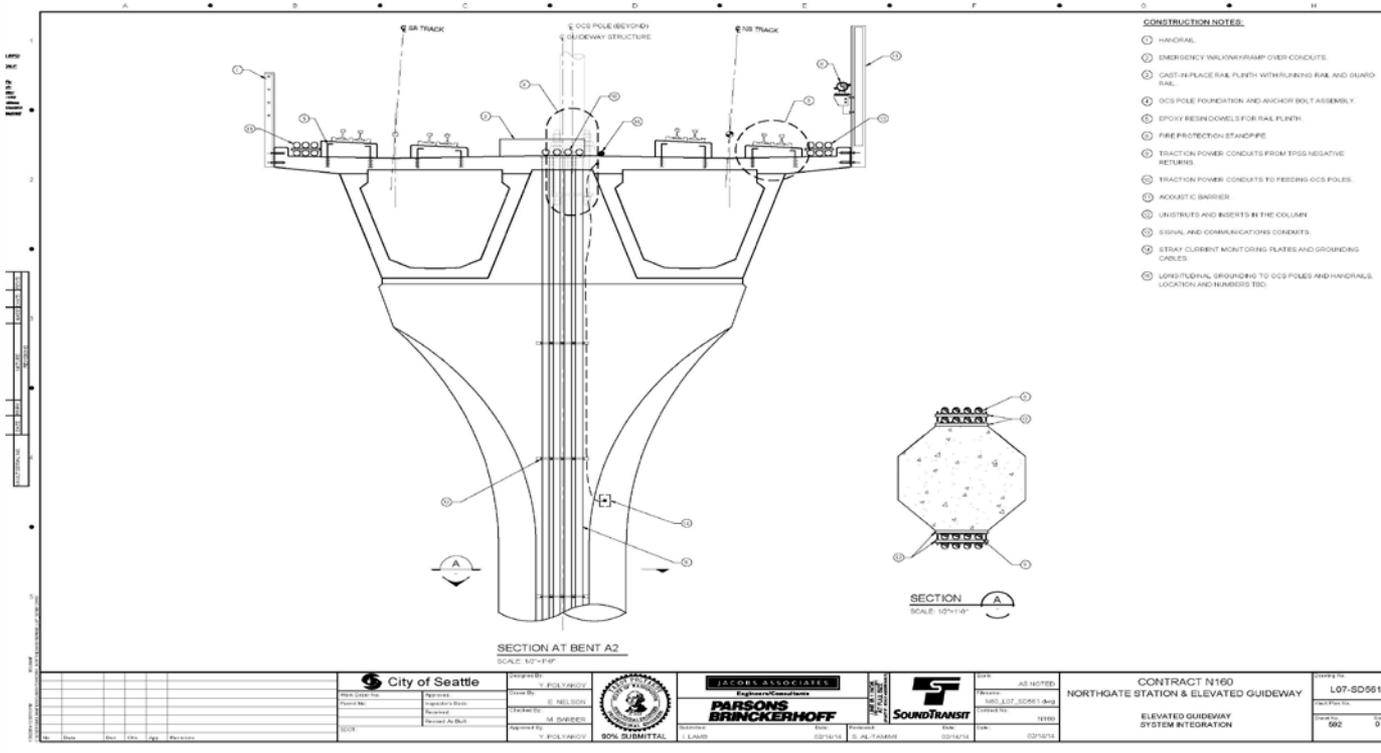
- Items typically procured from a subcontractor – Based on local historical cost data
- Contractor's Markup – Typical markup allowance for general contractors supervision and management

- **Unit Cost Allowance**

- Cost allowance for undefined project elements – Project metric based on historical cost data



