Sound Transit Regional Transit Long-Range Plan
Draft Supplemental Environmental Impact Statement

APPENDIX O

Technical Report on Future High Capacity Transit Development Along the Seattle CBD to East King County via I-90/Bellevue Corridor

SOUND TRANSIT
HCT Planning

SOUND TRANSIT HCT PLANNING

Technical Report on Future High Capacity Transit Development Along the Seattle CBD to East King via I-90/Bellevue Corridor

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Sound Transit

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Final

April 2004

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Technical Report on Future HCT Development Along the Seattle CBD to East King via I-90/Bellevue Corridor

Executive Summary

The purpose of this Technical Report is to: 1) summarize past studies of high capacity transit (HCT) development in the Seattle CBD to East King via I-90/Bellevue corridor; and 2) help frame policy and technical issues to be addressed in an upcoming planning and environmental analysis of the corridor. Figure E.1 shows the corridor in the context of the 1996 Long-Range Vision for Sound Transit (ST).

Sound Transit is updating its Long-Range Vision and will be developing a Phase 2 plan. To assist Sound Transit Board decisions in connection with these efforts, Sound Transit also is initiating a plan-level (programmatic) Supplemental Environmental Impact Statement (SEIS) consistent with the State Environmental Policy Act. The SEIS will update the 1993 Environmental Impact Statement prepared by the Joint Regional Policy Committee for the Regional Transit System Plan. The SEIS will address new information and changed conditions since 1993, including analysis and decisions regarding the I-90 corridor.

The I-90 corridor is a potential corridor for HCT development within the next phase of implementing ST's Long Range Vision. The corridor has been studied multiple times in the past**.** To facilitate future decision-making regarding the I-90 corridor, this Technical Report suggests that additional analysis is needed of HCT options, including both bus rapid transit (BRT) and light rail transit (LRT) technologies, without necessarily revisiting issues previously addressed. Considerable policy direction has come out of past studies and enough planning and engineering work has been done to draw certain conclusions about the technical feasibility of HCT development in the I-90 corridor.

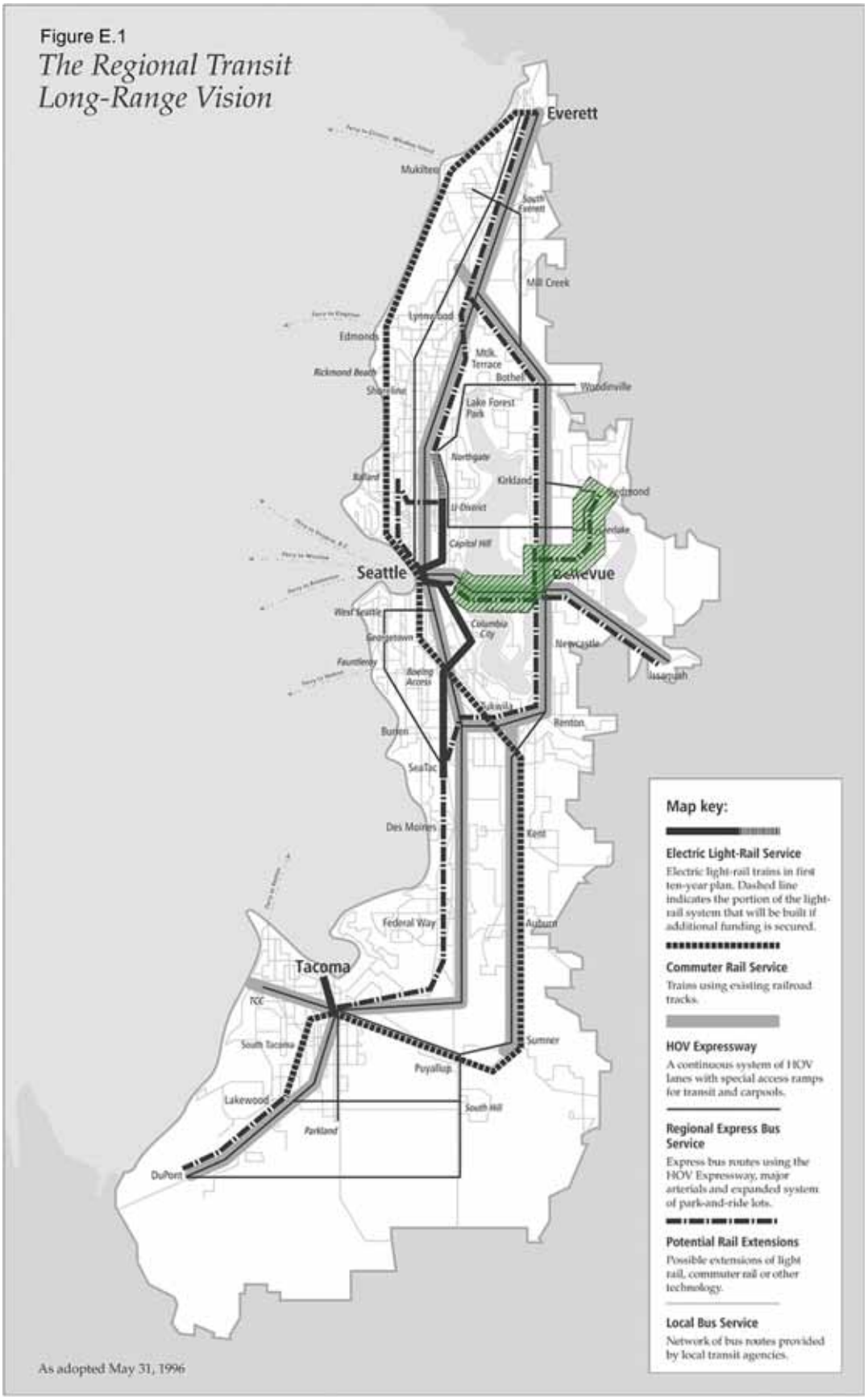
Thus, this Technical Report provides background and direction for the key issues that need to be addressed by ST in the I-90 corridor as part of the upcoming planning and environmental analysis of HCT alternatives. Results of this I-90 corridor evaluation will be incorporated into the overall assessment of HCT development being conducted as part of ST's Long-Range Vision, Supplemental Environmental Impact Statement (SEIS), and Phase 2 Planning efforts.

Policy Direction

Since the 1970's, policy direction has been provided for transit development along the I-90 corridor between downtown Seattle and the Eastside through a number of transportation development projects and studies. These include the original 1976 Memorandum Agreement for the operation and configuration of I-90. The Agreement stated that two lanes would be designed and permanently committed to transit use. The I-90 facility would be designed and constructed so that future conversion to fixed guideway is possible.

Figure E.1

The Regional Transit Long-Range Vision



In the 1990's, substantial regional planning was undertaken to identify potential HCT development along major corridors. Various plans and studies have included the I-90 corridor as one of the candidates for HCT development.

- The 1993 HCT System Plan identified rail transit for the Seattle CBD to East King via I-90/Bellevue corridor, with one branch proceeding north to Totem Lake and another east to Redmond.
- The 1995 Regional Transit Proposal that failed to gain voter approval included light rail transit along the corridor to Bellevue and beyond to Overlake.
- The *Sound Move* Plan (Phase 1) identified regional express bus/HOV expressway service along the corridor; however, the adopted 1996 Regional Transit Long-Range Vision noted potential rail extensions along the corridor in future phases.

Since adoption of the Long Range Vision, several major corridor studies have been carried out that affect the Seattle CBD to East King via I-90/Bellevue corridor. The Trans-Lake Washington Study concluded that I-90 was the preferred choice for future HCT development between Seattle and the Eastside**.** Although it evaluated potential HCT development along the SR 520 corridor, the Trans-Lake Washington Study noted that an HCT line in the I-90 corridor would more effectively serve transit ridership and could cost substantially less than one in the SR 520 corridor. A major contributing factor is that much of the needed basic infrastructure between downtown Seattle and south Bellevue is already in place. In the case of the SR 520 corridor, a multi-billion dollar investment in new infrastructure would likely be required to connect HCT along the corridor to downtown Seattle.

