Sound Transit 2 Planning
BNSF Eastside Corridor Commuter Rail Feasibility Study

Phase I Technical Memorandum: Review of Previous Plans, Studies and Other Documents

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Sound Transit

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FINAL DRAFT

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1. Introduction

1.1 Context

Substitute House Bill (SHB) 3224, passed by the 2008 Legislature and signed by the Governor, requires Sound Transit, in conjunction with the Puget Sound Regional Council (PSRC), to do the following:

- Review existing studies and other relevant information to determine whether commuter rail service between Snohomish County and eastern King County can be a meaningful component of a future regional plan;
- Conduct a feasibility study if the initial review does not provide sufficient information to:
  - Assess ridership potential;
  - Identify which locations would most benefit from service;
  - Identify and evaluate station sites;
  - Analyze the ability of the existing track structure to accommodate commuter rail service, coordination with freight operations, and how tourism in the region might be affected;
  - Determine the feasibility and develop cost estimates costs for establishing a concurrent bicycle and pedestrian pathway along or near the Woodinville Subdivision;
  - Identify which segments of the Subdivision would be most beneficial and cost-effective for commuter rail service; and
- Submit a joint report on the review and/or study to the transportation committees of the House of Representatives and Senate by February 1, 2009.

It is the purpose of this evaluation to satisfy the requirements of SHB 3224, and to provide information to support future decisions by the Sound Transit Board of Directors regarding the potential funding of facilities and/or passenger rail service along the BNSF Woodinville Subdivision (Eastside) corridor.

1.2 BNSF Woodinville Subdivision (Eastside) Corridor

The corridor to be studied is the BNSF Woodinville Subdivision (Eastside) corridor. The Eastside corridor is a contiguous right-of-way that stretches 39 miles from the Black River Junction in Renton (MP 0) to the city of Snohomish (MP 39). Also included in the corridor is an eight-mile line spur that stretches from Woodinville (MP 0) to Redmond (MP 8). The evaluation completed for this study will also consider the potential future connection of the corridor to the BNSF north-south mainline at Black River Junction as a means of extending commuter rail service.

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1 A feasibility study is a preliminary study undertaken to determine and document a project's viability.
1.3 Contents of this Report

Per SHB 3224, the evaluation will be completed in two phases. The initial phase will be a review of previous plans, studies and other reports that have included analysis relevant to the evaluation of commuter rail in the BNSF Woodinville Subdivision (Eastside) corridor. This report documents the results of this first phase.

The first phase will be followed by a second phase feasibility study addressing those elements listed previously (i.e., ridership forecasts, cost estimates, etc.) where the first phase analysis did not produce conclusions sufficient to satisfy the requirements of SHB 3224. The analysis completed for this effort would eventually be supplemented by more detailed alternatives and environmental analysis, if passenger rail is determined to be feasible and is selected for implementation in the corridor.

The next section of this report provides a summary of each of the plans, studies and other reports that included analysis relevant to the evaluation of commuter rail in the BNSF Woodinville Subdivision (Eastside) corridor. Section 3 includes a summary matrix of the information covered in those reports and is organized around the types of data called for in SHB 3224, passed by the Washington State Legislature and signed by the Governor in 2008. Finally, conclusions are presented in Section 4.

2. Summaries of Previous Plans, Studies and Other Reports (1990’s to Today)

Note: The studies referenced below may have covered various technologies and corridors, but the information included below includes only that which is considered pertinent and applicable to evaluation of commuter rail in the BNSF Eastside Corridor.

2.1 Joint Regional Policy Committee (JRPC) Regional Transit System Plan (early 1990’s)

Various studies and evaluations were conducted over several years in support of developing the Regional Transit System Plan. This section describes several of the studies that were included in that effort.

2.1.1 Regional Transit System Plan, Rail Alternative Report (Metro/Joint Regional Policy Committee, December 1991)

This report documented the Rail Alternative conceptual design for the North, East and South Corridors conducted during Phase II of the regional transit system planning effort. Rail was one potential technology considered during the Phase II planning; the other Plan Alternatives evaluated were No Build, Transportation System Management and Transitway. Each of these alternatives, including the Rail Alternative, was developed at a conceptual, system level. Phase II was led by Metro, in association with Pierce and Snohomish Counties, through the Joint Regional Policy Committee (JRPC).
The corridors studied for the Rail Alternative included portions of the BN Eastside ROW, including the Redmond spur. However, the technology (and vehicle type) being planned for the Rail Alternative was light rail transit (LRT). Therefore, the information contained in the Rail Alternative report is only somewhat relevant to the current study of commuter rail in the BNSF Eastside Corridor. Data on Rail transit alignment segments using the BN Eastside ROW that are pertinent to the current study are described in the section that follows.

Kirkland (Totem Lake Baseline Alignment, Segment 125) (portion):
Between SR 520 and approximately NE 12th Street, the alignment would use a short stretch of the BN ROW. The remainder of this segment would use the I-405 ROW.

Central Bellevue (Central Bellevue Baseline Alignment, Segment 122) (portion)
North of Wilburton Park-and-Ride, the Segment 122 alignment would run through Downtown Bellevue. Between Wilburton Park-and-Ride and I-90, Segment 122 uses approximately one mile of the BN ROW. The BN track would be relocated to the easterly 50 feet of the 100-foot-wide BN ROW. Due to the steep hillside, it is assumed that a tall retaining wall would be required to create the necessary rail transit trackbed.

South Bellevue to Renton (Kennydale Baseline Alignment, Segment 127)
The rail transit line would extend south in the BN ROW for 5.1 miles from the I-90/I-405 junction area in south Bellevue to north Renton where it would join the Burien-Renton branch of the South Corridor at Kennydale Station. The alignment assumes that the existing railroad track is re-located along most of the segment to one side of the 100-foot ROW to create room for the new rail transit line.

Renton Segment (Burien-Renton Baseline Alignment, Segment 139) (portion)
Continuing the Segment 127 (Kennydale) alignment south from Bellevue, the rail transit alignment would use the BN ROW in an at-grade configuration to Sunset Boulevard in North Renton. At this location, the alignment assumes an aerial configuration in the BN ROW and continues south, across the Cedar River, and on to the vicinity of the I-405/SR 167 interchange, where it leaves the BN ROW in an aerial configuration. It is assumed that existing power lines within the BN ROW would be relocated underground where the rail transit alignment is in an aerial configuration.

Redmond Segment (Redmond Baseline Alignment, Segment 124) (portion)
Approaching Downtown Redmond, the Segment 124 alignment enters the BN ROW (Lake Sammamish branch line/Redmond spur) in an aerial configuration west of the Sammamish River. The alignment continues in the BN ROW until the SR 520/Redmond Way interchange, where it curves north. The Redmond Town Center Station would be located in the BN ROW.

2.1.2 Regional Transit System Plan, Final EIS (Metro/Joint Regional Policy Committee, March 1993)

In developing the Regional Transit System Plan, a series of studies were completed during the early 1990’s to evaluate various HCT options in the region. These studies
included evaluation of commuter rail service operating in the BN Eastside ROW between Tukwila and South Kirkland via Renton and Bellevue. Evaluation of potential commuter rail service between Bellevue and Renton was requested by those two cities, but this link was not included in the adopted 1993 Regional Transit System Final Plan. A separate but coordinated study considered commuter rail service from Tukwila to North Renton, which was included in the adopted 1993 Final Plan. These two studies are summarized below.

Regional Transit Project, Eastside Commuter Rail Feasibility Study (Metro/Joint Regional Policy Committee, April 1992)

Eastside Commuter Rail (Tukwila to South Kirkland)
This feasibility study of commuter rail service between Tukwila and South Kirkland was developed at a conceptual level of definition. The report includes a description of the physical environment as well as a definition of a potential commuter rail scenario. An operations approach, ridership projections, capital facility and equipment needs, and cost estimates are included. The alignment would use the existing (at-grade) BN 18th Subdivision Branch Line ROW between Tukwila and South Kirkland.

Physical Environment:
This section of the report includes a description – in general terms – of the many topographical challenges present along the corridor, noting that there are steep cross-slopes at several locations. There are several bridges along the corridor, including the Wilburton Trestle, which is listed in the State Register of Historic Places. In addition, the report notes that wetlands exist at various locations along the corridor, including Mercer Slough in south Bellevue, Vernell’s wetland in the Bel-Red corridor, and along the Black, Green and Duwamish Rivers in Renton and Tukwila. The alignment also passes through or near several public parks and natural areas, including a blue heron rookery west of downtown Renton.

According to the report, the alignment abutted mostly vacant or industrially developed land, with some adjacent residential and/or office uses at various locations. The single largest trip origin and destination along the alignment was the Boeing Plant in Renton.

Operations:
At the time of the report’s publication, the existing freight usage of the alignment consisted of an average of two freight trains per day operated at an estimated average speed of 19 mph. These operations occur on the line between Tukwila and South Kirkland Park-and-Ride.

The potential commuter rail service scenario would provide two-way peak-hour service between South Kirkland Park-and-Ride and Boeing Renton, downtown Renton, and the main Seattle-Tacoma commuter rail line. Run times and ridership were estimated using a maximum commuter rail train speed of 50 mph (except for line sections subject to lower speed restriction). Including station dwell time, the average speed is 33 mph and cumulative one-way run time is 29 minutes for the 15 miles between South Kirkland Park-and-Ride and Tukwila. The peak-period operating plan assumed headways of 22
minutes and five train sets, which would require two passing sidings. These sidings would be located at the I-90/I-405 (Factoria) Station and the North Renton (Boeing) Station.

**Ridership:**
Total ridership projected by 2020 for the commuter rail service between Tukwila and South Kirkland was 1,200 boardings per day. If the existing commuter-oriented bus route that serves the same corridor (Route 340) was not truncated at either end of the commuter rail line, then ridership for commuter rail service would drop to 700 boardings per day.

The potential commuter rail service did not generate new transit riders: the estimated 1,200 daily boardings represent a reallocation of riders from existing bus service. This occurs because “…any travel time advantages the commuter rail alternative offers appear to be offset by the additional time added to commuter’s trips waiting to transfer to the commuter rail system. Since neither end of the commuter rail line is within convenient walking distance of downtown Bellevue or the western portion of the Boeing complex in Renton, commuters using the trains would be forced to transfer to local buses to finish their trips.”

**Rail Infrastructure:**
The condition of the track and ballast were evaluated during field inspections, and it was concluded that the rails, ties, ballast, and hardware warrant replacement to bring them up to ARA passenger standards. Switches and signals would also be replaced, and crossing protection would be provided. The report included a set of plan drawings indicating track geometry, bridges, grade crossing locations, and other prominent features of the corridor.

**Stations:**
Commuter rail station locations would be provided at seven locations along the corridor. The locations and layouts are preliminary in nature and would require further analysis and evaluation prior to selection of final sites.

- **South Kirkland Terminus Station:** This station would be located at the existing South Kirkland Park-and-Ride.
- **NE 8th and Bel-Red Road Station:** This station was located to serve the Overlake Hospital area. Downtown Bellevue destinations were recognized as not being within walking distance of the BN alignment.
- **I-90/I-405 (Factoria) Station:** This station was located to provide for transfers to the proposed east-west LRT line along I-90, which would have a station located in the vicinity of the interchange. Realignment of the track would be required to provide a straight track section at the station.
- **Barbee Mill/May Creek Station (near I-405/Lake Washington Boulevard interchange):** Because neighborhood land uses are industrial in nature, this station would be sited to provide for park-and-ride access.
- **North Renton/Boeing Plant 2 Station (south of NE Park Drive between I-405 and Garden Avenue North):** This station would provide commuter rail passengers with access to the Boeing facility, a primary employment center within the corridor.
- Downtown Renton Station: This station would be located west of Burnett Avenue South at the former train station and would provide access to Downtown Renton. At the time of report printing, this train depot was being modified for use by the Spirit of Washington dinner train.
- Tukwila Terminus Station (near Black River Junction): This station was identified as a potential transfer/interline station from the proposed South corridor commuter rail system. Further analysis is needed to identify if northbound and/or southbound commuter rail trains would run directly to Renton or if a transfer would be needed. A decision had not yet been made on whether the South corridor service would use the UP or BN mainline tracks. The location studied for this station is adjacent to the UP and BN mainline tracks between approximately South 141st Street and South 143rd Street, just north of the Black River Junction. An alternative location immediately south of the Black River Junction could be used if direct service to/from Tacoma was identified as warranted.