# Assemblies (Composite Cost)



# Assemblies (Composite Cost)

Sound Transit

**Unit Cost Library**  
 System Plan Development (ST3)

 Page 1  
 7/9/2015

Assembly	Phase	Item	Description	Takeoff Quantity	Bid Unit Price	Total Amount
<b>10.04.222</b>			<b>PC Seg Box Girder - 2 Track (20' Avg. Pier Ht)</b>			
	03-21-10.60	A010	Reinforcing Steel	112,000 lb	1.74	195.03
	03-30-53.40	A175	Structural Concrete, In Place, Aerial Pier	0.110 cy	797.27	87.70
	03-41-36.50	A035	Precast Segmental Box Girder, Double	1.000 lf	4,535.46	4,535.46
	05-05-23.80	A110	Multirotational Bearing (250 Kip)	0.020 ea	5,112.50	102.25
	05-73-16.10	A010	Metal Pipe & Cable Railing	1.000 lf	118.12	118.12
	26-05-26.80	A015	Corrosion Control, Aerial	1.000 lf	5.29	5.29
	31-63-26.13	A100	Drilled Shaft, 10' Dia.	0.830 vlf	3,650.71	3,030.09
	33-41-13.60	A025	Trackway Drainage Allowance, Aerial	1.000 lf	76.97	76.97
	33-71-19.17	A055	Cable Duct, Aerial Guideway	1.000 lf	91.60	91.60
	03-30-53.40	A195	Structural Concrete, In Place, Track Plinth	0.210 cy	1,115.19	234.19
	03-30-53.40	A205	Structural Concrete, In Place, OCS Pole Base	0.010 cy	1,373.00	13.73
	03-30-53.40	A180	Structural Concrete, In Place, Aerial Pier Cap	0.230 cy	1,117.43	257.01
	32-06-10.10	A100	Site Restoration Allowance	0.640 sy	80.67	51.63
	05-53-16.50	A010	Service/Safety Walkway	1.000 lf	75.71	75.71
	26-56-33.10	A010	Walkway lighting, Allowance	1.000 lf	49.40	49.40
	31-13-13.10	A015	Clearing & Grubbing Allowance, Level 2	3.460 sy	1.12	3.87
	32-35-16.10	A020	Sound Barriers	4.000 sf	30.90	123.61
	01-56-23.10	A030	MOT Allowance - Aerial	1.000 lf	69.30	69.30
			<b>PC Seg Box Girder - 2 Track (20' Avg. Pier Ht)</b>	<b>1.000 RF</b>	<b>9,120.96</b>	<b>9,120.96</b>

# Assemblies (Composite Cost)

Sound Transit

## Unit Cost Library System Plan Development (ST3)

 Page 2  
7/9/2015

### Partial Totals

Description	Amount	Totals	Hours	Rate	Cost Basis	Percent of Total
Labor	1,335		3 ch			14.63%
Material	4,078					44.72%
Subcontract	35					0.39%
Equipment	746		2 ch			8.18%
Other						
	<b>6,194</b>	<b>6,194</b>				<b>67.91</b> <b>67.91%</b>
Contractor's Overhead	924			15.000 % C		10.13%
Subcontract Markup	4			10.000 % C		0.04%
Field Supervision	496			8.000 % C		5.43%
Home Office	93			1.500 % C		1.02%
Sales Tax - General	458			9.500 % C		5.03%
Sales Tax - Subcontractor	2			4.750 % C		0.02%
Bond	62			1.000 % C		0.68%
Gen Liability & Builders Risk	124			2.000 % C		1.36%
Profit	248			4.000 % C		2.72%
	<b>2,411</b>	<b>8,605</b>				<b>26.43</b> <b>94.34%</b>
<b>Subtotal Construction</b>		<b>8,605</b>				<b>94.34%</b>
General Conditions	516			6.000 % T		5.66%
	<b>516</b>	<b>9,121</b>				<b>5.66</b> <b>100.00%</b>
<b>Partial Total</b>		<b>9,121</b>				