The I-405 Congestion Relief and BRT Project recommended Bus Rapid Transit development along I-405. The study concluded that the selected alignment for BRT would not preclude potential future development of rail along the Seattle CBD to East King via I-90/Bellevue corridor.

After issuance of the Draft Environmental Impact Statement (DEIS) for the I-90 Two-Way Transit and HOV Operations project, the I-90 Steering Committee identified Alternative R-8A, which would include the addition of HOV lanes in both directions on I-90 on the outer roadways between I-5 and Bellevue Way, as the preferred near-term alternative. The Committee also identified their ultimate vision for I-90 with HCT in the center roadways. The Sound Transit Board also identified Alternative R-8A as the preferred alternative and directed staff to participate in the development of an amendment to the 1976 Memorandum Agreement for I-90, which will call for the earliest possible conversion of the center roadways to two-way HCT operations based on outcomes of studies and funding approvals.

Technical Direction

The studies conducted in support of the Regional Transit System planning and those recently undertaken by the Trans-Lake Washington Project contain a number of conclusions regarding the I-90 corridor.

- An HCT line in the I-90 corridor would cost substantially less than any other alternative to cross the lake, since much of the right of way and basic infrastructure needed between downtown Seattle and south Bellevue is already in place.
- As concluded by the Trans-Lake Washington Project, HCT in the I-90 corridor would result in fewer environmental impacts than in any other corridor across the lake, primarily for the same reasons as the conclusions on costs.
- The resulting HCT line network on the Eastside is more efficient with an I-90 crossing with service from the Kirkland and Redmond areas passing through downtown Bellevue on the way to the lake crossing.
- If LRT proves to be the most promising HCT mode, service across I-90 would provide a balanced operation on the Central Link line through the Seattle CBD. Eastside ridership, when added to South Link ridership, balances efficiently with the high demands of North Link through the critical piece of the regional rail system in the Downtown Seattle Transit Tunnel (DSTT).
- With a BRT alternative on I-90, there will be a need to transfer from surface bus to LRT service operating in the DSTT; with potential rail on I-90, there will be no need to transfer.

In addition, the following should be considered in assessing potential HCT options:

- While BRT might meet some corridor needs in the short or mid-term, bus operations through the Seattle CBD will be highly problematic. Bus operations on congested surface streets will increase riders' travel times and cannot provide the reliability of grade-separated rail service in the DSTT.
- LRT technology integrates well with the Central Link line and allows seamless connections to Westside north and south transit services.
- LRT facilities to serve downtown Seattle will be in place once Central Link is completed, while any other technology will require new stations and/or transfer facilities to serve the CBD.

In March 2004, the Puget Sound Regional Council (PSRC) released draft results of a planning assistance effort for ST's update of the Regional Transit Long-Range Vision. The study addressed several corridors including *Crosslake* located between downtown Seattle and the Bellevue central business district (CBD). Several key findings relating to the Crosslake Corridor were identified in the draft workbook documenting study results, and commented on by an independent technical review committee organized by the American Public Transportation Association (APTA). Major findings and comments included:

- The North Corridor and the Crosslake Corridor have the greatest potential for near-term implementation of HCT.
- Corridor-wide land use characteristics and projected growth indicate that the Crosslake Corridor has sufficient densities to support HCT.
- Existing population and employment densities in the Seattle and Bellevue CBD's support HCT; and by 2010 Overlake will have densities to support HCT.

- The committee observed that it was not readily apparent how Monorail fits into the larger transportation system design.
- BRT would be difficult to integrate in the Downtown Seattle Transit Tunnel when rail frequencies increase.
- The committee indicated that future investments should build in the strengths of Phase 1 investments. The committee also indicated that LRT is the best HCT choice, as BRT may not have the long-term capacity to serve the likely ridership that will be generated.
- The peer review also observed that the Crosslake corridor was the "ripest" of all corridors for immediate HCT development.

Conclusions

The review of both policy and technical direction from past plans and studies suggests that further examination should be given to the Seattle CBD to East King via I-90/Bellevue corridor in terms of HCT development. Some technical issues such as alignments, station locations, and costs/ridership have been identified that need to be a part of potential HCT alternatives. Thus, a thorough analysis of options will need to be undertaken as part of ST's planning work to be carried out in 2004 and 2005. This analysis will be closely coordinated with other efforts, particularly the update of the Long-Range Transit Vision and the SEIS.

Next Steps

Follow-up studies are needed to further refine the HCT alternative(s) in the corridor. The studies relate to the two potential HCT alternatives that are likely to show the most promise in meeting needs of the corridor – LRT and BRT. LRT-related items to address include: the Eastside transition from the I-90 center roadway; alignment, profile, and station locations through the Bellevue CBD and location east of the CBD; impacts in downtown Seattle; and updated cost and ridership estimates. For a potential BRT alignment, the issues that need to be addressed include: the Eastside alignment, profile, and station locations; impacts in downtown Seattle and downtown Bellevue; and updated cost and ridership estimates.

Technical Report on Future HCT Development Along the Seattle CBD to East King via I-90/Bellevue Corridor

1. Background for the Technical Report

The purpose of this Technical Report is to: 1) summarize past studies, plans, and agreements relating to high capacity transit (HCT) development in the Seattle CBD to East King via I-90/Bellevue corridor; and 2) help frame policy and technical issues to be addressed in an upcoming planning and environmental analysis of the corridor. Figure 1 shows the corridor in the context of the 1996 Long-Range Vision for Sound Transit (ST). The Long-Range Vision for ST, adopted in May 1996, calls for potential rail extensions to the Eastside. Table 1 lists each of the major plans, studies, and agreements relating to HCT as well as principal conclusions that could affect the Seattle CBD to East King via I-90/Bellevue corridor.

Sound Transit is updating its Long-Range Vision and will be developing a Phase 2 plan. To assist Sound Transit Board decisions in connection with these efforts, Sound Transit also is initiating a plan-level (programmatic) Supplemental Environmental Impact Statement (SEIS) consistent with the State Environmental Policy Act. The SEIS will update the 1993 Environmental Impact Statement prepared by the Joint Regional Policy Committee for the Regional Transit System Plan. The SEIS will address new information and changed conditions since 1993, including analysis and decisions regarding the I-90 corridor.

The I-90 corridor is a potential corridor for HCT development within the next phase of implementing ST's Long Range Vision. The corridor has been studied multiple times in the past. To facilitate future decision-making regarding the I-90 corridor, this Technical Report suggests that additional analysis is needed of HCT options, including both bus rapid transit (BRT) and light rail transit (LRT) technologies without necessarily revisiting issues previously addressed. Considerable policy direction has come out of past studies and enough planning and engineering work has been done to draw certain conclusions about the technical feasibility of HCT development in the corridor.

Thus, this Technical Report provides background and direction for the key issues that need to be addressed by ST in the I-90 corridor as part of the upcoming planning and environmental analysis of (HCT) alternatives. Results of this I-90 corridor evaluation will be incorporated into the overall assessment of HCT development being conducted as part of ST's Long-Range Vision update, SEIS, and Phase 2 planning efforts.

1.1 Policy Direction

Since the 1970's, policy direction has been provided for transit development along the I-90 corridor between downtown Seattle and the Eastside through a number of transportation development projects and studies. These include the original 1976 Memorandum Agreement for the operation and configuration of I-90. The Agreement stated that two lanes would be designed and permanently committed to transit use. The I-90 facility would be designed and constructed so that future conversion to fixed guideway is possible.