**Maintenance and Storage Facilities:**
Trains would be stored (and cleaned daily) on storage tracks at either end of the line. Both sites would be fenced, and drains, etc., would be provided. Maintenance of the vehicles, other than cleaning, was assumed to occur at a facility to be provided for the South corridor line and/or sub-contracted. A shed/building for train operator/crew would be provided at each vehicle storage area.

**Equipment:**
Including spares, six locomotives and six bi-level push-pull passenger cars would be required to provide the commuter rail service. Extensive signal and switch upgrades would be needed. Fare collection equipment, communications and other equipment would be located at stations.

**Cost Estimate:**
The capital cost for the commuter rail service was estimated at $104.4 million (1991 dollars), including construction (including stations), equipment (e.g., rolling stock, signals, switches, etc.) and right-of-way.

The report indicates that operation of the commuter rail service would cost an estimated $5 million (1991 dollars) per year.

**Conclusions:**
The report concluded that implementation of commuter rail between Tukwila and South Kirkland -- while technically feasible -- would produce no new transit riders but would incur substantial costs. However, the report also indicated that this potential service should be considered in the context of all transit services in the East corridor. In addition, it was noted that an extension of the South corridor commuter rail system to Renton may be worth further consideration. This concept is the subject of the following report summarized in this section.
Renton Commuter Rail (Black River Junction to North Renton)
As discussed in the previous report, the concept of operating direct commuter rail service between North Renton and Seattle and/or Tacoma was evaluated. This study was a follow-up to the previous work. Information covered in the previous report is not repeated here. Summarized in this follow-up report are additional study conclusions regarding operations, ridership, alignment, and stations. Technologies other than commuter rail were also evaluated in this corridor.

The alignment would use the existing (at-grade) BN 18th Subdivision Branch Line ROW between Tukwila and North Renton. The distance from Black River Junction to North Renton is 4.2 miles. The rails have six grade crossings with streets in Downtown Renton.

Operations:
Due to existing train volumes on the mainline tracks in the South corridor, operating direct service between the South corridor commuter rail system and North Renton was recognized as having impacts on existing passenger and freight rail service. Operating considerations include uncoupling northbound trains at the Longacres (Tukwila) Station.

This report evaluated various operating scenarios to identify potential impacts to train traffic on the mainline tracks. Concepts considered included the following:

- Direct service between Tacoma and North Renton
- Direct service between Seattle and North Renton
- Direct service between Seattle and North Renton and between Tacoma and North Renton
- Shuttle service between Longacres Station (on Seattle-Tacoma line) and North Renton

After considering the potential impacts to existing Amtrak and freight train volumes, the operating plan assumption for the report used northbound trains operating from Tacoma at 20 minute headways during peak periods. Northbound service to North Renton would be provided either by upcoupling North Renton-bound cars from a Seattle-bound train at Longacres Station or by operating separate Seattle- and North Renton-bound trains in a controlled schedule “window”. It was recognized that eventual ridership and service demand, and resulting increases in train frequencies, within the Seattle-Tacoma corridor could complicate future efforts to continue direct service to Renton.

Assuming station locations as described previously and implementation of track and signal improvements, travel times would be 52 minutes between Tacoma Dome and North Renton and 25 minutes between King Street Station and North Renton.

Ridership:
Projected daily passenger trips for 1999 for each of the four operating scenarios are shown below:

- Direct service between Tacoma and North Renton: 1,000
- Direct service between Seattle and North Renton: 1,800
- Direct service between Seattle and North Renton and between Tacoma and North Renton: 3,000
- Shuttle service between Longacres Station (on Seattle-Tacoma line) and North Renton: 600

Due to the need to transfer, the shuttle scenario projects the lowest ridership of the four options. The majority of the passenger trips shown above would be re-allocated from bus routes and would not be considered new transit riders. The daily passenger trips are in addition to those trips which would use the South corridor commuter rail system.

**Rail Infrastructure:**

In order to allow direct train movements from the south UP or BN line to the Renton branch line, the proposal included reconstruction of the previously abandoned and demolished southern leg of the junction. Improvements would also be made to other sections of the Renton branch line track, sidings, switches, and crossings. Sidings would be added where needed.

**Stations:**

Commuter rail stations would be provided serving North Tukwila, Downtown Renton and North Renton. The locations of the Downtown and North Renton stations are the same as those covered in the previous report.

Because the purpose of this work was to evaluate direct service between the South corridor commuter rail line and North Renton, this study assumed that the North Tukwila Station would be relocated east to the Renton branch line tracks, rather than being located on the north-south mainline tracks. The location of the Black River Station would be along a relatively straight stretch of track immediately north of SW 7th Street and west of the extension of Lind Avenue SW. Physical constraints associated with this location include steep slopes and potential environmentally sensitive areas.

**Maintenance and Storage Facilities:**

Renton commuter rail would not require additional maintenance and storage facilities. Locomotives and coaches would share maintenance facilities with the Seattle-Tacoma line service.

**Equipment:**

Including spares, seven locomotives and seven bi-level push-pull passenger cars would be required to provide the commuter rail service between Tacoma and North Renton. Extensive signal and switch upgrades would be needed. Fare collection equipment, communications and other equipment would be located at stations.

**Cost Estimate:**

Capital cost estimates (in 1991 dollars) for the North Renton commuter rail service options are as follows:

- Direct service between Tacoma and North Renton: $48.4 million
- Direct service between Seattle and North Renton: $45.9 million
Direct service between Seattle and North Renton and between Tacoma and North Renton: $48.5 million
Shuttle service between Longacres Station (on Seattle-Tacoma line) and North Renton: $35.7 million

The amounts shown above include construction (including stations), equipment (e.g., rolling stock, signals, switches, etc.) and right-of-way.

Annual operations cost estimates (in 1991 dollars) for the North Renton commuter rail service options are as follows:
- Direct service between Tacoma and North Renton: $2.0 million
- Direct service between Seattle and North Renton: $822 thousand
- Direct service between Seattle and North Renton and between Tacoma and North Renton: $2.8 million
- Shuttle service between Longacres Station (on Seattle-Tacoma line) and North Renton: $310 thousand

Conclusions:
The report concluded that implementation of commuter rail between Tacoma and North Renton is technically feasible through provision of either direct or shuttle service. Commuter rail ridership for all of the direct operating scenarios is low (maximum of 3,000 per day), and shuttle service would be even lower.

2.2 **Central Puget Sound Regional Transit Authority (RTA/Sound Transit) Transit Plans (1995, 1996)**

Recognizing that the 1993 Regional Transit System Final Plan was too ambitious, the RTA Board drew from that Plan a smaller set of HCT investments in 1995 and sent it to the region’s voters. This $6.7 billion (1995$) 16-year Plan was placed before the voters in March 1995, but it was rejected. The 1995 did not include the South corridor commuter rail extension to Renton. Investments in the north-south Eastside (I-405) corridor were express bus improvements.

In 1996, the RTA (Sound Transit) Board sent a $3.9 billion (1995$) 10-year version of the 1995 Plan to the voters. This plan, known as *Sound Move*, did not include investments in the north-south Eastside (I-405) corridor other than express bus improvements. The east-west rail system on I-90 that was included in the 1995 Plan was eliminated for the 1996 Plan.

2.3 **Regional Transit Long-Range Vision (RTA/Sound Transit, May 1996)**

In May 1996, concurrent with adoption of the *Sound Move* program, the Sound Transit Board adopted a long-range plan to guide HCT investment in the region. The Vision was based on several years of planning, environmental analysis and public outreach that preceded its adoption. *Sound Move* is the first phase of implementation of the Vision;
additional steps toward implementation would require subsequent voter approval, following additional analysis and evaluation.

Transportation modes included for the north-south Eastside corridor include Regional Express Bus in an HOV Expressway, and a potential rail extension between Lynnwood and Tukwila. The rail extension could be light rail, commuter rail, or other rail technology. Further analysis would be needed to identify alignments, but potentially the north-south rail extension could use portions of the BNSF Eastside ROW. A rail extension was also defined for the SR 520 corridor from I-405 to Redmond, which could potentially use portions of the BNSF Eastside Redmond spur ROW.

2.4 I-405 Corridor Program Final EIS (WSDOT, 2002)

The I-405 Corridor Program evaluated a range of technologies to improve long-term multi-modal transportation conditions in the 30-mile I-405 corridor between Lynnwood and Tukwila. The study area was defined broadly and encompassed approximately 250 square miles on the Eastside. Improvement alternatives and options were developed and analyzed at a programmatic, corridor level. The Draft EIS included analysis of four programmatic alternatives and a No Action alternative. The Preferred Alternative was added for the Final EIS document. Each Build alternative contained improvements to a mix of modes. The Preferred Alternative is similar to Alternative 3.

The alternatives studied were as follows:
- No Action Alternative
- Alternative 1: HCT/TDM Emphasis
- Alternative 2: Mixed Mode with HCT/Transit Emphasis
- Alternative 3: Mixed Mode Emphasis
- Alternative 4: General Capacity Emphasis
- Preferred Alternative

Use of the BNSF Eastside ROW was considered for an HCT system in Alternatives 1 and 2. For both alternatives, this system was defined as a physically separated, fixed-guideway HCT system “potentially using some form of rail technology and potentially operating within portions of the existing Burlington Northern Santa Fe Railroad (BNSF) right-of-way.” Transit assumptions for the other Build alternatives were for lower cost bus-oriented improvements that would use the I-405 HOV lanes. Alternative 3 (and the Preferred Alternative) described the transit enhancements as Bus Rapid Transit (BRT), while Alternative 4 would continue the existing type of express bus services.

HCT System Definition:
As noted above, the HCT system defined for Alternatives 1 and 2 would potentially use portions of the BNSF Eastside ROW. However, a specific transit technology was not defined. The analysis identified that there would be potential impacts to the existing Spirit of Washington dinner train and freight trains operating in the BNSF Eastside corridor. Because the analysis was done at a programmatic level, no detailed evaluation of the BNSF Eastside ROW or definition of the HCT system was completed.
Ridership:
Transit ridership forecasts were prepared for each of the I-405 Corridor Program alternatives. Transit operations assumptions (e.g., vehicle speed, number of stations, alignment) were applied to the I-405 corridor HCT service with connections assumed to a regional HCT system, including connections to SR 520 and I-90 lines. According to the analysis, the segments with the highest projected 2020 ridership are within the central (e.g., South Kirkland to South Bellevue) portion of the corridor. These areas would generate over 15,000 riders per day on the HCT system. Projected 2020 HCT daily ridership to between Totem Lake and South Kirkland and between South Bellevue and Renton falls in the 7,500 to 15,000 range.

A sensitivity test was completed assuming that a commuter rail line was the HCT technology between Tukwila and Kirkland (assuming no other HCT service operating in that corridor). This forecast did not involve new modeling but factored up from previous information developed for the Regional Transit Project. Assuming commuter rail in this corridor, the I-405 Corridor Program’s projected 2020 ridership between Tukwila and Kirkland would be 1,800 to 1,900 per day. If direct trains were provided from the South Corridor commuter rail line serving Tacoma, the 2020 projected ridership increased to about 2,800 per day.

Other Corridor Improvements:
The BRT system proposed for the I-405 corridor includes HOV direct access ramps at various locations along the corridor, including N. 8th Street in Renton. Due to the elevation of I-405, the direct access ramps to/from the I-405 HOV lanes would be on an elevated profile well above the at-grade tracks.