# Quantity Takeoff (QTO)

Alternative: SP-2 from Segment 7

Everett Station to North Everett

SEGMENT: Segment 9

 3 Stations:  
 Downtown Everett  
 19th St  
 Everett Community College

 STATIONING:  
 2072+00 2185+00

 11,300.00 RF  
 2.14 MILES

 Checked by:  
 By: Torger Erickson 6/5/2015

SCC Cat.	STATIONING		DESCRIPTION	COST ID	QTY	UNIT	Comments
	BEGIN	END					
<b>10 Guideway &amp; Track Elements</b>							
<b>10.01 Guideway: At-grade</b>							
			At-Grade Ballasted - 1 Track	10.01.001		RF	
			At-Grade Ballasted - 2 Track	10.01.002		RF	All elevated
			At-Grade Embedded Streetcar Track in Asphalt Roadway - 1 Track	10.01.005		RF	
			At-Grade Embedded Streetcar Track in Asphalt Roadway - 2 Track	10.01.006		RF	
			At-Grade Embedded Streetcar Track in Concrete Roadway - 1 Track	10.01.007		RF	
			At-Grade Embedded Streetcar Track in Concrete Roadway - 2 Track	10.01.008		RF	
			At-Grade Direct Fixation Track in Express Median - 2 Track	10.01.009		RF	
			At-Grade Direct Fixation Track, Exclusive - 2 Track	10.01.010		RF	
			At-Grade Embedded Track, Exclusive - 2 Track	10.01.011		RF	
			At-Grade Embedded Track, Mixed Traffic - 2 Track	10.01.013		RF	
			At-Grade Direct Fixation Track, On Existing Structure - 2 Track	10.01.020		RF	
			At-Grade Roadway Track Crossing - 1 Track	10.01.051		RF	
			At-Grade Roadway Track Crossing - 2 Track	10.01.052		RF	
<b>10.04 Guideway: Aerial Structure</b>							
			Bridge Structure - Modification of Existing Structure	10.04.001		SF	
			Bridge Structure - 2 Track	10.04.023		RF	
	2072+00	2082+00	PC Seg Box Girder - 1 Track (20' Avg. Pier Ht)	10.04.122	1,000	RF	
	2082+00	2087+00	PC Seg Box Girder - 1 Track (30' Avg. Pier Ht)	10.04.123	500	RF	
	2087+00	2122+00	PC Seg Box Girder - 1 Track (40' Avg. Pier Ht)	10.04.124	3,500	RF	
			PC Seg Box Girder - 1 Track (50' Avg. Pier Ht)	10.04.125		RF	
	2122+00	2132+00	PC Seg Box Girder - 2 Track (20' Avg. Pier Ht)	10.04.222	1,000	RF	
			PC Seg Box Girder - 2 Track (30' Avg. Pier Ht)	10.04.223		RF	
	2132+00	2185+00	PC Seg Box Girder - 2 Track (40' Avg. Pier Ht)	10.04.224	5,300	RF	
			PC Seg Box Girder - 2 Track (50' Avg. Pier Ht)	10.04.225		RF	
			Twin Sngl PC Seg Box Girder - 2 Track (20' Avg. Pier Ht)	10.04.322		RF	
			Twin Sngl PC Seg Box Girder - 2 Track (30' Avg. Pier Ht)	10.04.323		RF	
			Twin Sngl PC Seg Box Girder - 2 Track (40' Avg. Pier Ht)	10.04.324		RF	
			Twin Sngl PC Seg Box Girder - 2 Track (50' Avg. Pier Ht)	10.04.325		RF	
			PC Seg Box Girder, Long Span - 2 Track (20' Avg. Pier Ht)	10.04.422		RF	