Figure 1
The Regional Transit Long-Range Vision

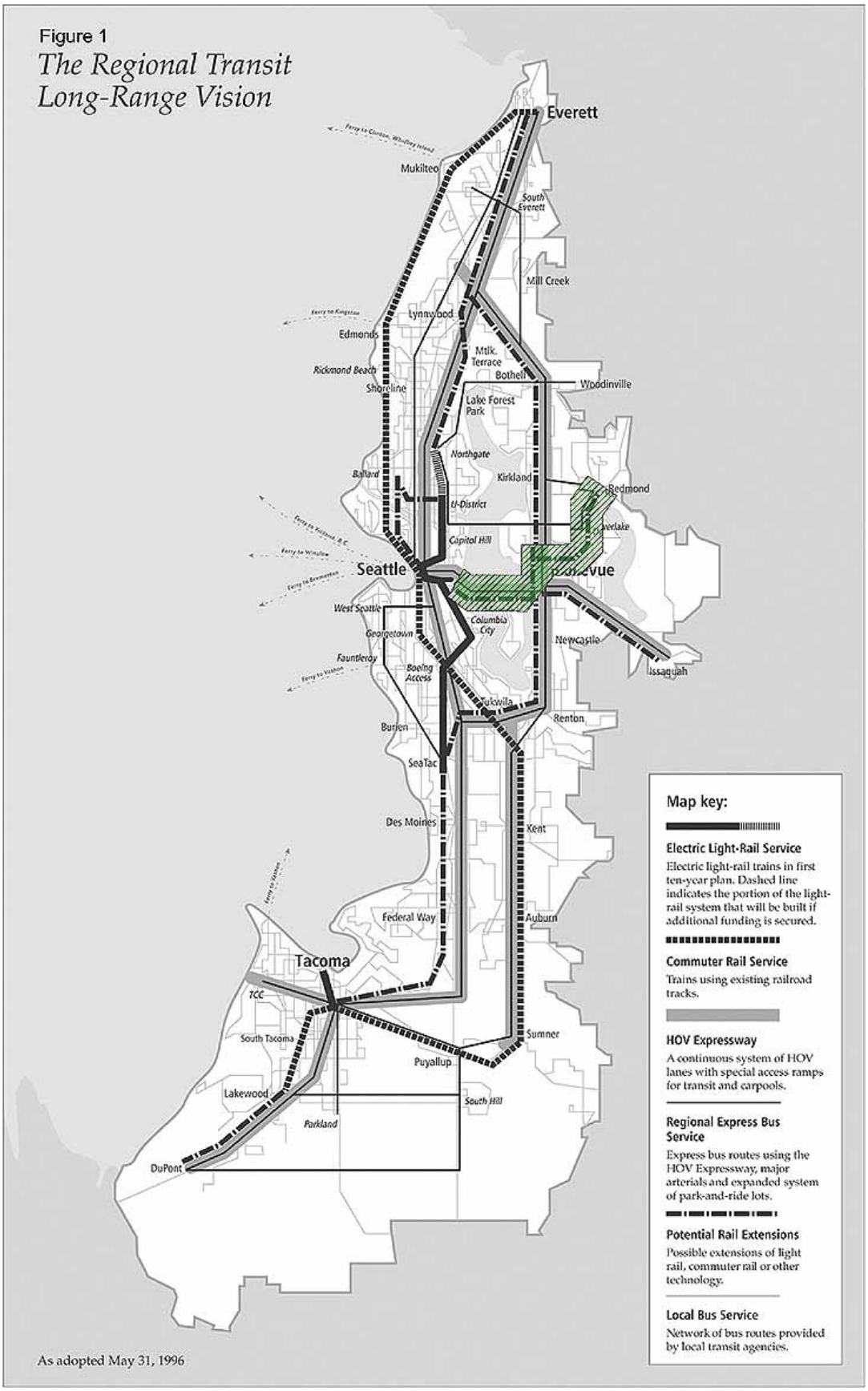


Table 1 - Summary of Studies Relating to Potential I-90/Seattle CBD-Bellevue-Redmond HCT Development

Information Items	Direction for Potential I-90/Seattle CBD-Bellevue-Redmond HCT Development and Analysis
Memorandum Agreement for I-90 Configuration and Operation (1976)	An agreement among the local jurisdictions and the State of Washington committing to the configuration and operation of I-90 and use of two lanes of I-90 for transit-operations, with ultimate conversion to fixed guideway.
Regional Transit System Plan and SEPA Programmatic EIS (1993)	The System Plan and EIS defined and evaluated different technologies, alignments, and areas served in order to determine the benefits and impacts of different systems. The System Plan adopted by the JRPC included rail transit in the I-90 corridor to downtown Bellevue, with two branches on the Eastside to Totem Lake and Redmond.
Master Plan for the Regional Transit System Plan (1994) and Plan Submitted to Voters (1995)	Phase 1 of the HCT plan submitted to voters included an LRT line on I-90 extending to Bellevue and Overlake. The ballot measure to approve local taxes was rejected by voters in March 1995.
Sound Move and the Regional Transit Long-Range Vision (1996)	Voters approved taxes to support *Sound Move* in 1996. *Sound Move* included a light rail line running north/south in Seattle from the University District to South 200th Street near SeaTac Airport with a possible extension to Northgate, if funding became available. The 1996 Plan substituted two-way bus transit on I-90 for LRT. The Long-Range Vision included potential light rail in the I-90/Seattle CBD-Bellevue-Redmond corridor. The Long-Range Vision was adopted by PSRC into the region's Metropolitan Transportation Plan.
Trans-Lake Washington Project (2002)	Studied long-range travel needs and affirmed earlier conclusions that the I-90 corridor was the priority HCT corridor for crossing Lake Washington. The conclusions reached to date indicate that LRT can be accommodated on the bridge provided that certain structural improvements are made and provisions are included in the track-work to accommodate the floating bridge movements.
Sound Transit and WSDOT Studies of the I-90 Bridge (2001 and 2002)	Several studies were carried out relating to accommodation of future rail service on the I-90 Floating Bridge.
I-405 Congestion Relief/BRT Project (2003)	The White Paper on BRT concepts for I-405 noted that BRT vehicles would use the HOV or future High Occupancy Toll (HOT) lanes on I-405. BRT on I-405 would not preclude potential future LRT on I-90 to Bellevue.
Draft Environmental Impact Statement for I-90 Two-Way Transit/HOV Operations (2003)	After the DEIS was issued, the I-90 Steering Committee identified Alternative R-8A, which would include the addition of HOV lanes in both directions on I-90 on the outer roadways between I-5 and Bellevue Way as the preferred near-term alternative. The Committee also identified their ultimate vision for I-90 with HCT in the center roadway. The Sound Transit Board also identified Alternative R-8A as the preferred alternative and directed staff to participate in the development of an amendment to the 1976 Memorandum Agreement for I-90, which will call for the earliest possible conversion of the center roadways to two-way HCT operations based on outcomes of studies and funding approvals.
Draft HCT Corridor Assessment for Central Puget Sound (2004)	The draft findings of the HCT Corridors Assessment conducted by PSRC noted that the corridor-wide land use characteristics indicate that the Crosslake Corridor has sufficient densities to support HCT. Existing population and employment densities in the Seattle and Bellevue CBD's support HCT now; by 2010, Overlake will have densities to support HCT. In comparison to other corridors, the technical review committee noted that the Crosslake corridor has the highest priority for HCT development after *Sound Move* is constructed.

In the 1990's, substantial regional planning was undertaken to identify potential HCT development along major corridors. Various plans and studies have included the I-90 corridor as one of the candidates for HCT development:

- The 1993 HCT System Plan identified rail transit for the Seattle CBD to East King via I-90/Bellevue corridor, with one branch proceeding north to Totem Lake and another east to Redmond.
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- BRT would be difficult to integrate in the Downtown Seattle Tunnel when rail frequencies increase.
- The committee indicated that future investments should build in the strengths of Phase 1 investments. The committee also indicated that LRT is the best HCT choice, as BRT may not have the long-term capacity to serve the likely ridership that will be generated.
- The review committee also observed that the CrossLake corridor was the "ripest" of all corridors for immediate HCT development.