2.5 Puget Sound Regional Council (PSRC) HCT Corridor Assessment (PSRC, August 2004)

In coordination with Sound Transit, the PSRC prepared the August 2004 workbook, *Central Puget Sound Region High Capacity Transit Corridor Assessment*. This assessment was part of Sound Transit’s planning effort to update its long-range regional transit plan. PSRC staff conducted an assessment of the updated existing and future land use and travel data to determine the relative potential of each study corridor to support high capacity transit. PSRC staff then reviewed a range of HCT technologies and analyzed them for future investments in each corridor.

The assessment found that, due to projected population and employment growth, the Eastside corridor will have sufficient land use activity and density to support HCT in the future. The designated Regional Growth Centers of Lynnwood CBD, Canyon Park, Totem Lake, Bellevue CBD, Renton CBD, Tukwila CBD, and SeaTac CBD are located in the corridor. Bellevue CBD already contains most of the land use indicators that are

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2 Regional Transit Project, Eastside Commuter Rail Feasibility Study (Metro/Joint Regional Policy Committee, April 1992).
supportive of HCT. Other activity centers within the corridor would also support HCT now or in the future, but to lesser extents.

Currently, a majority (66 percent) of a.m. peak person trips in the corridor are headed to Bellevue. The percentage of a.m. peak person trips by transit and carpool are even higher, at 86 and 70 percent, respectively. These data demonstrate Bellevue’s role as the key destination within the Eastside for all travel modes.

The technology assessment for the Eastside corridor evaluated the following 7 modes:
- Enhanced Bus
- BRT
- Light Rail
- Monorail
- Skytrain
- Commuter Rail (traditional locomotive-hauled technology)
- DMU

**Technology Assessment**

**Commuter Rail:**
Traditional locomotive-hauled commuter rail technology, as used for the existing Sounder services, was considered in corridors, including the Eastside corridor, where railroad tracks already exist. Other characteristics of this mode include peak hour service, high capacity and speeds, and few station locations. The report assumed train consists of a locomotive hauling between three and 10 passenger cars, with a line-haul capacity between 1,072 (2 cars) and 4,080 (4 cars) or more passengers per hour per direction (pphpd), depending on frequencies and train length. Stations would be spaced two to five miles apart with closer spacing in more dense urban areas. Average operating speed was assumed to be 25-50 miles per hour. Headways would be 20-40 minutes during the peak period.

**DMU:**
DMUs were evaluated as an alternative to traditional locomotive-hauled Commuter Rail trains. Existing and potential options for DMUs vehicles include FRA-compliant (can be operated on tracks with freight traffic) or non-compliant and either diesel or electric power. According to the report, “The DMU is particularly attractive for lower density corridors that require a short train of two or four cars.” The report assumed a line-haul capacity between 2,880 and 8,640 pphpd, depending on frequencies and train length. Stations would be spaced two to five miles apart with closer spacing in more dense urban areas. Average operating speed was assumed to be 45 miles per hour. Headways would be 2-4 minutes during the peak period.

**Application to Eastside Corridor**

**Capacity:**
PSRC calculated a southbound peak hour transit demand of 942 pphpd for current conditions and 3,733 pphpd for 2030. Based on this demand level, all of the technologies evaluated, including Commuter Rail and DMU, provide sufficient capacity to meet the
forecasted 2030 demand in the corridor. The report indicates that DMU may be more appropriate than Commuter Rail to serve the Eastside corridor, due to “the character of the right-of-way, the communities served, and the travel demands” of the corridor.

**Travel Speed and Reliability:**
Due to increasing congestion in mixed traffic, Enhanced Bus was determined to not meet desired levels of travel speeds and reliability. Due to their use of exclusive or semi-exclusive ROW, the other modes, including Commuter Rail and DMU, would provide satisfactory travel speeds and reliability. According to the report, “Stations may be spaced less frequently, giving Commuter Rail and DMU the capability to serve the less dense Eastside.” (Note that specific Commuter Rail and DMU station locations were not identified in the report).

**Land Use:**
Within the Eastside, the Bellevue CBD is already a dense mixed-use activity center and is expected to continue its recent growth. Other activity centers in the area provide lower levels of density but are also expected to grow over time. Investments in public transit infrastructure can help focus growth and development. According to the PSRC report, Commuter Rail and DMU could be expected to have a “moderate impact” on focusing transit-oriented development in the Eastside corridor. However, “… the BNSF route that would be used does not directly connect with many of the activity centers in the corridor.”

### 2.6 Sound Transit Long-Range Plan Update, Issue Paper E.1: I-90/East King County HCT Analysis (Sound Transit, March 2005)

In identifying and developing HCT options for East King County for the Long-Range Plan update, a variety of HCT technologies were evaluated, with many assumed to operate within portions of the BNSF Eastside ROW. The focus of the paper was the east/west I-90 corridor between Downtown Seattle and Bellevue, with potential branches serving Totem Lake/Kirkland, Redmond and Issaquah. The technologies that were evaluated for this effort that would use portions of the BNSF Eastside ROW were:
- Busway/Bus Rapid Transit (Busway/BRT)
- Fixed Guideway Transit
  - Light Rail
  - Monorail
  - Rail-Convertible BRT

BRT operating in HOV lanes on freeways (HOV/BRT) was also studied but would not require BNSF Eastside ROW. Commuter rail technology was not evaluated for the Downtown Seattle to Eastside corridor.

Acquisition or control of the entire (Snohomish to Renton) BNSF Eastside ROW was assumed for all of the scenarios except HOV/BRT. This assumption reflects BNSF’s loss-of-use brought on by conversion of portions of their track to transit or other
purposes. The Busway/BRT scenario was assumed to operate in the BNSF Eastside ROW from approximately Coal Creek Parkway to Totem Lake. Each of the Fixed Guideway scenarios (i.e., Light Rail, Monorail and Rail-Convertible BRT) was assumed to operate in the BNSF Eastside ROW from approximately NE 12\textsuperscript{th} Street in Bellevue to approximately 132\textsuperscript{nd} Street in Kirkland. Hybrid scenarios combining more than one technology were covered in a later report\textsuperscript{3}. Several other issue papers were also prepared for the Long-Range Plan update.

The following information on the BNSF Eastside ROW was developed as part of the conceptual engineering completed for the Busway/BRT scenario for this issue paper.

**Totem Lake to Bellevue CBD:**
- The alignment of the BNSF ROW in this segment runs primarily north/south, meandering between SR 520 and I-405. Moderate to heavy vegetation exists on each side of the existing tracks with cut and fill slopes ranging from 2 feet to 20 feet, with averages of less than 8 feet.
- At the existing NE 52\textsuperscript{nd} Street at-grade crossing, the cross-street has a 20\% grade approach west of the rail crossing and 13\% grade approach east of the rail crossing. A proposed aerial structure would have a span length of 120 feet.
- At the existing at-grade crossing at 108\textsuperscript{th} Avenue NE, the track alignment is on a horizontal curve. A proposed aerial structure would have a span length of 120 feet.

**Bellevue CBD to South Bellevue:**
- The curvature of the BNSF ROW would restrict this segment’s busway design speed to 40 mph. Speeds in excess of 40 mph could be achieved if horizontal stopping sight distances can be increased.
- The Wilburton trestle is assumed to be reconstructed.
- The at-grade intersection at SE 5\textsuperscript{th} Street is assumed to be maintained to avoid reconstruction of the Wilburton trestle at higher than its current elevation.

**South Bellevue to Coal Creek Parkway:**
- The busway leaves the BNSF ROW at the Coal Creek Parkway interchange to take advantage of comparable elevations between I-405 and the busway. The BNSF ROW drops in elevation significantly south of Coal Creek Parkway.

The branch line to Redmond was assumed to use a combination of the SR 520 ROW and a new corridor. Use of the BNSF Eastside Redmond spur ROW was not assumed.

**Ridership Forecasts:**
In general, the ridership forecast along the line serving Redmond was the highest of the three branches, followed by the Issaquah branch. The Totem Lake/Kirkland branch had the lowest ridership of the three branches, generating less than half of the ridership of the Redmond branch for LRT, Monorail and RC-BRT modes. Ridership was forecasted to

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drop off significantly at the outer edges of the system (i.e., away from Bellevue) branches to Redmond (east of Overlake Transit Center/NE 40th Street) and Issaquah (east of Eastgate Park-and-Ride).

2.7 Sound Transit Long-Range Plan Update Final SEIS (June 2005)

In 2005, Sound Transit updated its 1996 Long-Range Plan to make the plan consistent with updated local and regional plans and to reflect current conditions. The updated plan also identified projects and established priorities for the agency’s future efforts to provide additional HCT service and transit facilities within the regional transit district of urban Pierce, King, and Snohomish Counties. In preparation for this update, ST prepared a Supplemental Environmental Impact Statement (SEIS). The SEIS addressed the potential environmental effects of an updated Long-Range Plan and supplemented the original Regional Transit System Plan Final EIS, completed in 1993. The analysis in the SEIS forms the basis for subsequent Board decision-making and project-level planning by Sound Transit, including a potential second phase of HCT investments (ST2).

For the SEIS, Sound Transit evaluated a No Action Alternative and a Regional Transit Long-Range Plan Alternative. The No Action Alternative involved no change from current direction and assumed completion of Sound Move. The Plan Alternative was based primarily on the existing Long-Range Plan, adopted in 1996, and it included actions to expand regional transit facilities and services beyond the current commitments of Sound Move. The SEIS also evaluated a set of technology and corridor options that presented a “menu” of other actions that could be implemented, individually or in combination, as part of the Plan Alternative. The options do not stand alone as an alternative, but rather potentially modify or add to the Plan Alternative.

The SEIS evaluated transportation and environmental impacts for the two primary alternatives and options. For the I-405 (Eastside) corridor, the final Plan Alternative included Light Rail from (SeaTac to) Tukwila to Renton to Bellevue to Totem Lake (to Lynnwood). Regional express bus/BRT was also evaluated in all of the potential light rail corridors. Monorail was evaluated as an option in the Eastside corridor, including between SeaTac and Renton. Commuter rail was not evaluated in the Eastside corridor. LRT or Rail-convertible BRT was selected as the mode for the east-west/I-90 corridor.

Ridership forecasts were completed for the No Action and Plan Alternatives. For both alternatives, Eastside ridership forecasted for 2030 was greatest in the central Bellevue area and decreased with distance from Downtown Bellevue. With the Plan Alternative, HCT ridership along the central Bellevue segment would be 41,300 passengers per day. Along the north line in the Kirkland area, ridership would be 16,600 passengers per day, while the line to Redmond would have 13,100 passengers per day in the Overlake area, dropping to 3,900 at Redmond. The Issaquah branch line would have 11,200 passengers per day in the Eastgate area, dropping to 3,100 at Issaquah. The southern line would have 18,600 passengers per day between Bellevue and Renton.
The analysis for the SEIS was completed at a very conceptual level and did not identify or evaluate specific alignments or rights-of-way (such as the BNSF Eastside ROW). The EIS recognizes that, at the time of its publication, regional efforts had begun to consider public acquisition of the BNSF Eastside corridor. As such, the document indicates that use of the full corridor was not required for any of the HCT elements of the Plan Alternative or Options.

2.8 Sound Transit Phase 2 – East Corridor, HCT Design Report: Downtown Seattle to Redmond Terminal Station (Sound Transit, November 2005)

Immediately following the update of the Long-Range Plan, Sound Transit began the process to identify the next phase of investments in the region’s HCT system. This process, which is still on-going, is identifying and evaluating options to expand HCT serving each of the district’s subareas. In the East King County subarea, an HCT system connecting Downtown Seattle with Bellevue and Redmond via I-90 and Mercer Island was developed in 2005. Consistent with the Long-Range Plan direction for this corridor, this system was developed for use by either a Light Rail or a Rail-Convertible Bus Rapid Transit technology. Other projects in the East King County subarea have been or continue to be considered, including HCT improvements in the I-405 and SR 520 corridors, and various planning studies.

