

Integrating Sustainability in Project Development: Sound Transit East Link Case Study

Lisa Reid

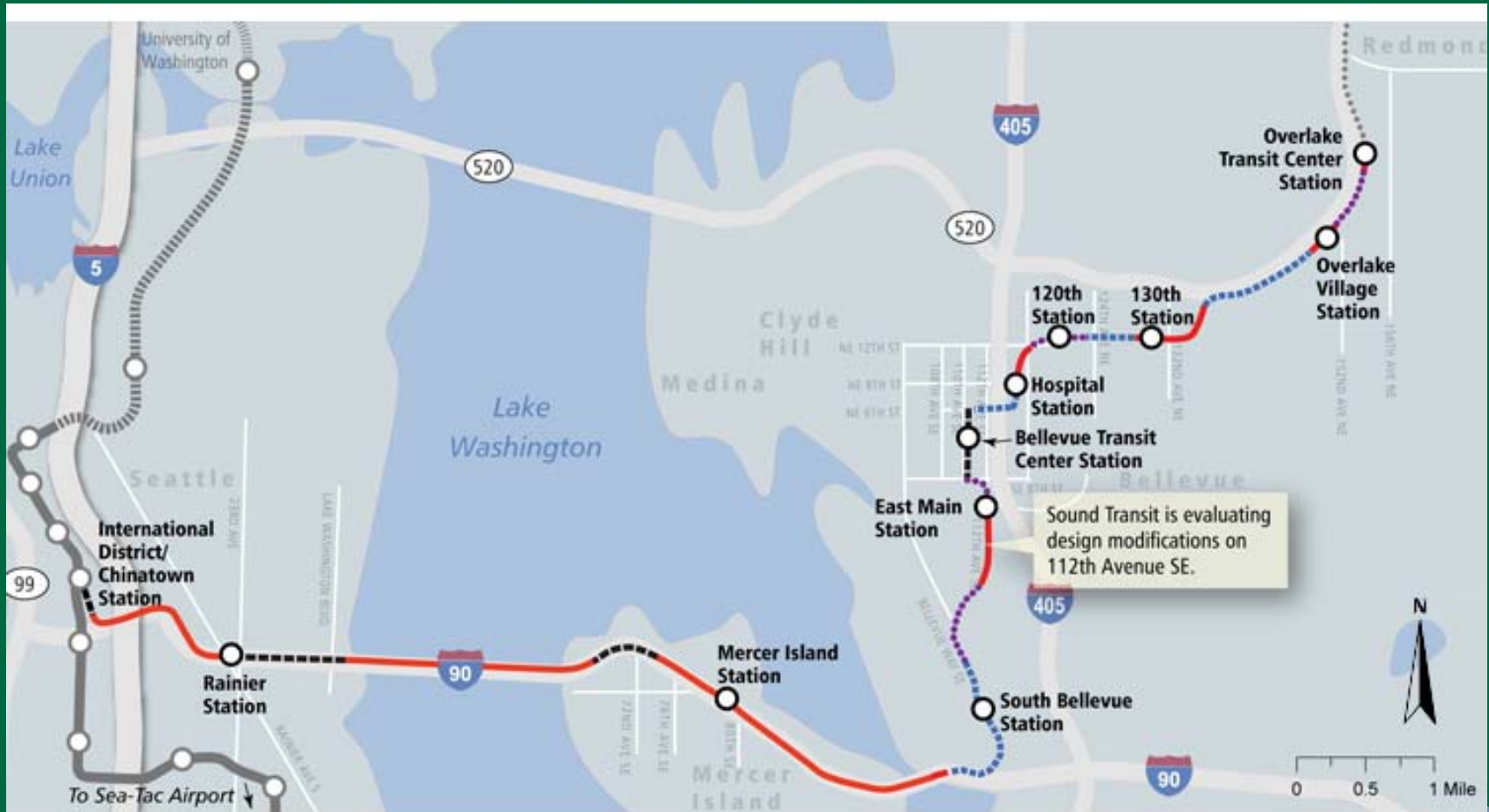
*CH2MHILL, Sr. Program Manager
Seattle, WA*



**2012 SUSTAINABILITY AND PUBLIC
TRANSPORTATION WORKSHOP**



Sound Transit East Link Project



**East Link Light Rail
Project to be built**

- | Route Profile | |
|---------------|---|
| ○ Station | ●●●● Retained Cut / Fill |
| — At-Grade | ◆◆◆◆ Future Downtown Redmond Extension* |
| ▬ Elevated | |
| ▬ Tunnel | |

- | Central Link Light Rail |
|--------------------------------------|
| ○ Central Link Alignment and Station |
| ▬ University Link Under Construction |
| ▬ Final Design |

* The Board also identified a route for a further extension to Downtown Redmond in the future that was not funded in the Sound Transit 2 ballot measure.