2. Corridor Assessment for Updating the Long-Range Vision

HCT planning under the Sound Transit Long Range Vision will include alternative assessments for the three potential extensions of rail transit identified in the adopted Regional Transit Long-Range Vision. These corridors are:

1. North of Seattle to Snohomish County
2. South of Sea-Tac Airport to Pierce County
3. Seattle CBD to East King via I-90/Bellevue

For the first two corridors, a system-level assessment of potential alternatives will be carried out. For the Seattle central business district (CBD) to East King via I-90/Bellevue corridor, more in depth assessments in the form of pre-Alternatives Analysis (AA) studies will be conducted in 2004. These assessments will provide local decision-makers with the information necessary to identify a specific HCT project to be carried forward into a NEPA/SEPA project-level AA/draft environmental impact statement (DEIS). The goal will be to position the I-90 corridor for accelerated project-level environmental review, depending on direction from the Sound Transit Board after the completion of the SEIS and the Long-Range Vision update. Initiating the pre-AA work now also would help satisfy the requirements of the Federal Transit Administration (FTA) and maintain the project's eligibility for federal funding should this corridor be the next one to be advanced.

The Seattle CBD to East King via I-90/Bellevue corridor has been identified as a priority corridor to be developed once Central Link between Northgate and South 200th Street is completed, as detailed in the voter approved *Sound Move* plan. Reasons for this include the following:

- Numerous studies conducted since the 1970's concluded that, if HCT is developed across Lake Washington, I-90 is the preferred corridor.
- Preliminary studies, recently completed by the Puget Sound Regional Council (PSRC), identify Crosslake as the next highest priority corridor for HCT in the region after *Sound Move* is built.
- The ST Board will shortly make a decision (by summer 2004) on the project to be implemented for I-90 Two-Way Transit/HOV Operations. The preferred alternative, R-8A, would add HOV lanes on the outer roadways and would accommodate future

conversion of the I-90 center roadway between the Seattle CBD and Bellevue Way to HCT operation.

3. Background Information and Technical Direction for the Seattle CBD to East King via I-90/Bellevue Corridor

The balance of this Technical Report provides background information and helps frame major issues for future studies and any project-level analysis that may follow. This is particularly critical in the I-90 corridor where a long history of plans and studies dating back to the 1970's frame many of the issues that will need to be addressed.

The report highlights key issues that have been previously examined and the conclusions drawn. It also identifies further issues that must be addressed as part of future corridor analysis work. These issues include the following:

- Impacts to bus/rail joint operations in the Downtown Seattle Transit Tunnel (DSTT) once rail is extended further north and south and the service frequencies of trains increase.
- Unresolved issues associated with the alignment and transition of grade-separated bus rapid transit (BRT) and light rail out of the I-90 center roadway in the Bellevue Way area.
- For the LRT alternative, alignment and profile alternatives for a potential light rail line from I-90 through the Bellevue CBD to an initial first phase terminus to the east of the Bellevue CBD.
- For the BRT alternative, alignment and profile alternatives for a potential BRT line from I-90 through the Bellevue CBD, including possible interface with the I-405 BRT facility to an initial phase terminus to the east.
- Possible locations for an operations and maintenance base east of the Bellevue CBD for the LRT and BRT alternatives.

3.1. Background Information – Summary of Previous Work

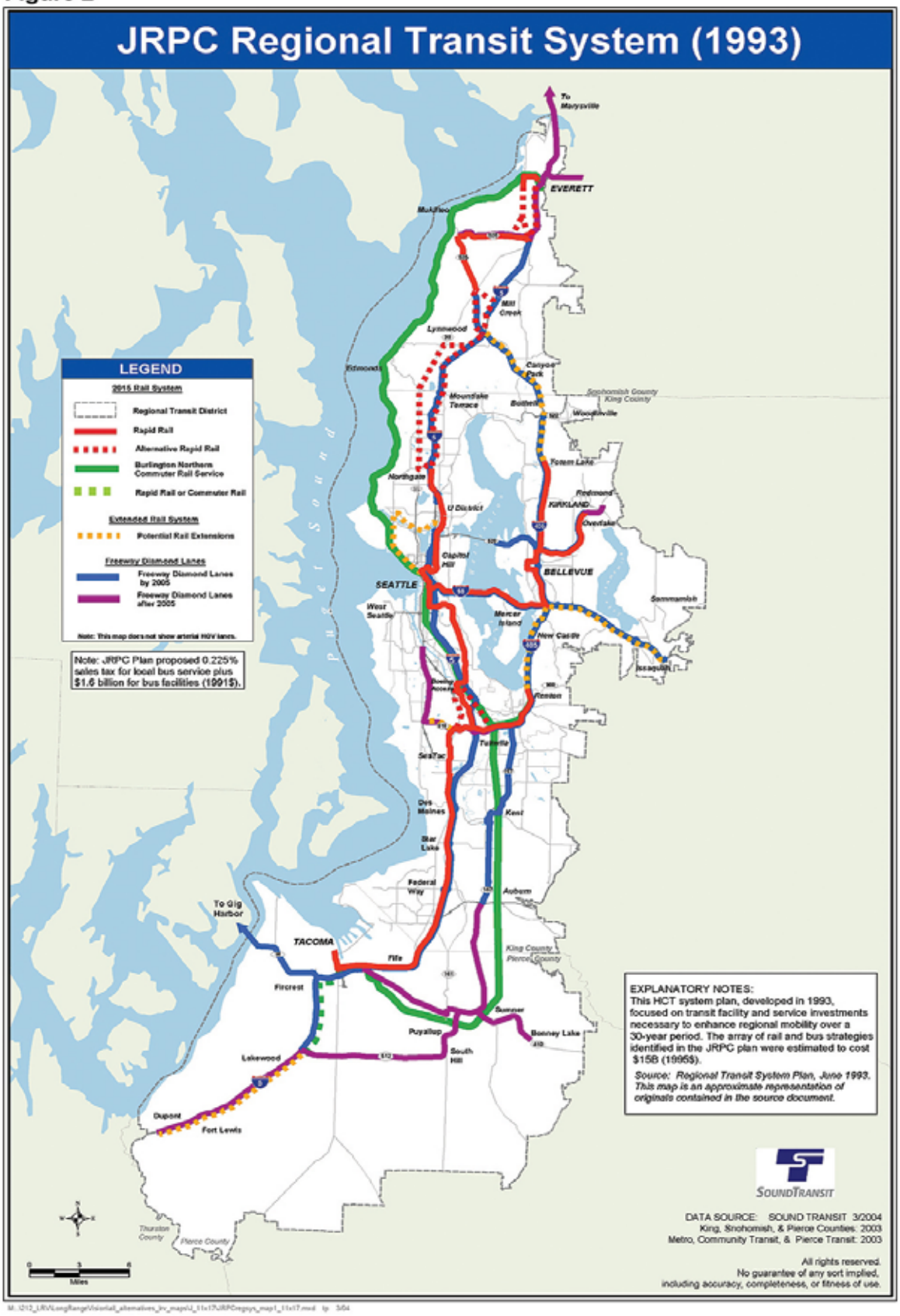
The I-90 corridor has been the subject of numerous past studies of the issue of locating HCT in the center roadway between the ramps connecting the highway to the DSTT at the IDS and the Bellevue Way ramps just past the East Channel Bridge. The sections that follow summarize major findings from several of these plans, studies, and agreements.

Memorandum Agreement – Operation and Configuration of I-90 (1976)

In 1976 the cities of Bellevue, Seattle, and Mercer Island, King County, Metro Transit, and the Washington State Highway Commission executed a Memorandum Agreement (MA) for I-90. This document outlined the general design configuration and operation of the I-90 roadway that was subsequently constructed by the State between I-5 and I-405. The agreement indicated that two lanes would be designed for and permanently committed to transit use[1]. The I-90 facility shall be designed and constructed so that conversion of all or part of the transit roadway to fixed guideway is possible.