# Prepare Cost Estimate

SOUND TRANSIT SYSTEM PLAN DEVELOPMENT (ST3) N-01								
TRANSIT MODE: LRT								
CAT NO.	DESCRIPTION	COST ID	QTY	UNIT	UNIT COST	BASE COST	ALLCTD CONTGY	TOTAL COST
<b>10 GUIDEWAY &amp; TRACK ELEMENTS</b>								
10.01	Guideway: At-grade (All Types)							
	N/A							
	Category Total		0	RF		\$0		\$0
10.04	Guideway: Aerial structure							
	PC Seg Box Girder - 1 Track (20' Avg. Pier Ht)	10.04.122	1,000	RF	\$7,144	\$7,143,770	30%	\$9,286,901
	PC Seg Box Girder - 1 Track (30' Avg. Pier Ht)	10.04.123	500	RF	\$7,350	\$3,674,810	30%	\$4,777,253
	PC Seg Box Girder - 1 Track (40' Avg. Pier Ht)	10.04.124	3,500	RF	\$7,464	\$26,123,895	30%	\$33,961,064
	PC Seg Box Girder - 2 Track (20' Avg. Pier Ht)	10.04.222	1,000	RF	\$9,121	\$9,121,000	30%	\$11,857,300
	PC Seg Box Girder - 2 Track (40' Avg. Pier Ht)	10.04.224	5,300	RF	\$9,423	\$49,942,483	30%	\$64,825,228
	Category Total		11,300	RF		\$96,005,958		\$124,807,745
10.05	Guideway: Built-up fill							
	N/A							
	Category Total		0	RF		\$0		\$0
10.06	Guideway: Underground cut & cover							
	N/A							
	Category Total		0	RF		\$0		\$0
10.07	Guideway: Underground tunnel							
	N/A							
	Category Total		0	RF		\$0		\$0
10.08	Guideway: Retained cut or fill							
	N/A							
	Category Total		0	RF		\$0		\$0
10.09	Track: Direct fixation							
	Direct Fixation Track - 2 Track	10.09.120	11,300	RF	\$1,034	\$11,679,002	30%	\$15,182,703
	Category Total		11,300	RF		\$11,679,002		\$15,182,703

# Right-of-Way (SCC 60)

- Assessed Property Values – from County Assessor
- Real Estate Adjustment Factors – for typical difference between assessed value and sale value for residential & commercial property by location
- Profile Factors – adjustment for:
  - Aerial = 0.75
  - At-Grade = 1.00
  - Deep Tunnel (>70 ft) = 0.50
  - Shallow Tunnel (<70 ft) = 0.65
- ROW Contingency – 1.65
- Range -  $\pm$  15%

## Vehicles (SCC 70)

- Cost for vehicles will be included based on recent procurement contracts by Sound Transit.

# Professional Services (SCC 80)

Projects under \$25M	Allowance
Admin *	7.00%
Prelim. Engineering	9.50%
Final Design/ DSDC	15.50%
Third Parties	2.00%
Const. Management	14.00%
<b>Total **</b>	<b>48.00%</b>

Projects over \$25M	Allowance
Admin *	6.00%
Prelim. Engineering	5.00%
Final Design/ DSDC	10.00%
Third Parties	2.00%
Const. Management	9.00%
<b>Total **</b>	<b>32.00%</b>

\*Admin is a percent of SCC 10-70 plus all other soft costs. All others are percent of construction.

\*\*Actual effective total is greater than shown due to the application of Admin to non-construction costs.

# Contingencies

- **Allocated Contingency – Applied by SCC category to line items within Cost Estimate**
  - SCC 10 – 50: 30% Contingency
  - SCC 60: 65% Contingency
  - SCC 70: 20% Contingency
  - SCC 80: Calculated on total values that include design allowance, art allowance and change order contingency
- **1% for Art Allowance – Applied to Subtotal of SCC 10 – 50**
- **Change Order Contingency – Applied to Subtotal of SCC 10 – 50 including Allocated Contingency**
- **Unallocated Contingency – Applied to Subtotal of SCC 10 – 50, including Art Allowance and Change Order Contingency**

A close-up, low-angle shot of a white and blue Sound Transit bus. The bus features a large, stylized wave graphic in shades of blue and teal that flows across its side. Several windows are visible, some with black frames. The background is a clear blue sky. A semi-transparent dark grey banner is overlaid across the middle of the image, containing the Sound Transit logo and text.

 **SOUNDTRANSIT**  
RIDE THE WAVE