APPENDIX B — ST2 BENEFIT-COST ANALYSIS RESULTS

Results in Brief

A benefit-cost analysis was conducted for the rail components of Sound Transit's Phase 2 (ST2) plan of June 2008. This analysis was completed and submitted to the Puget Sound Regional Council as part of their conformity review of the ST2 plan. The analysis was conducted in accordance with the methodology described in the *Sound Transit 2 Benefit-Cost Analysis Methodology Report*, to which these results are appended. For the ST2 plan "base case" scenario, the proposed rail investments yield a net present value of $7.8 billion, which provides a real economic rate of return of 7.5%. The associated benefit-cost ratio is 2.2. Exhibit B-1 presents the evaluation results for the base case and six sensitivity tests.

Exhibit B-1 — Benefit-Cost Analysis Summary Results

Scenario	Net Present Value (NPV)*	Economic Rate of Return (ERR)	Benefit-Cost Ratio (B/C)*
Base Case	**$7.8 B**	**7.5%**	**2.2**
Sensitivity Tests			
Scenario 1: 15% Increase in Benefits	$9.9 B	8.5%	2.5
Scenario 2: 15% Decrease in Benefits	$5.7 B	6.5%	1.9
Scenario 3: 10-Year Increase in Evaluation Period	$9.9 B	7.7%	2.4
Scenario 4: No Real Wage Growth	$5.1 B	6.4%	1.8
Scenario 5: 15% Increase in Capital Costs	$7.0 B	6.7%	2.0
Scenario 6: 15% Decrease in Capital Costs	$8.6 B	8.5%	2.5

** Assumes a 3% real discount rate*

All benefits and costs were estimated in constant 2007 dollars over an evaluation period extending 40 years beyond system completion in 2020, with future amounts discounted to their present values using a real discount rate of 3.0%.

Travel Impacts

The ST2 benefit-cost analysis results are based on transit ridership forecasts prepared by Sound Transit using methods reviewed and approved by the Federal Transit Administration and the State Expert Review Panel., and road network travel impacts from the Puget Sound Regional Council (PSRC) model.

Exhibit B-2 on the next page summarizes the key travel impacts of the ST2 rail investments as annual amounts projected for the year 2030.

The ST2 rail investments are predicted to save existing and new transit riders nearly 13 million hours of time per year. New transit riders that shift from their cars to rail will also benefit from savings in vehicle operating costs and parking charges in addition to time savings.

Exhibit B-2 — Travel Impacts Resulting from Rail Investments

ST2 Travel Impact	Annual Value & Units
New Transit Riders	14 million riders
Transit Rider Travel Time Savings (Existing & New Riders)	13 million hours
Vehicle Miles of Travel Saved due to New Transit Riders	210 million VMT
Paid Parking Saved for New Transit Riders	7 million transactions
Traffic Congestion Delay Reduction	14 million vehicle hours

The Sound Transit and PSRC travel demand models estimate that the ST2 rail investments would encourage some auto travelers, especially those making relatively longer trips, to switch to transit. The models predict that the 14 million new riders or transit trips in 2030 would reduce, by 210 million, the annual number of vehicle miles traveled (VMT) on the central Puget Sound region road network. This reduction in VMT is expected to lower traffic congestion and improve mobility over what would have otherwise been the case. The roadway network in 2030 is predicted to be sufficiently congested by 2030 that the impact of the rail investments will yield significant mobility benefits, resulting in 14 million vehicle-hours of time savings from reduced vehicle delay per year.