[1] *Memorandum Agreement* (City of Seattle, City of Bellevue, City of Mercer Island, King County, Metro, Washington State Highway Commission; December 1976)

Figure 2


JRPC Regional Transit System (1993)
LEGEND
2015 Rail System
Regional Transit District
Rapid Rail
Alternative Rapid Rail
Burlington Northern Commuter Rail Service
Rapid Rail or Commuter Rail
Extended Rail System
Potential Rail Extensions
Freeway Diamond Lanes
Freeway Diamond Lanes by 2005
Freeway Diamond Lanes after 2005
Note: This map does not show arterial HOV lanes.
Note: JRPC Plan proposed 0.225% sales tax for local bus service plus $1.6 billion for bus facilities (1991$).
To Marysville
EVERETT
Mukilteo
Mill Creek
Lynnwood
Edmonds
Canyon Park
Mountlake Terrace
Bothell
Woodinville
Snohomish County
King County
Northgate
Town Lake
Redmond
KIRKLAND
U District
Overlake
Capitol Hill
SEATTLE
BELLEVUE
West Seattle
Mercer Island
Sammamish
New Castle
Issaquah
Renton
Tukwila
SeaTac
Des Moines
Kent
Star Lake
Federal Way
Auburn
To Gig Harbor
TACOMA
Fife
King County
Pierce County
Fircrest
Sumner
Puyallup
Bonney Lake
South Hill
Lakewood
Dupont
Fort Lewis
Thurston County
Pierce County
Puget Sound
EXPLANATORY NOTES:
This HCT system plan, developed in 1993, focused on transit facility and service investments necessary to enhance regional mobility over a 30-year period. The array of rail and bus strategies identified in the JRPC plan were estimated to cost $15B (1995$).
Source: Regional Transit System Plan, June 1993. This map is an approximate representation of originals contained in the source document.
SOUNDTRANSIT
DATA SOURCE: SOUND TRANSIT 3/2004
King, Snohomish, & Pierce Counties: 2003
Metro, Community Transit, & Pierce Transit: 2003
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Miles

Regional Transit System Plan and SEPA EIS (1993)

The Joint Regional Policy Committee (JRPC) adopted the Regional Transit System Plan (RTSP) in May 1993. As shown in Figure 2, rail segments included in the plan were:

- I-90 between downtown Seattle and downtown Bellevue, with branches to Redmond and Totem Lake
- Downtown Seattle north to downtown Everett
- Downtown Seattle south to downtown Tacoma via SeaTac, with a branch to Tukwila and Renton

To support the action of adopting the RTSP, a plan-level (Programmatic) Environmental Impact Statement was prepared in compliance with the State Environmental Policy Act for the plan. This environmental process compared No Build, Transportation System Management (TSM), Transitway/TSM (this mode is generally comparable to BRT), and Rail/TSM and explored other HCT technologies. The Rail/TSM was selected as the preferred alternative.

Prior to JRPC adoption of the RTSP, the Eastside Transportation Partnership (ETP) provided input to the decision-making process. In August of 1992, the ETP adopted a resolution endorsing an Eastside element of the System Plan. This element included local or feeder bus service, a TSM plan, rapid transit (including rail across I-90 to Bellevue, Redmond and Totem Lake), and a regional bus system serving Bothell, Renton, Issaquah, and the University of Washington. Following the System Plan adoption, a separate report, *Summary of Decisions Leading to Recommendation for Rail on the Eastside*[2] was prepared for the newly created Regional Transit Authority (RTA) Board. Appendix A includes the report. The report summarized the basis for the decision leading to the choice of rail to serve the Eastside.

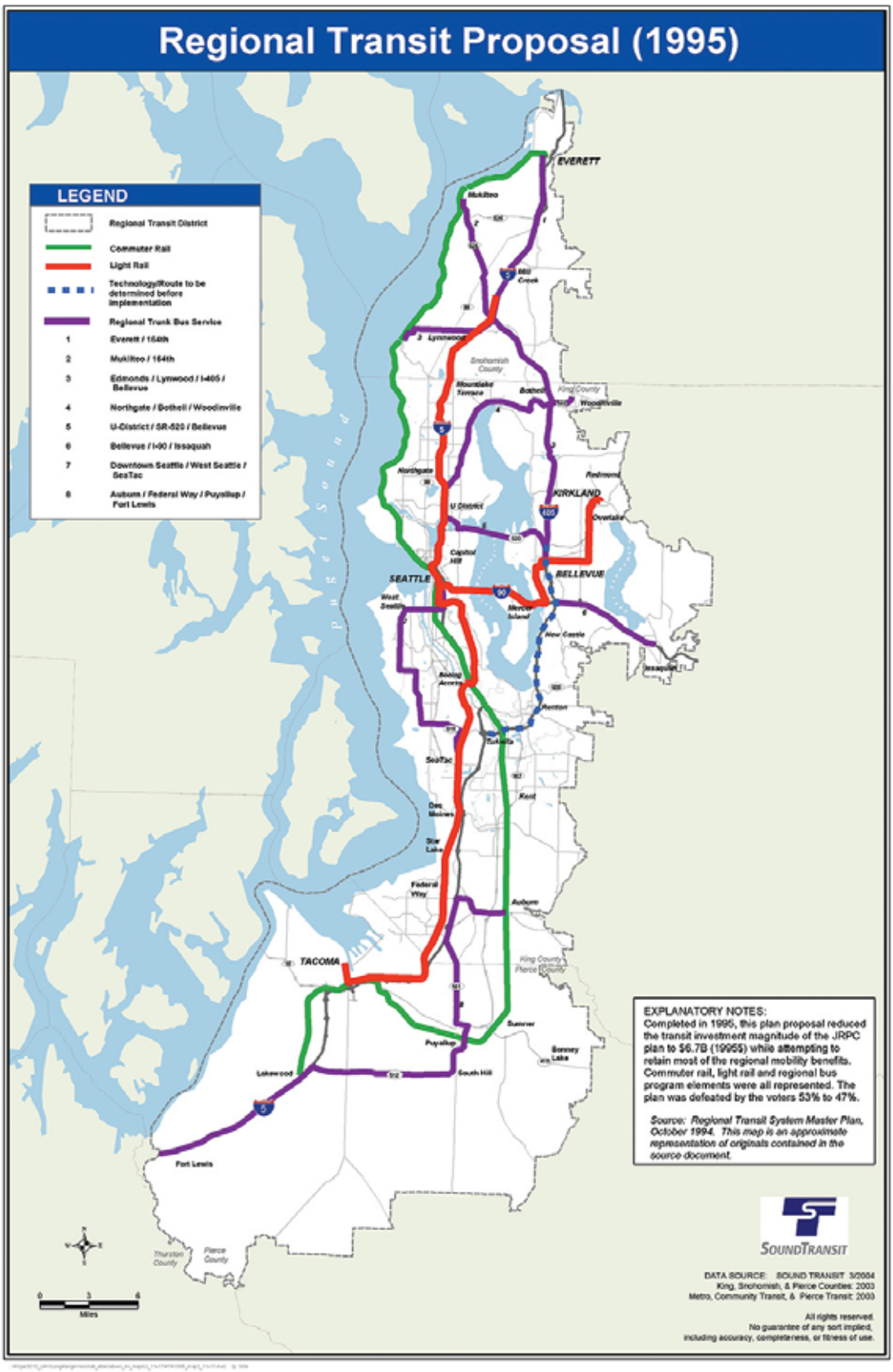
The summary also noted that the ETP gave consideration to land use, bus service, transportation system productivity, and costs in reaching the conclusion that rail service across I-90 was the most appropriate long-range solution. Under bus service implications, it was noted that Seattle CBD would have some residual capacity for buses if a three-corridor rail system (extending north and south in the general I-5 corridor and east across I-90) were constructed. However, if the rail system extended only north and south and the Eastside was served only by buses, downtown Seattle surface streets would be highly congested and Eastside transit riders would experience crowding, delays, and unreliable service.