For purposes of developing a cost estimate for the I-90/East Corridor HCT system for ST2 planning, a representative alignment was defined at a conceptual level of engineering. Various options were considered in developing the representative alignment. The alignment analysis used information developed for Issue Paper E.1: I-90/East King County HCT Analysis (Sound Transit, March 2005), which was summarized in a previous section of this report.

The representative alignment was assumed to enter the BNSF Eastside Redmond spur ROW in an aerial configuration near State Highway 908 in Redmond. The alignment continues through downtown Redmond in an aerial configuration to a station serving downtown Redmond and a terminal station located near SR 520 and SR 202. In addition, a representative site for a 15-acre maintenance and storage facility was located along the BNSF Eastside ROW in the Bel-Red corridor area. The BNSF Eastside ROW was considered for other segments of the representative alignment, such as between downtown Bellevue and I-90, but was not included in the final alignment.

Issues/Conditions Noted within BNSF Eastside ROW:
Wetlands were identified in proximity to the prototypical alignment and the maintenance facility in areas along the BNSF Eastside ROW. Mitigation of wetlands impacts would need to be mitigated.
Ridership Forecasts:
Based on ST2 ridership forecasts, the Bellevue CBD will continue to be the primary transit origin and destination within the Eastside. Projected HCT boardings drop along segments as their distance increases from the Bellevue CBD.

2.9 Sound Transit East Link Light Rail Project (currently in process)

NOTE: This section summarizes preliminary information developed for the East Link Light Rail Project Draft EIS.

Sound Transit is currently in an environmental review process to consider expansion of the Link Light Rail system from Downtown Seattle to the Eastside. The East Link system would connect the Eastside’s largest population and employment centers with Downtown Seattle and SeaTac Airport. Connecting to the Central Link system at the International District Station in Downtown Seattle, the proposed East Link system would serve Rainier Avenue in Seattle, Mercer Island, South Bellevue, Downtown Bellevue, Bel-Red/Overlake, and Downtown Redmond. Conceptual engineering of various alignment, station, and maintenance facility options is underway to inform the environmental process.

The East Link preliminary alignment options include line sections along portions of the BNSF Eastside ROW, including the Redmond spur. Segment alternative B7 would use the BNSF Eastside ROW at-grade between I-90 and approximately SE 20th Street in south Bellevue. The preliminary typical cross-sections in this section assume 39 feet of ROW width for the Light Rail tracks and up to 25 feet for a parallel trail.

Segment alternatives C1T and C2T would use the BNSF ROW in aerial and at-grade configurations between NE 8th Street and NE 12th Street. Hospital Station at NE 8th Street along these segment alternatives is located in the BNSF ROW.

Various connector segment alternatives would use the BNSF ROW in the Bel-Red area, and the Ashwood/Hospital and 124th Avenue Stations (for some or all segment alternatives) would be located within the BNSF ROW. In addition, maintenance and storage facility alternatives 1 and 2 would be located adjacent to the BNSF ROW in this area. The preliminary typical at-grade cross-sections in this section assume 52 feet of ROW width for the Light Rail tracks and up to 25 feet for a parallel trail.

All segment alternatives in Downtown/SE Redmond would use the BNSF Eastside Redmond spur ROW. One or more stations in Redmond may be located along these segment alternatives within the BNSF Eastside Redmond spur ROW. The Redmond Transit Center Station for segment alternative E2 would be located near the BNSF Eastside Redmond spur ROW. In addition, some options for the maintenance and storage facility alternative 5 would be located adjacent to the BNSF Eastside Redmond spur ROW in this area. A preliminary typical at-grade cross-section in this section could assume an envelope width for the tracks of 30 feet, with additional ROW width for a parallel trail. The width of the BNSF Eastside Redmond spur ROW varies between 76
and 100 feet in this area, and a portion of this section of the BNSF ROW is adjacent to NE 76th Street.

**Preliminary Ridership Forecasts:**
Based on preliminary ridership forecasts, daily boardings along the Downtown Bellevue segment of the East Link system will continue to be the primary transit origin and destination within the Eastside. Projected East Link boardings drop along segments as their distance increases from Downtown Bellevue.

### 2.10 BNSF Corridor Preservation Study Final Report (PSRC, May 2007)

Following an announcement in 2003 that the BNSF Railroad was seeking to divest itself of most of its Woodinville Subdivision (Eastside) rail corridor, the PSRC began a study of potential future public transportation uses of the ROW. The roughly 42 miles of ROW potentially available for public purchase stretch from approximately MP 5 (Gene Coulon Park) to MP 39 (Snohomish) of the Woodinville Subdivision and the eight-mile Redmond spur. The section of track between Black River Junction and MP 5 was not included because BNSF will retain ownership of this section for active rail use.

The study was led by an Advisory Committee comprised of representatives of local jurisdictions along the corridor, transportation interests, and other BNSF corridor users and/or beneficiaries. This advisory committee met regularly during the study process and provided updates to the standing policy committees of the PSRC.

For purposes of the planning study, the corridor was broken into four segments as described below (milepost numbers are rounded up). The study did not cover the southern five miles of the BNSF ROW because it is not under consideration for public acquisition.

- **Segment A:** North Renton (MP 5 near Gene Coulon Park) to North Bellevue (MP 14)
- **Segment B:** North Bellevue (MP 14) to Woodinville (MP 25, at the junction of the spur to Redmond)
- **Segment C:** Woodinville (MP 25, at the junction of the spur to Redmond) to Snohomish (MP 38 plus the additional one-mile section of unused track crossing the Snohomish River)
- **Segment D:** Woodinville (MP 0) to Redmond (MP 8), known as the Redmond Spur

The study effort began with a data compilation effort, which was followed by technical analysis and Advisory Committee discussions.

**Data Gathering**
In process of conducting the study, the PSRC compiled a significant amount of data about the BNSF Eastside Corridor. The following is a list of the types of data that were included in this effort:
- Aerial maps (2002) to use as base maps;
- Right-of-way lines for King and Snohomish counties;
- Existing regional and local trail facilities near the corridor;
- Existing utility infrastructure crossing the corridor;
- BNSF track charts;
- Information on the physical environment of the corridor, obtained during a Hy-Rail tour; and
- Issues/concerns expressed by staff of local jurisdictions along the corridor.

**Aerial Maps:**
The aerial maps included in the final report show ½ mile of the corridor on each 11”x17” sheet. These maps show the existing geographic area within which the BNSF Eastside Corridor is located.

**Right-of-Way Lines:**
The right-of-way lines for the BNSF property are shown on the maps. This data was provided by King County for both King and Snohomish county areas of the corridor.

**Regional and Local Trail Facilities:**
Regional and local trail facilities were mapped to show the opportunities that could exist for trail connections if a trail was developed along the BNSF ROW.

**Utility Crossings:**
Similar to transportation infrastructure, utilities also require linear corridors that can be challenging to site in urban areas. The PSRC study documented utility crossings in the corridor and evaluated preservation of existing utilities as well as potential future utility infrastructure opportunities. Utility data collected by the study include Puget Sound Energy (PSE) electric transmission, electric distribution, and gas distribution facilities.

**BNSF Track Charts:**
The track charts were obtained from BNSF to identify the milepost, street crossing and other data for locations along the corridor.

**Characteristics of the Physical Environment:**
A Hy-rail tour along the corridor was conducted for the study team. The focus of this tour was to identify and record readily apparent physical characteristics of the corridor, such as the following:
- Steep slopes;
- Standing water;
- Wetlands;
- Right-of-way related issues (such as obvious encroachments);
- At-grade crossings; and
- Existing trails.
Documentation of the tour included production of a video. The characteristics noted during the tour were included (as appropriate) on the study base maps. The condition of the existing track, railbed and bridges were not subjects of this tour.
Interviews with Local Jurisdictions and Other Interested Parties:
During the study process, meetings were held with staff of the eight local jurisdictions along the corridor to identify and record their issues and concerns with the potential uses being studied for the corridor. Meetings were held with the following local jurisdictions: the cities of Renton, Bellevue, Kirkland, Redmond, Woodinville and Snohomish, plus King and Snohomish counties. In addition, meetings were held with the following interested parties: Cascadia Center/Discovery Institute, Cascade Bicycle Club, the Bicycle Alliance, and Puget Sound Energy. The PSRC report includes detailed information on the topics discussed during these meetings.

Technical Analysis
Early in the study process, the Advisory Committee identified the following five potential scenarios for evaluation:

- **Scenario 1: Trail-only (Common Baseline).** This scenario assumed removal of the rails and ties with subsequent reconfiguration of the railbed to support a paved multi-use trail.
- **Scenario 2: Trail with Current Rail (includes Dinner Train).** A paved multi-use trail would be added alongside the existing tracks for this scenario.
- **Scenario 3: Trail with Increased Rail.** This scenario would assume increased use of the tracks along with construction of a paved multi-use trail alongside the existing tracks. The tracks, railbed, rail bridges and other infrastructure/hardware would be upgraded and/or replaced to allow for redundant or backup/bypass freight rail use.
- **Scenario 4: Trail with Commuter Rail.** This scenario would assume implementation of commuter rail (either locomotive-hauled passenger cars or DMU) service on the tracks along with construction of a paved multi-use trail alongside the existing tracks. The tracks, railbed, rail bridges and other infrastructure/hardware would be upgraded and/or replaced to allow for more frequent use by passenger trains.
- **Scenario 5: Trail with HCT.** A yet-to-be-determined HCT technology would use the corridor along with a paved multi-use trail in this scenario. The HCT technology could be Light Rail, monorail or some other HCT mode using an exclusive guideway.

While the study initially identified five potential future scenarios for the corridor, it was determined that earlier regional transit system planning decisions should guide decisions on whether to further evaluate transit uses in the corridor as part of this study. The prior technical work by WSDOT and Sound Transit on the I-405 Corridor Program resulted in a decision to proceed with BRT as the primary north-south transit technology on the Eastside for the short and medium-term (20 years). This was due to the relatively low ridership projected for HCT and/or commuter rail in the Eastside corridor, coupled with relatively high cost of implementation. Therefore, early in the study, Scenarios 4 and 5 were removed from further consideration and evaluation for the short and medium-term but were retained for the long-term timeframe.
Upon reviewing information generated through the WSDOT Statewide Rail Capacity and Need Study on freight shipping needs in the Puget Sound region and statewide, the Advisory Committee determined that the Eastside corridor should not be considered as a strategic regional or state freight rail corridor. The concept of the Eastside corridor as a potential future “back-up” to the BNSF mainline (Everett-Seattle) was permanently set aside. The BNSF and WSDOT are investigating potential freight rail capacity improvements in the Stampede Pass and Columbia River Gorge corridors to reduce current and anticipated bottlenecks in the Stevens Pass rail corridor.

The following sections summarize the types of technical information developed for the study, particularly as related to the Commuter Rail with Trail scenario.

**Rail Use Configuration:**
A potential configuration of the rail was developed using the track charts. This configuration was developed for an operating scenario that would provide for the following rail traffic volumes:
- Commuter rail trains on twenty minute headway with ten minute headway possible during peak periods; and
- Freight trains on 30 or 40 minute headway (48 or 36 trains per day).

Based on the above operating scenario, the potential configuration identifies suggested sidings (passenger and freight), suggested speed limits for passenger and freight trains, and potential track alignment changes to allow for the increased speeds.