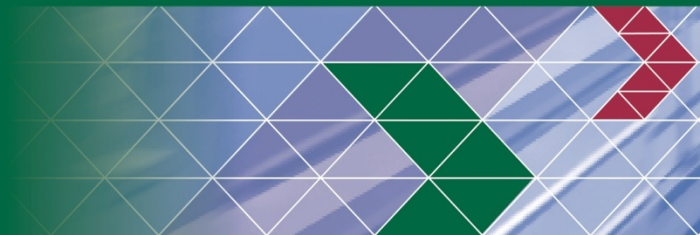
Best Practices Approach for Integrating Sustainability

- Step 1: Define a Sustainable Transit System
- Step 2: Confirm Sustainability Vision and Goals
- Step 3: Understand Context
- Step 4: Identify a Range of Sustainable Solutions
- Step 5: Evaluate to Determine Appropriate Solutions
- Step 6: Track Progress throughout Implementation
- Step 7: Lessons Learned/Feedback



Step 2 – Sustainability Vision and Goals Sound Transit Directive

- Executive Order No 1 Established the Sustainability Initiative for Sound Transit
- “...take all reasonable and appropriate steps to integrate sustainable business practices and strategies throughout the ST organization including planning, design, construction and operating...transit systems.”
 - petroleum conservation
 - alternative fuels
 - renewable energy
 - energy efficiency
 - greenhouse gas emissions
 - water conservation
 - toxins reduction
 - waste prevention
 - re-use and recycling
 - building / facility performance



Step 4 – Identify Solutions

Examples of Sustainable Solutions?

- A **Sustainable Solution** is a specific project activity, feature, or process that accomplishes the goal of promoting sustainability. Some examples are:
 - Activity: Reusing bus shelters or construction noise mitigation
 - Feature: Installation of bicycle lanes and/or sidewalks
 - Process: Lifecycle cost analysis or tracking environmental commitments.



Step 5 – Evaluate Solutions

Evaluation Process

Researched 17 Documents to Identify Potential Solutions

345 Solutions



Consolidated and Filtered for Possible Application to East Link. Performed Preliminary Evaluation.

165 Solutions



Assessment – Accept for Inclusion
– Evaluate Further
– Reject/Not Applicable

< 165 Solutions



Complete Evaluations. Compare vs. East Link Plans.

Assessment Report and Recommendations

Step 5 – Evaluate Solutions Evaluation

Sustainable Options				
Type of Solution	Objective	Discipline	Solution	Description
Infrastructure Planning & Design	Reduce Consumption of Material Resources	Civil	Earthwork Balance	Use cut and fill soils sourced on site to minimize need for import of new soil materials and reduce the need to transport materials
Infrastructure Planning & Design	Reduce Consumption of Material Resources	Civil	Minimize new construction - Reuse existing facilities	At Overlake Transit Center - Consider leaving existing bus facility at the current location on the site and constructing new parking facilities where the existing parking is located.

- 
- Policy & Systems Planning
 - Infrastructure – Planning & Design
 - Infrastructure – Construction
 - Rolling Stock & Fleet
 - Operations & Maintenance



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- Reduce Consumption of Material Resources
- Reduce Energy Consumption
- Reduce Impacts to Environment & Water
- Support Vibrant Urban Communities



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- Aesthetics
- Civil (incl. roadway)
- Construction Administration
- Electrical
- Facilities
- Landscape
- Materials
- Pavement
- Stormwater
- Structures
- Track
- Traffic



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Step 5 – Evaluate Solutions Evaluation

Sustainable Options	Dimension of Sustainability			Sustainable Benefit/Value	Relative Initial Capital Cost	Relative Life Cycle Cost		
	Ecology	Equity	Economy				Project Requirement	Demonstrated Feasibility
Solution				1-5 points*	High/ Medium/ Low	High/ Medium/ Low		
Earthwork Balance	x		x	3	Low	Low	No	Yes
Minimize new construction - Reuse existing facilities	x		x	2	Low	Low	No	Yes



Three Elements of the Sustainable Triple Bottom Line:

- Ecology (Environment)
- Equity (Social)
- Economy

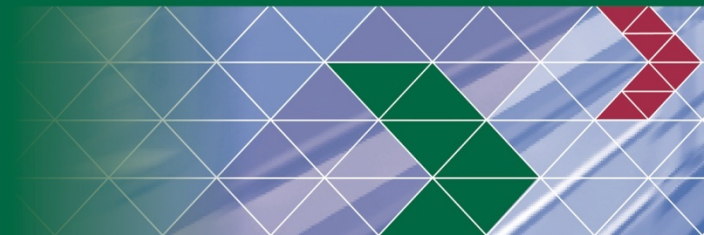


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	Ecology	Equity	Economy				Project Requirement	Demonstrated Feasibility
Solution				1-5 points*	High/ Medium/ Low	High/ Medium/ Low		
Earthwork Balance	x		x	3	Low	Low	No	Yes
Minimize new construction - Reuse existing facilities	x		x	2	Low	Low	No	Yes



Sustainable Benefit/Value: This measures the duration or extent of the sustainable benefit. A short term benefit will receive a lower score than a long term benefit. For example a solution that reduces emissions during construction only would be scored less than a solution that reduces emissions for the life of the project. The following constructed scale was used to evaluate the solutions:



Step 5 – Evaluate Solutions Evaluation

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Solution				1-5 points*	High/ Medium/ Low	High/ Medium/ Low		
Earthwork Balance	x		x	3	Low	Low	No	Yes
Minimize new construction - Reuse existing facilities	x		x	2	Low	Low	No	Yes



Design/Construction Value

1 point – Benefits limited to design or construction phase

2 point – Benefits realized in design and construction phases

+

Value over Project Lifetime

1 point – Benefits realized for limited portion of project life (5 years or less)

2 point – Benefits realized for extended portion of project life (15 years or less)

3 point – Benefits realized in throughout life of project (more than 15 years)

Step 5 – Evaluate Solutions Evaluation

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Solution				1-5 points*	High/ Medium/ Low	High/ Medium/ Low		
Earthwork Balance	x		x	3	Low	Low	No	Yes
Minimize new construction - Reuse existing facilities	x		x	2	Low	Low	No	Yes

Low – Minimally increases cost as compared to traditional solution. Since quantitative data isn't available, this was generally perceived to be less than 10% more expensive than the traditional solution.

Medium – Moderately increases cost as compared to traditional solution. Since quantitative data isn't available, this was generally perceived to be 10-50% more expensive than the traditional solution.

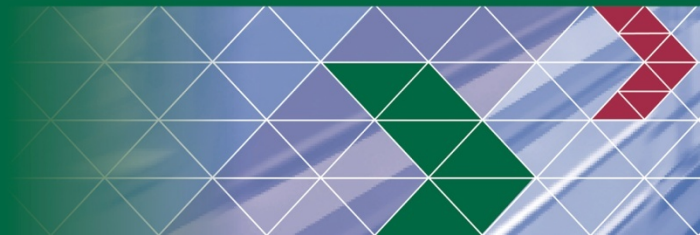
High – Significantly increases cost as compared to traditional solution. Since quantitative data isn't available, this was generally perceived to be greater than 50% more expensive than the traditional solution.

Step 5 – Evaluate Solutions Evaluation

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	Ecology	Equity	Economy				Project Requirement	Demonstrated Feasibility
Solution				1-5 points*	High/ Medium/ Low	High/ Medium/ Low		
Earthwork Balance	x		x	3	Low	Low	No	Yes
Minimize new construction - Reuse existing facilities	x		x	2	Low	Low	No	Yes

Project Requirement: An indication will be made if a possible solution is already a project requirement so that further assessment is not undertaken.

Demonstrated Feasibility: As the realm of sustainability evolves, new ideas emerge that may not yet be feasible. Solutions that have not yet been demonstrated may not be feasible to incorporate into the East Link Project.



Step 5 – Evaluate Solutions Evaluation

Sustainable Options	Assessment		
Solution	Accept for Inclusion in Design	Evaluate for Inclusion in Design	Reject/Not Applicable for Design
Earthwork Balance			

↓
Focus of Last Meeting



Step 6 – Track Progress Throughout Implementation

				Design Task Lead Assessments			
No	Discipline	Solution	Description	Reviewer Name	Discipline	Is this solution incorporated in current design? If yes, please explain.	If this solution is not incorporated currently, could it be? Please explain.
3	Civil	Pedestrian Curb Extensions Near Bus Stops	Install curb extensions at bus stops to make pedestrian crossings shorter and could add space for landscaping and/or bioswales.	Brian Shinn	Roadway		Yes - as part of Final Design where traffic allows and AHJ approves.
4	Civil	Construction Footprint	Reduce construction footprint to minimum area necessary; Minimize construction footprint by efficiently utilizing already disturbed areas for construction activities and construction staging (Utilize station locations or construct from existing adjacent rail corridors.) Limit ability of contractor to obtain excessive staging areas.	Bob Ironmonger	Construction		Yes - as part of Contract Specifications (developed during Final Design).
6	Civil	Urban Design: Neighborhoods	Incorporate urban design goals that support neighborhood plans and promote community identity.	Brian Shinn	Roadway	Yes - design development was coordinated with Cities of Bellevue and Redmond to be in alignment with their master plans.	
8	Civil	Train Signal for Pedestrian Safety	Policies to ring train bell before leaving stations in high-pedestrian activity areas.	Brian Shinn	Roadway	Yes - current ST Link SOP (standard operating procedure).	
9	Facilities	Energy Efficiency Building Systems	Use lighting technologies that reduce long-term operational energy use; use efficient HVAC systems to include monitoring systems, optimized flow designs, automatic controls; provide HVAC only where necessary.	Lloyd Mack	Facilities	Yes - design assiduously adhering to provisions in ST Link Design Criteria Manual, which was developed in consideration of sustainability and energy	

Lessons Learned

- APTA Draft Sustainability Checklist good source of solutions
- Rating systems for roadways are strong sources of possible corridor-type solutions
- Need mix of facility (LEED type) and infrastructure types of solutions
- Interdisciplinary conversations were very useful coming up with solutions and potential issues
- Process was effective and repeatable
- Sound Transit developed Sustainability Checklist with first set of sustainability solutions to be considered on projects