Master Plan for the Regional Transit System/1995 Plan Vote

The Regional Transit Authority (RTA) adopted the Master Plan for the Regional Transit System Plan in October 1994. Phase 1 of the System Plan represented the initial stage of the Master Plan[3]. LRT development under Phase 1, as shown in Figure 3, included three

[2] *Summary of Decisions Leading to Recommendation for Rail on the Eastside* (Prepared for the Regional Transit Project; February 1994)
[3] Regional Transit System Plan – Master Plan (as adopted October 29, 1994); prepared for the Regional Transit Authority

Figure 3


Regional Transit Proposal (1995)
LEGEND
Regional Transit District
Commuter Rail
Light Rail
Technology/Route to be determined before implementation
Regional Trunk Bus Service
1 Everett / 164th
2 Mukilteo / 164th
3 Edmonds / Lynnwood / I-405 / Bellevue
4 Northgate / Bothell / Woodinville
5 U-District / SR-520 / Bellevue
6 Bellevue / I-90 / Issaquah
7 Downtown Seattle / West Seattle / SeaTac
8 Auburn / Federal Way / Puyallup / Fort Lewis
EVERETT
SEATTLE
BELLEVUE
KIRKLAND
TACOMA
Puget Sound
EXPLANATORY NOTES:
Completed in 1995, this plan proposal reduced the transit investment magnitude of the JRPC plan to $6.7B (1995$) while attempting to retain most of the regional mobility benefits. Commuter rail, light rail and regional bus program elements were all represented. The plan was defeated by the voters 53% to 47%.
Source: Regional Transit System Master Plan, October 1994. This map is an approximate representation of originals contained in the source document.
SOUNDTRANSIT
DATA SOURCE: SOUND TRANSIT 3/2004
King, Snohomish, & Pierce Counties: 2003
Metro, Community Transit, & Pierce Transit: 2003
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Miles

corridors – North (Seattle CBD to South Snohomish County), South (Seattle CBD to Downtown Tacoma), and East (Downtown Seattle to Overlake).

The Master Plan identified an LRT alignment between Downtown Seattle and Overlake via I-90 and the Bellevue CBD. In March 1995 funding for the plan failed to get voter approval in the RTA District boundaries.

Sound Move and the Regional Transit Long-Range Vision (1996)

Figure 4 illustrates *Sound Move* in the context of the Long-Range Vision. In November 1996, voters in the RTA District boundaries approved increases in taxes to provide local funding for *Sound Move*. The Long-Range Vision is also included in Destination 2030, the Metropolitan Transportation Plan for the Puget Sound area.

The rail components for *Sound Move* included commuter rail between downtown Seattle and Lakewood and downtown Seattle and Everett. The adopted Central Link LRT was identified for the corridor linking South 200th Street near SeaTac airport with the University District, with potential extensions to Northgate if funding becomes available. LRT was also identified for downtown Tacoma. For the Eastside, Regional Express bus was identified along the I-90 corridor between Downtown Seattle and Issaquah, along I-405 between Snohomish County and Renton, and from Issaquah to Northgate and Redmond/Kirkland to the University District via SR 520.

The Vision identified several factors that should be used to determine future light rail extensions beyond Central Link. These factors include evolving technologies, environmental analysis, actual population and employment growth, changing development trends, as well as future transportation priorities.

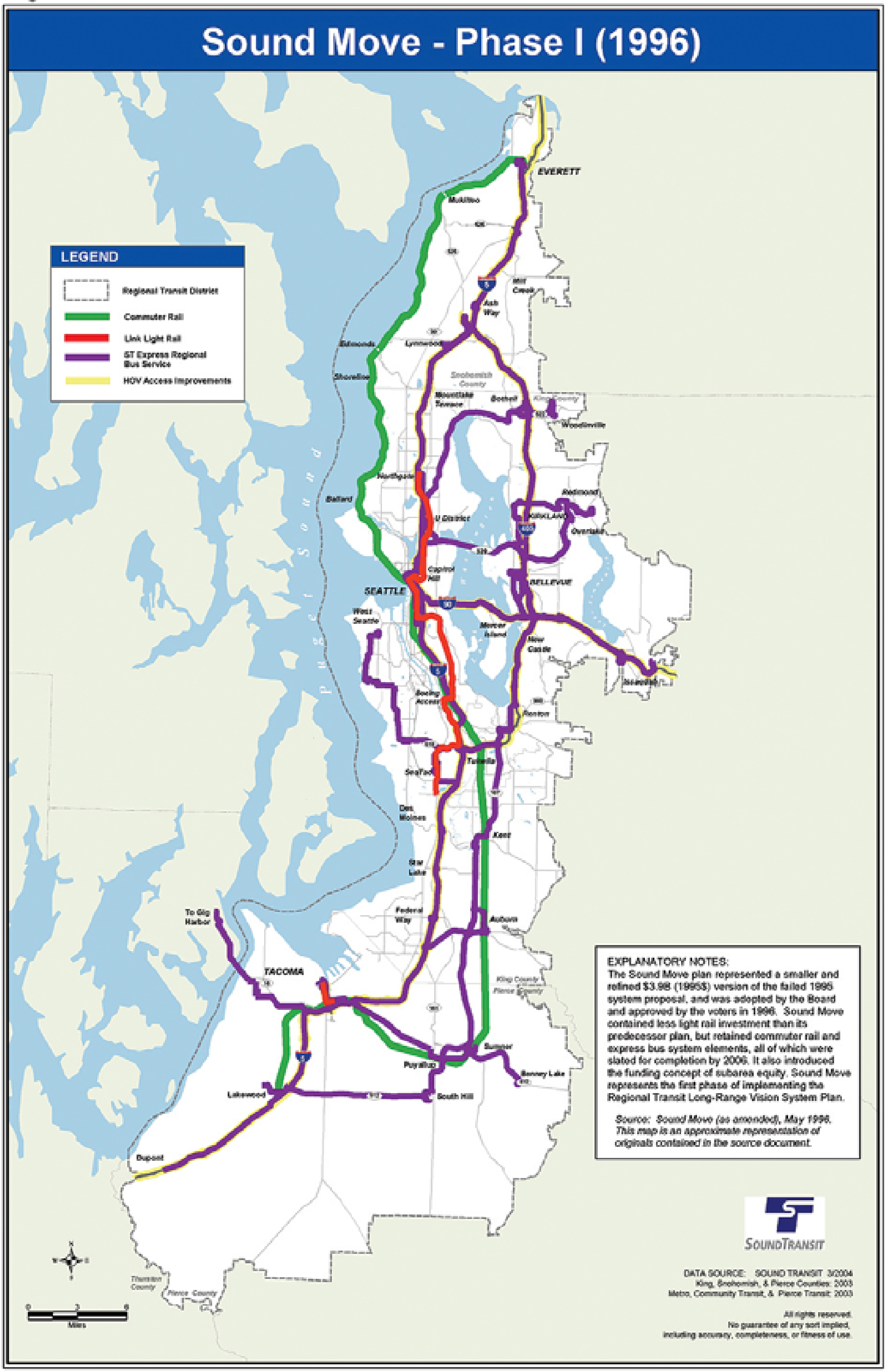
The Vision identified LRT, commuter rail, or other technology as possible technologies for HCT extensions. Along the I-90 corridor, the Long-Range Vision indicated that future HCT developments could be rail extensions for the I-90/Seattle CBD-Bellevue-Redmond corridor.

Trans-Lake Washington Project Multi-Modal Alternatives Evaluation Report (2002)

With WSDOT, ST served as co-lead for the Trans-Lake Washington Project. The project was carried out to identify potential roadway and transit capacity improvements to meet long-range travel demand across Lake Washington. The Multi-Modal Alternatives Evaluation Report examined potential needs to the year 2020. The report re-examined the question of the most appropriate corridor for the development of HCT service across the lake. In addition, the report explored a number of alignment alternatives for light rail on the Eastside, including alternatives for serving the Bellevue CBD from both I-90 and SR 520.