**Environmental Assessment:**
The study included a general assessment of the existing community and environmental conditions along the corridor, and the PSRC report provided this information in the context of the three scenarios that were fully considered. While the study did not include this data for the Commuter Rail scenario, some of the results reported for the other scenarios would still be applicable to the Commuter Rail scenario. For example, additional right-of-way could be needed to provide for infrastructure in excess of the existing single track. For the Commuter Rail scenario, the additional ROW could be needed for passing sidings, stations and parking. ROW acquisition and development could potentially impact residential and commercial businesses, parks, wetlands, flood hazard areas, and streams. In addition, an increase in train volumes could generate noise, vibration and air quality impacts in the corridor. It was recognized that additional engineering and environmental analysis would be needed if one of the scenarios moves forward.

**Economic Impact Assessment:**
The study included a general assessment of the potential economic impacts of project development along the corridor, and the PSRC report provided this information in the context of the three scenarios that were fully considered. The potential expected economic impacts were identified for each group of users, such as future trail users, along and near the corridor. While the study did not include this data for the Commuter Rail scenario, some of the results reported for the other scenarios would still be applicable to the Commuter Rail scenario. For example, positive impacts are expected for future trail
users but could be less positive (as compared to other scenarios) due to increased train volumes operating nearby. Potential traffic impacts of the increased train volumes (at grade crossings) could cause concern to people living and working nearby.

If commuter rail is provided in the corridor, the rail crossing at the I-405 southbound lanes would need to be replaced and that would mean that the *Spirit of Washington* dinner trail could return to operations in the corridor. This situation would be a positive economic impact for that corridor user. Requirements for additional ROW acquisition could impact land use development along the corridor in positive and negatives ways. It was recognized that additional economic impact analysis would be needed if one of the scenarios moves forward.

**Cost Estimates:**
Planning level cost estimate data that were developed for the study is described in the section: “Fact Sheet for Scenario 4 (Trail with Commuter Rail).” Cost estimates were based on rough order-of-magnitude per-mile costs developed at a conceptual level of analysis.

The study found that construction of a trail parallel to the existing tracks could cost two to four times as much as construction of a trail on the existing railbed (i.e., reconstructed for trail use with tracks removed). The average cost per mile for trail construction for the rail (not specifically commuter rail) with trail scenario was estimated at $400,000 to $800,000 per mile, while the trail construction as a single use in the corridor was estimated at $1.5 to $3.0 million per mile.

**Traffic Impacts:**
The study included an analysis of the potential traffic impacts in year 2030 of project development along the corridor, and the PSRC report provided this information in the context of the three scenarios that were fully considered. While the study did not include this data for the Commuter Rail scenario, some of the results reported for the other scenarios would still be applicable to the Commuter Rail scenario. For example, increased volumes of trains could cause significant negative traffic impacts on roadways that cross the rail corridor. The level of impact would depend on the frequency and length of the trains. Grade-separated crossing would reduce impacts to traffic and would reduce conflicts between trains and roadway traffic and between trail users and roadway traffic. However, grade separation of crossings would increase project costs.

**Fact Sheet for Scenario 4 (Trail with Commuter Rail)**
Fact sheets were developed to describe the preliminary conceptual project definitions, order-of-magnitude cost estimates and other information that were developed for each of the five scenarios. This information was conceptual in nature and included footprint assumptions, typical cross sections, general planning level costs, potential time frame and probable issues and concerns.

According to the Fact Sheet for Scenario 4 (Trail with Commuter Rail), this scenario was assumed to require physical separation between the rail and trail uses, upgraded grade-
crossings, signal improvements (due to higher train volumes than existing conditions),
and development of stations. The scenario could be implemented using either the
*Sounder*-type traditional locomotive-hauled trains or with DMUs. It was noted that the
Eastside rail line is not located to serve Downtown Bellevue which could limit its
potential ridership (Note: no ridership estimates were completed as part of this study).

**Footprint Assumptions:**
The footprint assumptions for the Commuter Rail scenario were as follows:

**Trail Assumptions:**
- Paved pathway (asphalt paving)
- Minimum 10’ width; 12’ average; 14’ desired
- Gravel footpath – 5’, one side only, can phase as shoulder
- Shoulders – 2’ each side, 1’ minimum in narrow areas
- Total trail width for development:
  - Minimum – 14’ wide (10’ paved, 2’ shoulder each side, no footpath)
  - Average – 19’ wide (12’ paved, 2’ shoulder one side, 5’ footpath one side)
  - Desired – 25’ wide (14’ paved, 5’ footpath one side, three 2’ shoulders
    including shoulder to footpath)

**Rail Assumptions (builds off of the Trail with Increased Rail Scenario #3):**
- Single track width
  - Minimum – 30’ wide (15’ from centerline of track)
  - Average – 50’ wide (25’ from centerline of track)
- Combined width (Single-track Trail plus Rail)
  - Minimum – 59’
  - Average – 84’
- Assumes stations every 3.8 miles (allows for 10 minute running times between
  stations at an average speed of 40 mph)
- Passing tracks (1,000’ long) provided at each station

**Typical Cross Sections:**
The report included typical cross sections for the Trail with Commuter Rail Scenario for
the following situations:
- Flat Land (urban and rural)
- Embankment (trail level with track; trail at ground level)
- Steep Slopes (trail level with track; trail above track; trail below track)

**Generic Planning Level Costs:**
General order-of-magnitude unit costs were provided for the following:
- Baseline trail
- Trail on new bridge structures
- Retaining walls (10’ high)
- Rehabilitate track (Class 3 minimum)
- CTC signal system
- Station
- Annual trail maintenance (urban and rural)
- Annual track maintenance
Quantities were not estimated for Scenario 4, so a complete cost estimate for implementation can not be determined.

**Potential Time Frame:**
This scenario was viewed as being potentially applicable to the long-term (beyond 20 years) only. This decision was based on the earlier planning work regarding the limited ridership potential for commuter rail in this corridor (see earlier section on this topic).

**Probable Issues/Concerns:**
The following were the probable issues and concerns noted for Scenario 4:
- Community impacts
- Economic impacts
- Upgrade requirements
- Geometric restrictions
- Liability resulting from dual (rail and trail) use
- General planning level cost refinement
- Trail connectivity opportunities
- Investment requirements
- Ability to accommodate trail with rail
- Major investment underway for I-405 Corridor BRT (as alternative to commuter rail)

**Recommendations**
The primary conclusion of the study was that preservation of the corridor for current and future public transportation use was essential. It was determined that any segments not expected to have ongoing freight use should be formally rail-banked through the Surface Transportation Board process. The only segment of the corridor expected to have continuing freight rail use is Segment C between Woodinville and Snohomish. Rail-banking of the other segments would allow for future consideration of new options or reconsideration of previous options for public use of the corridor. The study specifically recommended that HCT passenger rail options be reconsidered in the medium to long-term timeframe in all segments of the corridor, including the Redmond spur. In addition, the study recommended near-term implementation of a regional multi-purpose trail in all segments of the corridor, except for Segment C. In that segment, additional study of the potential for a trail is advised. The study also recommended consideration of use of the corridor by the *Spirit of Washington* dinner train in the corridor between Woodinville and Snohomish.

2.11 **I-405 Corridor Program, Bellevue Nickel Improvement Project Environmental Assessment (WSDOT, January 2006) and I-405 South Bellevue Widening Project Fact Sheet (WSDOT, March 2008)**

The phased implementation of improvement projects contained in the I-405 Master Plan includes widening the freeway to add one additional general-purpose lane in each
direction between I-90 and Southeast 8th Street in South Bellevue. This South Bellevue project is partially funded by the Transportation 2003 (Nickel) Package and is currently under construction. The BNSF track crossed under the northbound I-405 lanes, which are on a structure. The track crossed over the top of a tunnel (known as the Wilburton tunnel) that contained the southbound freeway lanes.

In order to widen the freeway to add the new southbound lanes while keeping the BNSF track in its current configuration, WSDOT determined that the current tunnel would need to be demolished and re-built with a wider structure. The re-building of a rail crossing at this location was estimated to cost roughly $25 million (construction cost) plus $10 million to accommodate active freight rail use during construction. However, when BNSF announced its intention to abandon rail operations on the Eastside line and sell the ROW, WSDOT determined that it would not need to replace the tunnel as part of the highway widening project. This action was viewed as a cost savings for the freeway project. A short (approximately 0.6 mile) section of the tracks in this location has been removed (following abandonment by BNSF in October 2006), and the Wilburton tunnel has been demolished. If desired at some future point, a new structure would be needed to reconnect the corridor across the southbound lanes.

Anticipating the removal of the tunnel and track connection across the southbound freeway lanes, the Spirit of Washington dinner train ceased operations in the BNSF Eastside corridor. The only other rail use of the corridor at the time was delivery of airplane fuselages from the Boeing Everett facility to its plant in North Renton. Trains carrying these very long airplane parts were unable to use the tracks approaching the Boeing plant from the south (i.e., via Black River Junction) due to a tight horizontal curve at the rail bridge over the Cedar River in Renton. Agreements were made to improve the curvature at the bridge in order to allow the Boeing parts to be shipped via the southern portion of the Eastside corridor. The replacement of the Cedar River rail bridge (along with replacement of the other three rail bridges in Downtown Renton as part of a combined rail/street improvement program) has been completed.

It should be noted that, due to the absence of a wye track between the Black River Junction (south) leg and the spur into the Boeing Renton plant, freight trains traveling to the Boeing plant will need to stop on the Eastside line and then proceed in the reverse direction into the Boeing plant. This operation would be reversed for trains leaving the Boeing plant.

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2.12 Purchase and Sale Agreement: Woodinville Subdivision – North Rail Line, including Exhibits (Approved by BNSF, Port of Seattle, and King County, May 2008); and Donation Agreement: Woodinville Subdivision – South Rail Line, including Exhibits (Approved by BNSF, Port of Seattle, and King County, May 2008)

In May 2008, following years of discussion and negotiation, the Port of Seattle and King County signed agreements with BNSF to obtain ownership of the BNSF (Woodinville Subdivision) Eastside Corridor, including the Redmond spur. One agreement covers the North portion of the corridor, between Woodinville and Snohomish where current freight rail operations are expected to continue, along with the Redmond spur. A separate agreement covers the Port’s acquisition of the South portion of the corridor between Renton and Woodinville. The North corridor is covered in a purchase and sale agreement, while the South corridor agreement is structured as a donation of the rail property to the Port.

Purchase and Sale Agreement for the North Rail Line
This agreement covers the portion of the BNSF Eastside Corridor between approximately MP 23.45 in Woodinville and 38.4 in Snohomish including the Snohomish bridge at MP 38.25. This agreement also covers the entire Redmond spur from MP 0.0 in Woodinville to MP 7.3 in Redmond. The agreement commits the Port to pay, at closing, approximately $107 million to BNSF in exchange for the North Rail Line property. King County receives the right of first opportunity to purchase portions of the corridor from the Port. The agreement directs that the Port and the County accept the corridor in an “As Is With All Faults” condition. For information purposes, the agreement includes a list of third party leases and licenses (e.g., utility easements) along the corridor.

The remainder of this section includes a brief summary of information contained in the Purchase and Sale Agreement (and Exhibits) that is pertinent to the study of feasibility of commuter rail in the corridor.

Easement for Rail Operations on North Rail Line (Exhibit H):
Included in the purchase and sale agreement for the North Rail Line is a Freight Easement Sale Agreement. With the Purchase and Sale Agreement, the Port of Seattle will assume ownership of the real property encompassing the North Rail Line (i.e., land, tracks, bridges, etc.). However, the Port itself does not want to become a rail operator and “...declines to assume any obligation to provide common carrier freight rail service...” Accordingly, the Freight Easement Sale Agreement identifies that, upon sale of the real

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5 List of Third Party Leases/Licenses, Exhibit F to Purchase and Sale Agreement: Woodinville Subdivision - North Rail Line (approved by BNSF, Port of Seattle and King County, May 2008).
6 Form of Freight Easement Sale Agreement, Exhibit H to Purchase and Sale Agreement: Woodinville Subdivision - North Rail Line (approved by BNSF, Port of Seattle and King County, May 2008).
property itself, BNSF will retain the rights to operate freight on the North Rail Line through an exclusive and permanent easement. The freight easement agreement indicates that – concurrent with the closing of the Purchase and Sale Agreement transaction – BNSF intends to transfer (i.e., sell) the freight easement to a third party operator (TPO), who would then have the exclusive rights to operate freight on the North Rail Line. The process to select the TPO is underway.