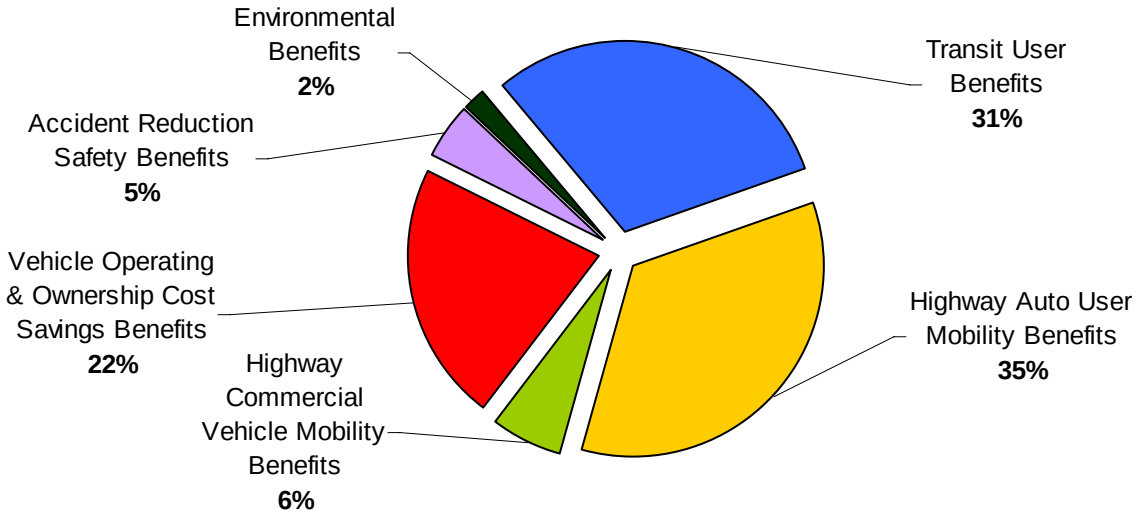
Many people assume that every new transit rider leaving their vehicle behind simply allows another auto trip to occur, resulting in no net change in the level of auto travel or congestion delay. This alternative effect is sometimes referred to as "induced demand." The ST and PSRC models, like most other regional travel demand models, follow the state of the practice by predicting reduced auto travel from new transit investments, and are not equipped to capture this potential induced demand. The assumption of induced auto travel would mean that more trips occur in the entire transportation system than without induced auto travel. This too is a benefit, because all travel — including the induced auto trips — have very real economic value. At a minimum, the value of induced auto travel must exceed its total time and dollar costs, and this value is likely comparable to the congestion relief, safety and environmental benefits that would occur in the absence of induced auto travel.

Empirical evidence suggests that attracting some auto users to transit would actually cause some combination of both highway network mobility improvements and induced highway travel. Additional information on travel demand impacts can be found in the main body of the *Sound Transit 2 Benefit-Cost Analysis Methodology Report.*

ST2 Benefits by Category

The (discounted) present values of all benefits generated over the ST2 evaluation period, expressed in 2007 dollars, are shown in Exhibit B-3, distributed by category.

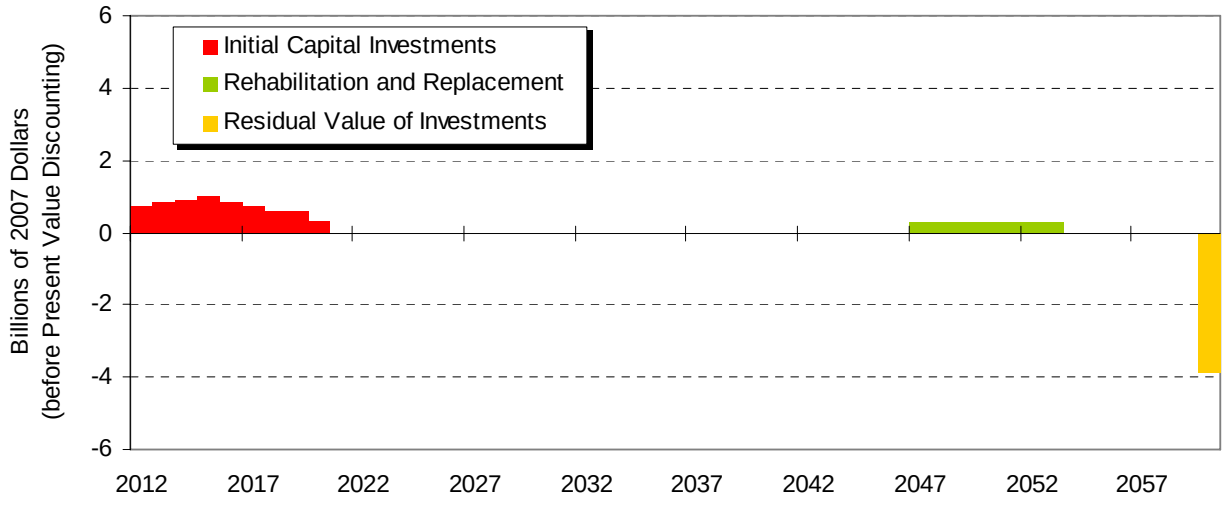
Exhibit B-3 — Cumulative Present Value of Benefits by Category