Travel forecasts conducted for the Trans-Lake Washington Project indicated that only one HCT corridor would be necessary to satisfy transit demand through the year

Figure 4


Sound Move - Phase I (1996)
LEGEND
Regional Transit District
Commuter Rail
Link Light Rail
ST Express Regional Bus Service
HOV Access Improvements
EVERETT
Mukilteo
Mill Creek
Ash Way
Lynnwood
Edmonds
Shoreline
Mountlake Terrace
Bothell
Woodinville
Northgate
Ballard
Redmond
U District
KIRKLAND
Overlake
Capitol Hill
SEATTLE
BELLEVUE
West Seattle
Mercer Island
New Castle
Issaquah
Boeing Access
Renton
Tukwila
SeaTac
Des Moines
Kent
Star Lake
Federal Way
Auburn
To Gig Harbor
TACOMA
Sumner
Puyallup
Bonney Lake
Lakewood
South Hill
DuPont
Puget Sound
EXPLANATORY NOTES:
The Sound Move plan represented a smaller and refined $3.9B (1995$) version of the failed 1995 system proposal, and was adopted by the Board and approved by the voters in 1996. Sound Move contained less light rail investment than its predecessor plan, but retained commuter rail and express bus system elements, all of which were slated for completion by 2006. It also introduced the funding concept of subarea equity. Sound Move represents the first phase of implementing the Regional Transit Long-Range Vision System Plan.
Source: Sound Move (as amended), May 1996. This map is an approximate representation of originals contained in the source document.
SOUNDTRANSIT
DATA SOURCE: SOUND TRANSIT 3/2004
King, Snohomish, & Pierce Counties: 2003
Metro, Community Transit, & Pierce Transit: 2003
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Miles

2020[4], which was the horizon year for the project. With regard to potential SR 520 vs. I-90 alignments for future HCT, the report concluded the following:

- An HCT line in the I-90 corridor could cost substantially less than a line in the SR 520 corridor, since much of the needed basic infrastructure between downtown Seattle and south Bellevue is already in place. In the case of SR 520, a multi-billion dollar investment in new infrastructure would likely be required to connect HCT along the SR 520 corridor to downtown Seattle.
- In the short to medium term, merging an SR 520 light rail line into Central Link would be feasible. However, in the longer term, when Central Link is extended beyond Northgate into Snohomish County, the segment between Northgate and downtown Seattle will have limited capacity to handle a rail junction and the added train movements to and from the Eastside. On the other hand, ridership and LRT service levels entering the Downtown Seattle Transit Tunnel (DSTT) from the south provides capacity for additional service coming from the east, as with an I-90 LRT operation. A potential splitting of LRT at the south end of downtown Seattle, one south and one east results in twice as much as service capacity to the north end thereby balancing ridership loads.
- HCT in the I-90 corridor would result in fewer environmental impacts than in the SR 520 corridor. This is primarily due to the need for major infrastructure work and associated impacts to accommodate HCT along SR 520 on the east shore of Lake Washington.
- An HCT line network on the Eastside is more efficient with an I-90 crossing with service from the Kirkland and Redmond areas passing through downtown Bellevue on the way to the lake crossing. With an SR 520 crossing, Kirkland and Redmond service to downtown Bellevue requires either a spur line or diversion of the main route prior to reaching the lake crossing. The latter results in added travel time for Eastside travelers to the Seattle CBD.

Sound Transit and WSDOT Studies of the I-90 Bridge (2001 and 2002)

In support of the Trans-Lake Washington Study, Sound Transit and WSDOT undertook a number of studies of the geometric and structural issues surrounding conversion of the major structures in the I-90 center roadway for light rail operation. The I-90 Floating Bridge was designed and constructed to handle the added loads associated with a future rail transit line in the corridor. In support of the RTP, technical studies were conducted on use of the Floating Bridge for light rail transit in the early 1990's. This work concluded that LRT use of the bridge was feasible pending further definition of transit requirements[5].

In 2001, Puget Sound Transit Consultants (PSTC) identified examples of modern rail bridges with similar or greater movements that accommodated rail operations. The examples include the Tagus River Bridge in Portugal and the Skytrain Fraser River Bridge in Vancouver, BC. The Trans-Lake Washington Project included summary results of a structural analysis

[4] Summary pf HCT Screening Process: Evaluations and Recommendations (Prepared for Washington Department of Transportation – Office of Urban Mobility; August 2002)
[5] Use of I-90 Floating Bridge Technical Memorandum (Draft; prepared for Regional Transit Project by Parsons Brinckerhoff/Kaiser Team; November 1992)

conducted for LRT conversion of the approach structures and transition spans for the I-90 Floating Bridge[6]. The conclusions reached to date indicate that LRT can be accommodated on the bridge provided that certain structural improvements are made and provisions are included in the track-work to accommodate the floating bridge movements.

I-405 Congestion Relief/BRT Project - White Paper on BRT (2003)

With WSDOT, ST served as co-lead for the I-405 Corridor Improvement Program (now called I-405 Congestion Relief and BRT Project). The project was carried out to develop strategies to reduce traffic congestion and improve mobility between Tukwila in the south and Lynnwood in the north. A NEPA corridor-level FEIS was also prepared for the project. The study concluded that BRT was the preferred HCT alternative for the I-405 with the provision that a higher capacity transit may at some point be required in the East King County core. This core is generally defined as Bellevue, Kirkland, and Redmond and centered on the SR 520 and I-90 corridors.

A subsequent White Paper on a Bus Rapid Transit Line Concept further discussed the BRT system recommended as part of the I-405 project[7]. The White Paper noted that BRT vehicles would use the HOV lanes or future High Occupancy Toll (HOT) lanes on I-405. Since potential rail-related HCT development along the I-405 corridor would use a separate alignment outside I-405 right of way, LRT along the corridor would not be precluded.

EIS for I-90 Two-Way Transit/HOV Operations (2004)

As part of Sound Move, ST and WSDOT in cooperation with the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have been evaluating alternatives for implementing two-way transit and HOV operations on I-90. The purpose of the project is to provide reliable, two-way transit and HOV operations between the Seattle CBD and Bellevue with a primary goal of improving the speed, reliability, and access for regional transit. A DEIS was issued and an FEIS is planned to be issued by May 2004. A Record of Decision on the EIS is expected in summer of 2004. The Sound Transit Board will decide on the project to be implemented after the FEIS is issued. The project also requires the approval of the Washington State Highway Commission and the FHWA.

The following further describes the results from the two-way transit and HOV operations on I-90 project:

I-90 Preferred Alternative

At its July 2003 meeting, the I-90 Steering Committee identified Alternative R-8A, HOV lanes on the outer roadways as its preferred alternative and as an essential first step towards achieving a long-term transit vision for the Eastside. The Committee envisioned

[6] The Homer Hadley (I-90) Floating Bridge Approach Structure and Transition Span: Draft Structural Analysis for the Light Rail Conversion (KPFF Consulting Engineers; August 2001)

[7] *White Paper: Bus Rapid Transit Line Concept – Ten-Year Program Implementing the First Phase of the I-405 Corridor Program Recommendations* (submitted to Washington Department of Transportation. Office of Urban Corridors; prepared by I-405 Transit Work Group and Mirai Associates; August 2003)

the I-90 roadway with HCT in the center roadway as the ultimate configuration of the roadway.

Amendment to the Memorandum Agreement
An amendment to the Memorandum Agreement has been negotiated with all the parties to the 1976 Agreement, with Sound Transit being added as a signatory. Respective city councils are reviewing the amendment. It is anticipated that the Sound Transit Board will take action on the amendment at the same time that it selects the I-90 Two-Way Transit and HOV Operations project to be implemented.