The terms of the freight easement agreement specify that these rights cover not only freight rail service but also passenger excursion rail service. According to the agreement, the “TPO shall have the exclusive right and obligation (...) to provide, by itself and/or by or through any entity designated by TPO, Freight Rail Service and/or Excursion Rail Service on and over the Corridor.” In addition, “TPO shall have exclusive authority to manage, direct and control all activities on the Corridor to provide Freight Rail Service and Excursion Rail Service, including, without limitation, the operations of all trains, locomotives, rail cars and rail equipment, and the movement and speed of the same on the Corridor.” Because the agreement defines excursion rail service as trains using the North Rail Line “for purposes other than hauling common carrier freight or in service other than Freight Rail Service,” the easement agreement effectively conveys to the TPO all rights to provide, manage, direct and control all rail operations on the North Rail Line, both freight and passenger. Therefore, the TPO would have the right to refuse access to any organization seeking to operate commuter rail service on the North Rail Line.

The operations and maintenance agreement requires that the TPO be responsible for general maintenance activities of rail facilities, roadbed, embankments, bridges/trestles, signal systems, grade crossings, etc., including upgrades and/or replacements.

The operations and maintenance agreement requires that the TPO allow the Port to permit certain transportation uses (such as a multi-use trail) on the Corridor as long as those uses are not inconsistent with and do not interfere with the TPO’s other rights and obligations under the agreement. However, any construction work performed by others (in support of a trail or commuter rail facilities, for example) must make a reasonable effort to not interfere with or delay other users of the corridor.

If the TPO seeks at a future time to abandon any portion or segment of the North rail line and if the Port proceeds with the STB process for railbanking of that portion of segment, the agreement requires the TPO to actively participate in the railbanking process.

Easement Agreement for Snohomish Bridge (Exhibit J):
The operations and maintenance agreement between the Port and the TPO (as described previously) authorizes the use of the Snohomish bridge by the TPO. With the Easement Agreement for the Snohomish Bridge, BNSF provides to the Port a non-exclusive permanent easement for maintenance, repair and replacement of the existing bridge for

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7 Operations and Maintenance Agreement between the Port of Seattle and [Third Party Operator], Exhibit C to Freight Easement Sale Agreement (approved by BNSF, Port of Seattle and King County, May 2008).
8 See Section 8(d) of the National Trails System Act (aka the “Rails-to-Trails Act”), 16 U.S.C. 1247(d) and 49 C.F.R. 1152.29.
the purposes of providing freight rail transportation and trail use. With the agreement, BNSF retains all other rights for operations, maintenance and construction activities associated with the property, including tracks, utility lines, etc.

**Trail Use Agreement (Exhibit K):**

Due to abandonment of freight rail operations on portions of the corridor, BNSF, the Port of Seattle and King County are seeking to railbank some segments of the rail line. Along the North Rail Line, the segment between MP 23.45 (southern limit of the North Rail Line) and MP 23.8 in Woodinville and the entire Redmond spur would be railbanked, subject to Surface Transportation Board (STB) approval. With this agreement, King County agrees to serve as the designated Interim Trail User for those portions of the North Rail Line being railbanked. According to the text of the Purchase and Sale Agreement, King County agrees to file with the STB a trail use/railbanking request for the railbanked portions of the corridor. In addition, the County will file with the STB a request for “…approval of the transfer from BNSF to County the right and/or obligation to restore rail freight service over the railbanked portion.”

**Public Multipurpose Easement (Exhibit L):**

This document describes the agreed-to easement provided by the Port to King County for development of a regional trail along a portion of the North Rail Line. The agreement indicates that – in addition to a regional trail – rail or other transportation uses (other than interstate freight service) may be developed in the corridor. It is anticipated that these other transportation uses would be operated by the TPO. If interstate freight rail service should be reactivated at a future time, it should be compatible with the intended regional trail and other transportation uses.

The Port of Seattle and King County will jointly determine the appropriate location and size of the trail area within the corridor but generally agree that the trail area will range from ten feet to 30 feet in width, depending on the physical constraints of the corridor, other uses in the corridor, etc. The two agencies agree that the trail placement will accommodate future transportation uses in the corridor. Both parties must make a good faith effort to provide a minimum of ten feet in width for the trial area if the trail is relocated for any reason.

The agreement provides King County with the right to use the trail area for all purposes, including construction, maintenance and operations, improvements, etc., associated with development of a regional trail. King County is allowed to construct crossings over, under or across the railroad tracks as long as these activities do not interfere with transportation use of the property. King County is required to comply, at its expense, with all stormwater requirements for the trail development.

If transportation uses are active in a portion the corridor prior to trail development in that portion, King County would be responsible for installation of barriers to separate the trail area from the other use. If a trail is in place prior to activation of a transportation use, then the Port or the TPO would be required to provide the barrier infrastructure. The Port,
King County and the TPO (if applicable) would jointly determine the type and scope of barriers and/or any other measures to be used to separate the trail area from the other use.

**Property Reports (Exhibit M):**
The title page for this exhibit lists several reports regarding bridge and track inspection data, among others. The information in many of these reports is subject to a confidentiality agreement between BNSF, the Port and King County and is currently not available for review.

**Donation Agreement for the South Rail Line**
This agreement covers the portion of the BNSF Eastside Corridor between approximately MP 5.0 in Renton and 23.45 in Woodinville. The Redmond spur is not subject to this agreement. With this agreement, the South Rail Line portion of the corridor will be donated by BNSF to the Port of Seattle. The Donation Agreement directs that the Port and the County accept the corridor in an “As Is With All Faults” condition. For information purposes, the agreement includes a list of third party leases and licenses (e.g., utility easements) along the corridor.

The remainder of this section includes a brief summary of information contained in the Donation Agreement (and Exhibits) that is pertinent to the study of feasibility of commuter rail in the corridor.

**Wilburton Segment of the South Rail Line:**
The Wilburton segment of the South Rail Line is defined as the portion of the corridor between MP 10.6 and MP 11.25. In Exhibit L (*Public Multipurpose Easement*) to the *Purchase and Sale Agreement for the North Rail Line*, it is recognized that the Wilburton segment of the corridor will not be subject to the Interim Trail Use/railbanking process but was instead abandoned with approval of the STB in a separate filing (STB Docket No. AB-6-453x). In this segment, the corridor crossed the I-405 southbound lanes on the top of a tunnel structure that was demolished as part of a freeway widening project. In anticipation of the tunnel’s removal, the tracks in the Wilburton segment were removed. However, the Port and King County agree to maintain the potential for future reactivation of interstate freight rail service on the Wilburton segment.

**Public Multipurpose Easement:**
According to the Donation Agreement, the Port agrees to grant a multipurpose easement that would allow the County to develop a public trail or other transportation use in the railbanked portion of the South Rail Line. The easement is to be described in a separate agreement (see next section) between the Port and King County that would be substantially similar in form to that of Exhibit K (*Trail Use Agreement*) to the *Purchase and Sale Agreement for the North Rail Line*, which was described in a previous section of this report. The public multipurpose easement would also cover the County’s interests in regard to the Wilburton segment.

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9 List of Known Third Party Leases/Licenses, Exhibit F to Donation Agreement: Woodinville Subdivision - South Rail Line (approved by BNSF, Port of Seattle and King County, May 2008).
2.13 Interlocal Agreement between King County and the Port of Seattle Regarding Eastside Rail Corridor, including Exhibits (Approved by King County and the Port of Seattle, May 2008)

In addition to the Purchase and Sale and Donation agreements previously described in this report, the Port of Seattle and King County also approved an Interlocal Agreement between the two agencies regarding the BNSF Eastside Corridor. The agreement includes numerous references to the Purchase and Sale and Donation agreements. In fact, as Exhibit A, the Interlocal Agreement includes a public multipurpose easement that appears to be identical in form and content to Exhibit L (Public Multipurpose Easemen) of the Purchase and Sale Agreement: North Rail Line, which was described previously in this report.

In the Interlocal Agreement, the Port and the County agree to participate in the STB process for railbanking, trial use or any other public purpose proposed for the corridor. In addition, the agreement indicates that certain rights and responsibilities would be passed through the Port and assigned to the County. The County and other appropriate public agencies will have the right of first opportunity to purchase the property from the Port, should it ever decide to divest itself of the corridor or any portions of the corridor. In addition, the agreement provides for the opportunity for the County to purchase from the Port at closing the portion of the corridor between MP 5.0 in Renton and MP 11.8 in Bellevue (immediately north of the Wilburton trestle bridge).

The agreement stipulates that the existing tracks will remain in place at least until the Port and the County carry out a formal, multi-agency process to determine the appropriate uses of the corridor.

The County will be the Interim Trail User to develop, maintain and operate a public trail within the portion of the corridor that is railbanked. The agreement specifies that the trail would be developed to accommodate other public transportation uses in the corridor. If any entity seeks to abandon freight common carrier service on any portion of the corridor that is not currently identified for railbanking (i.e., segments of the corridor north of Woodinville that will continue in active freight use), then the County (or other entity) will also seek to railbank those portions of the corridor.

2.14 King County Plans for Regional Bicycle/Pedestrian Trail in the BNSF Eastside Corridor

According to its Web site, King County plans to construct a regional trail in the BNSF Eastside Corridor between MP 5 in Renton and MP 25 in Woodinville. Its intent to develop a trail in the corridor has led King County to become a party, along with BNSF and the Port, to the Purchase and Sale and Donation agreements for the corridor. Those documents, along with the Interlocal Agreement with the Port, spell out the roles and

responsibilities of the various parties involved in the preservation of the corridor for public use, including a regional trail. As described in those documents, the County’s development of a regional trail in portions of the corridor will not hinder existing or potential future transportation uses (e.g., freight or passenger rail) in the corridor.

2.15 King County Regional Trail System Development Guidelines

Report/data were unavailable for use in this report.

2.16 Trail Plan(s) and Cost Estimate(s) Prepared for King County

Report/data were unavailable for use in this report. According to a letter from King County Executive Ron Sims to Port of Seattle Chief Executive Officer Tay Yoshitani dated November 29, 2007, a “very preliminary” cost estimate to construct a trail next to the track was $160 million to $230 million. A cost estimate to create a trail lid over the track was approximately $250 million.


This agreement between GNP Rly Inc. (GNP) and Snohomish County assigns to GNP the rights to construct, operate and maintain a railway on property owned by Snohomish County. This property was formerly owned by Burlington Northern Railroad (BNRR) and is located in the former BNRR railroad corridor between approximately Pine Street and NE 10th Street in the City of Snohomish. The property is approximately 100 feet wide and 950 feet long and is shown in Figure 1.

Under the agreement, Snohomish County retains the rights to construct, operate and maintain a trail on the property. GNP will construct a railway in an expeditious manner and will begin freight and commuter rail service on the property. GNP intends to start commuter rail service within two years of the agreement. GNP shall allow tourist-oriented excursion trains (e.g., the Spirit of Washington Dinner Train) to be operated on the property, subject to reasonable and ordinary terms and conditions (i.e., substantially similar to the Dinner Train’s prior agreement with BNSF for operations in King County).

As compensation for the rights to operate a railway on the County’s property, GNP will pay Snohomish County $0.50 (fifty cents) per car, per mile traveled in each direction. The rate will be indexed (on an annual basis) to the Canadian Industrial Products Prices Index (or US equivalent).