ST2 Costs over Time

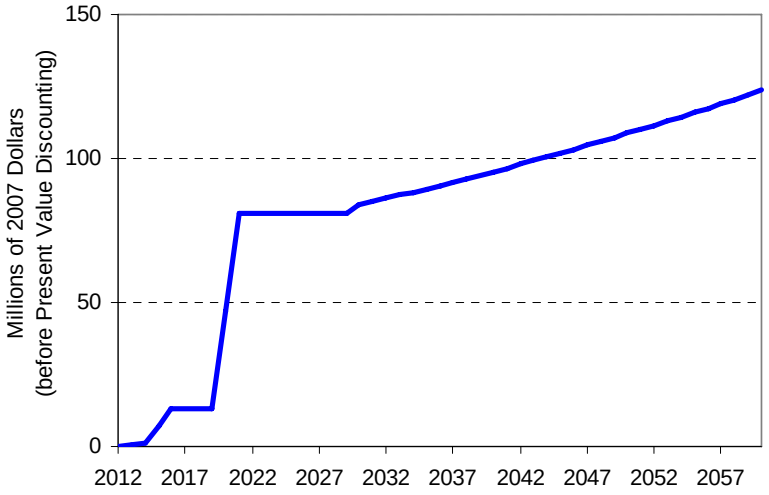
Exhibit B-4 presents the rail capital expenditures over time, expressed in constant 2007 dollars before present value discounting. The initial capital investments ($6.7 billion) were assumed to begin in 2012 and conclude by the end of 2020. The benefit-cost analysis assumed that the rail vehicles as well as 70% of the initial project capital investment (excluding right-of-way) would need to be replaced or receive major rehabilitation, on average, 30 years after full project operations begin. The negative cost or cost credit spike shown in 2060 represents the residual value of the depreciated investments at the end of the economic evaluation period. This nearly $4 billion residual value at the end of 2060 is less than $900 million in present value.

Exhibit B-4 — Capital Expenditures in 2007 Dollars before Present Value Discounting



Annual operating and maintenance (O&M) costs over the economic evaluation period are presented in Exhibit B-5, expressed in constant 2007 dollars before present value discounting. The upward sloping line illustrates the assumption of 1.3% real growth in O&M expenditures. This assumption reflects both real growth in O&M cost factors (labor and material costs escalating faster than overall inflation) and expected growth in O&M expenditures to keep pace with increasing ridership over time.

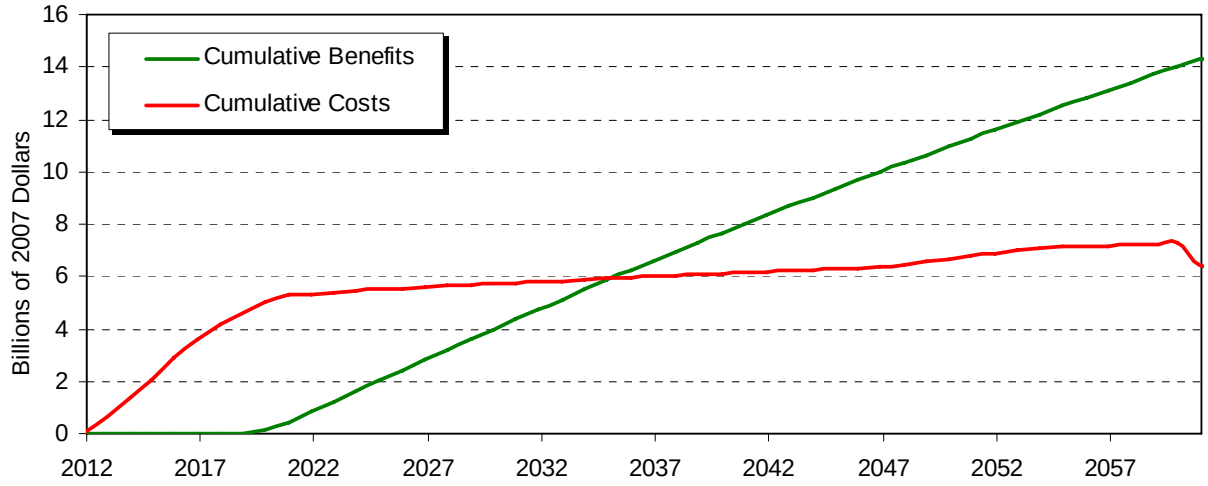
Exhibit B-5 — Annual O&M Costs in 2007 Dollars before Present Value Discounting



Cumulative Benefits and Costs

Exhibit B-6 compares the cumulative present value of benefits with the cumulative present value of costs over time for the base case scenario in Exhibit B-1. The figure shows that the cumulative discounted benefits exceed the cumulative discounted costs by the mid-2030s, or approximately fifteen years after the completion of the ST2 rail investments.

Exhibit B-6 — Cumulative Present Values of Benefits and Costs



Conclusion

This analysis shows that the anticipated quantifiable benefits from transit exceed their anticipated costs. It is important to note this analysis does not include all of the potential benefits that rail investments will contribute to region (see pages 18-22). The value of providing additional transportation capacity in new right-of-way is substantial, both for today's residents and for the continued economic growth we expect into the future.