The rights of railway operations on the property shall be for an initial period of 31 years, ending December 31, 2039. The contract may be renewed for an option period of an additional 31 years by mutual agreement.
Any rail vehicles (e.g., locomotives and rolling stock), railway infrastructure, and equipment and buildings, etc., purchased or developed on the property by GNP shall remain the property of GNP. Upon the expiration or termination of the agreement, GNP shall have up to three (3) years to remove all of its vehicles, infrastructure, equipment and/or buildings, or it shall become the property of Snohomish County.

If GNP is not operating commuter rail service (six round trips per weekday, as described in the Timetable, Appendix B to the agreement) within five (5) years of the agreement, then either party can terminate the agreement. Other options for termination of the agreement by one or both parties are also identified.
2.18 Eastside Rail Corridor: Potential Commuter Rail Capital and Operating Cost Estimates (Cascadia/Discovery Institute, June 2008)

In 2008, the Cascadia Center of the Discovery Institute developed a cost estimate for capital and operating expenses of a potential commuter rail line in the BNSF Eastside corridor. The analysis does not include a cost estimate for development of a parallel trail in the corridor. The report identifies phased implementation of commuter rail service, with service potentially starting in the northern portion of the corridor between Snohomish and Bellevue (including the Redmond spur), followed by service in the southern portion of the corridor.

Operations:
The cost estimate assumes two-car DMU trains on 30 minute headways for 16 hours per day. The document appears to indicate that the service would be operated six days per week. The one-way run time for the 25-mile northern portion of the corridor is estimated to be 53 minutes, including 24 minutes of dwell time at intermediate stations, which results in an average speed of approximately 25 MPH. The one-way run time for the 14-mile southern portion of the corridor is estimated to be 29 minutes, including 8 minutes of dwell time at intermediate stations, which results in an average speed of approximately 29 MPH.

It is assumed that the Redmond spur operation would involve a single train set operating between Woodinville and Redmond. Cross-platform transfers to the north-south line would be accommodated at Woodinville.

Ridership:
No original ridership forecast was prepared for this cost estimate. The report assumes 4,600 commuter rail boardings per day between Snohomish and Bellevue/Redmond, which is equal to the number of boardings projected for BRT service in the I-405 corridor (Lynnwood to SeaTac Airport) in the year 2014.\(^{11}\)

Rail and Bridge Infrastructure:
The cost estimate assumes replacement of all existing rails, ties and ballast along the entire corridor.

The cost estimate assumes upgrading of public street crossings and the signal control electronics (but not the signal equipment) at those crossings.

The cost estimate includes six new sidings along the length of the corridor.

The cost estimate assumes that all existing timber trestles in the corridor would be replaced with concrete trestles.

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\(^{11}\) I-405 South Corridor Bus Rapid Transit Pre-Design Final Report (WSDOT, June 2005).
The cost estimate assumes repairs of the Snohomish River bridge and its approaches. New double-track bridges are assumed at the current location of the Wilburton trestle and the crossing of the I-405 southbound lanes.

One-quarter mile of new track would be added in Woodinville at the junction between the north-south rail line and the Redmond spur. This track would include a new bridge over the Sammamish River, a grade crossing of SR 202, a bridge over SR 202, and a crossover.

The cost estimate includes a new track between the Eastside corridor at the Black River Junction and the Tukwila Sounder station. The track would be located parallel to the existing BNSF and UP mainline tracks and would require widening of the BNSF mainline railbed. The extension would include a grade crossing at Monster Road, and new bridges at the Black River and north of the Tukwila station. The plywood platforms at the Tukwila Sounder station would be modified to accommodate cross-platform transfers to the Seattle-Tacoma Sounder service. A new crossover and relocated switch would be provided for rail access to an existing rail customer located north of the Tukwila station. The cost estimate does not include right-of-way acquisition or easement costs for the proposed track extension to Tukwila station.

An estimate for drainage improvements is included.

**Equipment:**
The cost estimate assumes use of two-car double-deck DMU train sets. Six train sets (i.e., 12 cars) are assumed for the service along the northern portion of the corridor, plus an additional three train sets (i.e., six cars) for the southern service.

**Stations:**
The cost estimate assumes eight stations in the northern portion of the corridor and three stations in the southern portion of the corridor. The only station locations identified were at City of Snohomish (located either at Pine Avenue or Harvey Field Airport), Woodinville, Bellevue (NE 8th Street), Coal Creek, Downtown Renton and Tukwila (modifications to existing station). The locations of other stations were not identified.

The report indicated that stations should be sited to accommodate a 10-car (plus locomotives) platform length, although they would be initially constructed for a four-car platform.

**Maintenance and Storage Facilities:**
The cost estimate assumes provision of a maintenance and storage facility in the Maltby area. This location is near the BNSF Eastside ROW and has an existing track switch. This facility would serve the entire corridor. A turntable at the shop is included in the cost estimate.
Capital Cost Estimate:
The total capital cost estimate for the northern and southern portions of the corridor is estimated to be $278.3 million (2008$). The cost estimate included the following categories:

- Vehicles (double-deck DMUs)
- New track and signals at Snohomish and Tukwila
- Track realignment to straighten curves
- Station and siding tracks
- Track rehabilitation of the Redmond spur line
- Concrete ties and ballast
- Rail
- Drainage and ditching
- Signal upgrades
- Crossing improvements
- Replace trestles with fill/embankment
- Bridge repairs
- New bridges (Woodinville, Wilburton, I-405, Tukwila)
- Right-of-way (purchase of Snohomish River bridge and rail line between the bridge and Pine Avenue)
- Stations, including Tukwila platform modifications
- Fare collection systems
- Shop and equipment
- Train control system
- Dragging equipment detector and hotbox detector
- Administration/dispatch building
- Motor (non-revenue) vehicles

The capital cost estimate includes an alternative scenario using Davis Bacon wage determination for construction labor. For this scenario, the total capital cost estimate for the northern and southern portions of the corridor is estimated to be $294.2 million (2008$).

With the exception of the Snohomish station, no estimate was included for right-of-way acquisition costs.

No costs for preliminary engineering, environmental clearance, final design/specifications, permits or construction management are included in the estimate. No contingency is included in the capital cost estimate.

Operating Cost Estimate:
Assumed annual labor costs by expertise are provided and include benefits. Annual amounts are also included for insurance, legal services, fuel, maintenance-of-way, tie accrual, shop materials and non-revenue vehicle operations and maintenance. The total annual operating cost for the northern and southern portions of the corridor is estimated to be $15.4 million (2008$).
No contingency is included in the operating cost estimate.

2.19 Proposal for Pilot Commuter Rail Service and Extensions (Eastside Rail Now! Organization)

The Eastside Rail Now! organization has proposed a three-year pilot commuter rail service on the BNSF Eastside corridor between downtown Renton and just south of the City of Snohomish. The concept identified on the organization’s Web site proposes stations at seven (7) locations with service to be provided using DMU equipment. Either two or three trainsets would be required, and each trainset would cost approximately $6.9 million. The concept identifies the existing track as being in “fair to excellent” condition, requiring only minimal modification. The total cost of the pilot concept is less than $10 million. Of the $10 million total cost, $2 million is for vehicle costs. The operation assumes use of the BNSF corridor south of Gene Coulon Park; this segment will be retained by BNSF.

The organization also proposes an extension of rail service from the Eastside corridor to the UW Bothell campus by construction of a new section of track and structures. The new track would cross under the I-405 lanes and would be placed on a new structure elevated above the Sammamish Slough and SR 522. No cost estimate was provided for this extension concept. The organization has also proposed other extensions, which overlap with the Sound Transit East Link LRT potential alignments.

2.20 Eastside Circulator System (HDR Engineering, Inc.)

The Eastside Circulator System is a concept for providing an interurban rail circulator connecting Bellevue, Kirkland, Woodinville and Redmond. The project would primarily use existing BNSF Eastside right-of-way but would also require construction of spur track to provide services into the downtown business districts of Bellevue and Kirkland. Peak period commuter rail service could also be provided to Snohomish County along the BNSF Eastside corridor. The report identifies a lump sum cost estimate for the circulator system of $225 million to $250 million (2007 dollars), which includes the following six elements:

- Trail construction with track rehabilitation
- Track rehabilitation for commuter rail option
- Signal and communications
- Stations and maintenance facility
- In-street connections to Bellevue and Kirkland
- DMU vehicles

Stations were identified at the following nine locations:
- Bellevue Meydenbauer Center
- Overlake Medical Center
- South Kirkland Park-and-Ride

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- Kirkland Third Street Transit Center
- Totem Lake Center
- Woodinville Wineries
- Woodinville NE Mill Place
- Redmond Willows
- Redmond Town Center

Optional commuter rail stations would be located at:
- Woodinville (SR 522)
- Maltby
- Snohomish

Rail service to downtown Bellevue would require a crossing of I-405 at NE 6<sup>th</sup>, NE 10<sup>th</sup> or NE 12<sup>th</sup> Street and use of downtown Bellevue streets for train operations. Rail service to downtown Kirkland would require use of portions of downtown Kirkland streets for train operations. Average operations speed, including station stops, would be approximately 35 MPH between Bellevue and Redmond and approximately 39 MPH between Bellevue and Snohomish.

The concept also proposes early construction of the Bel-Red Corridor (at BNSF Eastside corridor) to Overlake Transit Center portion of the East Link LRT project. Sound Transit is currently preparing a Draft Environmental Impact Statement of route and station alternatives for this project. With early construction of that segment, the concept proposes interim use by DMU. Transit service between downtown Seattle and Overlake Transit Center would still be provided by express bus. A public-private partnership is proposed to accelerate implementation.
3. **Summary Matrix of Data from Previous Plans, Studies and Other Reports**

This section includes a matrix of the information covered in the previous plans, studies and other reports that is pertinent and applicable to the evaluation of commuter rail in the BNSF Eastside Corridor. The matrix is organized around the types of information called for in SHB 3224, passed by the Washington State Legislature and signed by the Governor in 2008.
<table>
<thead>
<tr>
<th>Plan/Study/Report</th>
<th>(a) Ridership forecasts for commuter rail service</th>
<th>(b) Locations that would benefit from commuter rail service</th>
<th>(c) Potential station sites</th>
<th>(d)1 Ability of existing rail lines and sections to accommodate commuter rail service</th>
<th>(d)2 Effect on existing and planned rail and freight operations</th>
<th>(d)3 Effect on tourism</th>
<th>(e) Cost estimate for concurrent bicycle and pedestrian pathway</th>
<th>(f) Identification of portions most beneficial and cost-effective for commuter rail service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Regional Transit System Plan, Rail Alternative Report (Metro/Regional Joint Policy Committee, December 1991)</td>
<td>• Commuter rail not evaluated.</td>
<td>• LRT alignments under study would use portions of the BNSF Eastside ROW.</td>
<td>• LRT alignments would serve several corridors on the Eastside.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
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<td>1.2</td>
<td>Regional Transit Project, Eastside Commuter Rail Feasibility Study (Metro/Regional Joint Policy Committee, April 1992)</td>
<td>• Projected boardings were 1,200 per day by 2020 for commuter rail between Tukwila and Kirkland; no new transit riders.</td>
<td>• Local trips origin and destination along the alignment is the Renton Boeing plant.</td>
<td>• South Kirkland P&amp;R</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• Limited benefits (low ridership, no new transit riders) at significant cost for this proposal.</td>
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<tr>
<td>1.2</td>
<td>Regional Transit Project, Renton Commuter Rail Study (Metro/Regional Joint Policy Committee, April 1993)</td>
<td>• Projected boardings were 1,000 per day for 1999 for direct commuter rail service between Tacoma and North Renton. 600 daily boardings if transfer required.</td>
<td>• Local trips origin and destination along the extension’s alignment is the Renton Boeing plant.</td>
<td>• North Renton (Boeing Plant 2)</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• Limited benefits (low ridership, no new transit riders) at significant cost for this proposal.</td>
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<tr>
<td>4 I-405 Corridor Program Final EIS (WSDOT, 2002)</td>
<td>▪ Commuter rail ridership forecasts from 1992/1993 RTA studies were updated. ▪ Projected commuter rail riders could be 1,800-1,900 per day by 2020 between Tukwila and Kirkland. ▪ Projected commuter rail riders could be 2,800 per day by 2020 if direct Tacoma-Kirkland service was provided.</td>
<td>▪ HCT service (technology TBD) ridership forecasts for 2020 were highest (&gt;15,000 per day) between South Kirkland and South Bellevue. ▪ Projected HCT 2020 daily ridership was 7,500-15,000 between Totem Lake and South Kirkland and between South Bellevue and Renton. ▪ Ridership projections assumed connections to the regional HCT system.</td>
<td>▪ No information on specific station sites.</td>
<td>▪ No information.</td>
<td>▪ Potential impacts to existing Spirit of Washington dinner trains and freight trains in the BNSF Eastside corridor.</td>
<td>▪ Potential impacts to existing Spirit of Washington dinner trains in the BNSF Eastside corridor.</td>
<td>▪ No information.</td>
<td>▪ Adopted I-405 Corridor Program Master Plan included bus rapid transit (BRT) improvements in Eastside corridor.</td>
</tr>
<tr>
<td>5 Puget Sound Regional Council (PSRC)</td>
<td>▪ Southbound peak ▪ Downtown</td>
<td>▪ No information on ▪ No information.</td>
<td>▪ No information.</td>
<td>▪ No information.</td>
<td>▪ No information.</td>
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<td>HCT Corridor Assessment (PSRC, August 2004)</td>
<td>hour transit demand was 942 and 3,733 passengers per hour per day for 2004 and 2030, respectively.</td>
<td>Bellevue already a high density, mixed use, transit-supportive activity center.</td>
<td>specific station sites.</td>
<td>Commuter rail and DMU could be expected to have moderate impact on transit-oriented development on the Eastside.</td>
<td>No information.</td>
<td>No information.</td>
<td>No information.</td>
<td>ROW does not directly connect many of the Eastside’s activity centers.</td>
</tr>
<tr>
<td>Sound Transit Long-Range Plan Update, Issue Paper E.1: I-90/East King County HCT Analysis (Sound Transit, March 2005)</td>
<td>Analysis included 3 HCT (commuter rail excluded) branches of an east-west/I-90 corridor system. Branches on the Eastside were from Bellevue to Totem Lake/ Kirkland, Redmond and Issaquah.</td>
<td>Commuter rail not evaluated.</td>
<td>Forecasted HCT ridership (on Eastside) for east-west/I-90 system decreases with distance from Downtown Bellevue.</td>
<td>The Totem Lake/ Kirkland branch line had the lowest ridership of the 3 branches.</td>
<td>Forecasted HCT ridership (on Eastside) for east-west/I-90 system decreases with distance from Downtown Bellevue.</td>
<td>No information.</td>
<td>No information.</td>
<td>No information.</td>
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<tr>
<td>Sound Transit Long-Range Plan Update Final SEIS (June 2005)</td>
<td>Commuter rail not evaluated for Eastside corridor.</td>
<td>LRT, Express Bus/BRT and Monorail (as an option) were evaluated for the Eastside corridor (between Tukwilla and Totem Lake/ Kirkland).</td>
<td>HCT alignments under study could use portions of the BNSF Eastside ROW.</td>
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<td>No information.</td>
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<td>Plan/Study/Report</td>
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<td><strong>(b) Locations that would benefit from commuter rail service</strong></td>
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<td><strong>(c) Potential station sites</strong></td>
<td><strong>(d)1 Ability of existing rail lines and sections to accommodate commuter rail service</strong></td>
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<td><strong>(d)2 Effect on existing and planned rail and freight operations</strong></td>
<td><strong>(d)3 Effect on tourism</strong></td>
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<tr>
<td><strong>(e) Cost estimate for concurrent bicycle and pedestrian pathway</strong></td>
<td><strong>(f) Identification of portions most beneficial and cost-effective for commuter rail service</strong></td>
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<td><strong>8 Sound Transit Phase 2 – East Corridor, HCT Design Report: Downtown Seattle to Redmond Terminal Station (Sound Transit, November 2005)</strong></td>
<td>- Commuter rail not evaluated. - Corridor studied was east-west/I-90 corridor. - Forecasted LRT/RC-BRT ridership (on Eastside) decreases with distance from Downtown Bellevue. - Downtown Bellevue is Eastside’s primary transit origin and destination. - Population and employment areas served: Downtown Bellevue, Overlake Hospital district, Bel-Red Corridor/Overlake, and Downtown Redmond. - In BNSF ROW: Downtown Redmond Station and SE Redmond Station. - Near BNSF ROW: Overlake Hospital Station.</td>
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<td><strong>9 Sound Transit East Link Light Rail Project (in process)</strong></td>
<td>- Commuter rail not evaluated. - Corridor being studied is east-west/I-90 corridor. - Forecasted LRT ridership (on Eastside) decreases with distance from Downtown Bellevue. - Downtown Bellevue is Eastside’s primary transit origin and destination. - Population and employment areas served: Downtown Bellevue, Overlake Hospital district, Bel-Red Corridor/Overlake, and Downtown Redmond. - In BNSF ROW: Hospital Station, SE Redmond Town Center Station, and SE Redmond Station. - Near BNSF ROW: Ashwood/Hospital Station, ‘124’ Avenue Station, and Redmond Transit Center Station.</td>
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<td><strong>10 BNSF Corridor Preservation Study Final Report (PSRC, May 2007)</strong></td>
<td>- No information. - No information. - Information developed for Scenarios 2 and 3 included unit costs for track rehabilitation to FRA Class 2 and 3, respectively. - Then-existing rail uses were assumed to continue for all scenarios. - Then-existing rail uses (including the Spirit of Washington dinner train) were assumed to continue for all scenarios. - Trail construction cost assuming dual use could be two to four times as high as cost for single (trail only) use.</td>
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<tr>
<td>(a) Ridership forecasts for commuter rail</td>
<td>• No cost estimates for rail bridge rehabilitation.</td>
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<td>(b) Locations that would benefit from commuter rail service</td>
<td>• I-405 widening project creates a break in the existing rail line at the southbound lanes. BNSF formally abandoned a small segment of the Eastside corridor at this location.</td>
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<td>(c) Potential station sites</td>
<td>• Construction cost to re-build the rail crossing at the southbound I-405 lanes was estimated at $25 million.</td>
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<td>(d)1 Ability of existing rail lines and sections to accommodate commuter rail service</td>
<td>• I-405 widening project creates a break in the existing rail line at the southbound lanes. BNSF formally abandoned a small segment of the Eastside corridor at this location.</td>
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<td>(d)2 Effect on existing and planned rail and freight operations</td>
<td>• The Spirit of Washington dinner train ceased operations.</td>
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<td>(d)3 Effect on tourism</td>
<td>• Improvements made to Cedar River rail bridge in Renton to allow Boeing parts to be shipped using the BNSF mainline instead of the Eastside corridor.</td>
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<tr>
<td>(e) Cost estimate for concurrent bicycle and pedestrian pathway</td>
<td>• Freight easement requires BNSF/Third Party Operator (TPO) to allow the Port to permit transportation uses (such as a trail) on segment between Woodinville and Snohomish.</td>
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<tr>
<td>(f) Identification of portions most beneficial and cost-effective for commuter rail service</td>
<td>• BNSF, Port and King County agree to railbank corridor between Woodinville and Renton (except Wilburton section crossing I-405 southbound lanes) and the Redmond spur. STB railbank requirements are TBD.</td>
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I-405 Corridor Program, Bellevue Nickel Improvement Project Environmental Assessment (WSDOT, January 2006) and I-405 South Bellevue Widening Project Fact Sheet (WSDOT, March 2008)

- No information.
- No information.
- No information.
- No information.

Purchase and Sale Agreement: Woodinville Subdivision – North Rail Line, including Exhibits (Approved by BNSF, Port of Seattle, and King County, May 2008), and Donation Agreement: Woodinville Subdivision – South Rail Line, including Exhibits (Approved by BNSF, Port of Seattle, and King County, May 2008)

- No information.
- No information.
- No information.
- BNSF, Port and King County agree to railbank corridor between Woodinville and Renton (except Wilburton section crossing I-405 southbound lanes) and the Redmond spur. STB railbank requirements are TBD. Freight easement provides BNSF/Third Party Operator (TPO)
<table>
<thead>
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<td>Woodinville and Renton (except Wilburton section crossing I-405 southbound lanes) and the Redmond spur. STB railbank requirements are TBD.</td>
<td>With a permanent, exclusive easement to control all rail operations on segment between Woodinville and Snohomish.</td>
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<tr>
<td>13</td>
<td>Interlocal Agreement between King County and the Port of Seattle Regarding Eastside Rail Corridor, including Exhibits (Approved by King County and the Port of Seattle, May 2006)</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
<td>• No information.</td>
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<td>1. Ridership forecasts for commuter rail</td>
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<td>3. Potential station sites</td>
<td>No information.</td>
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<tr>
<td>4. Ability of existing rail lines and sections to accommodate commuter rail service</td>
<td>Existing tracks will be left in place subject to public planning process.</td>
</tr>
<tr>
<td>5. Effect on existing and planned rail and freight operations</td>
<td>Existing tracks will be left in place subject to public planning process.</td>
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<tr>
<td>6. Effect on tourism</td>
<td>Existing tracks will be left in place subject to public planning process.</td>
</tr>
<tr>
<td>7. Cost estimate for concurrent bicycle and pedestrian pathway</td>
<td>No rail cost estimates.</td>
</tr>
<tr>
<td>8. Identification of portions most beneficial and cost-effective for commuter rail service</td>
<td>No information.</td>
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</table>

<p>| King County Plans for Regional Bicycle/Pedestrian Trail in the BNSF Eastside Corridor | No information. |
| King County Regional Trail System Development Guidelines | Not Available |
| Trail Plan(s) and Cost Estimate(s) Prepared for King County | Not Available |
| Eastside Rail Corridor: Potential Commuter Rail Capital and Operating Cost Estimates (Cascadia/Discovery Institute, June 2008) | Assumed same ridership as I-405 BRT (4,600 boardings per day) |
| Proposal for Commuter Rail Service and Extensions (Eastside Rail Now!) | No information. |
| Eastside Circulator System (HDR) | No information. |</p>
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<td></td>
<td>(a) Ridership forecasts for commuter rail</td>
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<tr>
<td>Kirkland, Bellevue and Redmond.</td>
<td>Maltby, Woodinville (3), Kirkland (3), Bellevue (2), and Redmond (2).</td>
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*Letters refer to sections of SHB 3224, Section 1
4. Conclusions

The purposes of this technical memorandum are: (1) to review of previous plans, studies and other reports that have included analysis relevant to the evaluation of commuter rail in the BNSF Eastside corridor; and (2) to determine whether those previous efforts produced conclusions sufficient to satisfy the requirements of SHB 3224. Based on the analysis completed for those previous efforts, as summarized in Sections 2 and 3 of this report, it is clear that the requirements of SHB 3224 have not been fully satisfied by those efforts. Therefore, a second phase feasibility study will be required to determine whether commuter rail service between Snohomish County and eastern King County can be a meaningful component of a future regional plan. The study should provide sufficient information to:

- Assess ridership potential;
- Identify which locations would most benefit from service;
- Identify and evaluate station sites;
- Analyze the ability of the existing track structure to accommodate commuter rail service, coordination with freight operations, and how tourism in the region might be affected;
- Determine the feasibility and develop cost estimates costs for establishing a concurrent bicycle and pedestrian pathway along or near the Woodinville Subdivision; and
- Identify which segments of the Subdivision would be most beneficial and cost-effective for commuter rail service.

Sound Transit and the PSRC are required by SHB 3224 to submit a joint report on the review (summarized in this technical memorandum) and the feasibility study to the transportation committees of the House of Representatives and Senate by February 1, 2009.