The Cities of Bellevue, Mercer Island, and Seattle have endorsed a concept that will address the development and implementation of future HCT in the I-90 corridor according to the following principles:

- R8-A with HCT deployed in the center lanes is the ultimate configuration for I-90;
- Construction of R8-A should occur as soon as possible as a first step in the ultimate configuration;
- Upon adoption of R8-A, move as quickly as possible to implement HCT in the center lanes;
- Commit to the earliest possible conversion of center roadway to two-way HCT operations based on outcome of studies and funding approvals.

HCT Corridor Assessment for Central Puget Sound Region (2004)

The Puget Sound Regional Council (PSRC) is assisting ST in the update of the Long-Range Vision. PSRC is providing a base of updated population, employment, and travel demand forecasts. It is also conducting an assessment of land use and travel data to determine the relative potential for HCT development in each of the major Long-Range Vision corridors.

In the Draft Assessment of HCT corridors, the study identified findings for the Crosslake corridor, which includes SR 520 and I-90[8]. The findings noted that corridor-wide land use characteristics and projected growth indicate that the Crosslake Corridor has sufficient densities to support HCT. It also noted that existing population and employment densities in the Seattle and Bellevue CBD's support HCT; and by 2010, Overlake will have densities to support HCT.

The HCT assessment concluded the following regarding potential transit technologies for the Crosslake Corridor:

> *Enhanced Bus*: Due to capacity and speed limitations (particularly in the Seattle CBD), enhanced bus technology would lack capabilities needed for the long-range travel needs of the corridor.

[8] *Central Puget Sound High Capacity Transit Corridor Assessment: Independent Technical Review Workbook* (Draft) March 2004

BRT: In the near-term, BRT could serve projected travel demand between Seattle and Bellevue. However, the report notes that it would be challenging to meet long-term needs without investment in grade-separated services and facilities. Also, bus volumes on downtown Seattle streets would become a serious problem once light rail volumes in the DSTT reach levels precluding bus operations in the tunnel.

LRT: LRT meets both the current and long-term needs of the Crosslake corridor. The higher capacity, speed, flexibility in frequency, and the permanence of the stations fully support long-range plans and projected growth for Seattle and Bellevue. In addition, light rail will provide a seamless connection to the Central Link line serving the corridor running north and south through Seattle.

Monorail: This technology's capacity could meet the needs for the Crosslake Corridor between Seattle and Bellevue. However, larger vehicles and more extensive infrastructure than planned for the monorail's Green Line would be required to meet long-range capacity needs. In addition, Crosslake monorail service would require a transfer and construction of transfer facilities to integrate with the Central Link light rail line in Seattle.

Skytrain. Skytrain could meet many needs of the corridor. If operated like the system in Vancouver, BC, it would be automated and fully grade separated. However, as with monorail, Skytrain technology requires full grade separation and would require a transfer and new facilities to accommodate connections to the Central Link light rail line in Seattle.

In coordination with the American Public Transportation Association, an independent technical committee conducted a peer review of the PSRC effort. The committee was comprised of transit industry professionals from other regions. Major findings from the committee's review included the following that specifically relate to the Crosslake Corridor:

- The North and Crosslake Corridors have the greatest potential for near-term implementation of HCT.
- The Crosslake Corridor has levels of service that are comparable to BRT systems. The committee could not envision much more additional future capacity with this technology.
- To effectively build on current transit applications and future projections, consideration should be given to systems with capacities beyond what BRT could provide in the Crosslake Corridor.
- The term "ripe" was used to describe the HCT study corridors. If forced to pick, the committee indicated that the Crosslake Corridor is ripest of all.
- Corridors that build on Phase 1 HCT investments should be given priority.

3.2. Direction for Further I-90 HCT Studies

This section describes potential direction for future alternatives analyses. This direction includes a policy context as well as major HCT-related issues and follow-up studies.

Policy Context

Since 1976 the conclusions of a number of studies and plans provided policy direction for the development of HCT in the Seattle CBD to East King via I-90 corridor.

- 1976 I-90 Memorandum Agreement
- 1992 ETP resolution supporting rail to the Eastside
- 1993 JRPC Plan
- 1995 Regional Transit Plan
- 1996 *Sound Move* and Long Range-Range Vision
- PSRC 2030 Metropolitan Transportation Plan (adopted 2001)
- 2002 Trans-Lake Washington Study
- 2003 I-90 Two-Way Transit/HOV Access Project
- 2004 PSRC HCT Study

The results of the items listed above support HCT development on the I-90 corridor between downtown Seattle and downtown Bellevue. While current efforts involve designing and constructing bus facilities across I-90, many past studies have suggested that the ultimate technology should be rail.

HCT Issues and Follow-up Studies

The sections that follow describe the issues to be addressed by an assessment of potential HCT alternatives for the Seattle CBD to East King via I-90/Bellevue corridor. Follow-up studies are needed to further refine the HCT alternative(s) in the corridor. The studies relate to the two potential HCT alternatives that have been concluded by previous studies to have the most promise in meeting needs of the corridor – LRT and BRT. Suggested elements for these studies, grouped under LRT and BRT, are as follows:

LRT Alternative Studies

Eastside Transition from I-90 Center Roadway
Much of the alignment work to date has assumed that a potential LRT line would continue across the I-90 East Channel Bridge, exit the center roadway via the existing Bellevue Way ramps, and transition to an aerial guideway and station near the existing South Bellevue park-and-ride lot. In this same area, the potential line needs to include provisions for a future junction for a branch that continues east to Eastgate and eventually Issaquah. In addition, it would be highly desirable to provide for passenger transfers between the Bellevue CBD branch and the Issaquah branch. While previous studies have identified a number of options for meeting these needs, none are ideal and more study is needed.

Alignment, Profile and Station Locations to and through Bellevue CBD
Work to date has examined a number of alignment options between I-90 and the Bellevue CBD. The use of Bellevue Way and 112th Avenue was the most recently studied by the Trans-Lake Washington Project. At-grade, aerial and subway options and stations through the CBD have also been studied. More work is needed to refine these options and identify a short list of alternatives to carry forward.

Alignment, Profile and Station Locations East of Bellevue CBD
Additional work is needed to identify project limits for a potential initial segment east of the Bellevue CBD. While the Long-Range Vision describes a system that ultimately extends beyond the Redmond CBD, the first phase may not be built that far. It will be important, however, that the line extends east to a maintenance and operations base site and gains access to additional park-and-ride-facilities.

Seattle CBD Impacts
Additional work is needed on both the light rail and bus operations issues in the Seattle CBD associated with the introduction of rail service on I-90. The major issue is whether joint bus and rail operations can continue in the tunnel once the rail junction at the south end of International District Station goes into service.

Updated Cost Estimates
Numerous planning level cost estimates have been prepared in the past, with the most recent estimates developed in support of the Trans-Lake Washington Project. However, Sound Transit has not developed any recent estimates. New estimates need to be prepared based on the knowledge gained from Central Link.

Updated Ridership Estimates
Numerous planning level ridership estimates have been prepared in the past, with the most recent estimates developed in support of the Trans-Lake Washington Project. However, Sound Transit has not developed an estimate for the most likely initial Eastside segments and new estimates need to be prepared using methodologies developed to meet FTA's New Starts requirement (such as those performed for Central Link).

BRT Alternative Studies

Eastside Transition from I-90 Center Roadway While a number of BRT strategies have been explored in the past, more work is needed to define a predominantly grade-separated BRT system extending from the end of the I-90 center roadway. This grade-separated system would have to address connections to potential alternative alignments that could serve either downtown Bellevue, a potential BRT line on I-405, or both.

Alignment, Profile and Station Locations to and through Bellevue CBD
For the Bellevue CBD, work is needed to define potential grade-separated and at-grade options for BRT. These include both alignments and station locations for the system. At-grade, aerial and subway options and stations through the CBD could be explored. More work is needed to refine these options and identify a short list of alternatives that

could be carried forward in project-level environmental review should the I-90 corridor be the next one to be advanced.

Alignment, Profile and Station Locations East and North of Bellevue CBD
Work is needed to identify a BRT system east and north of the Bellevue CBD and tied into the existing and planned HOV lane network on SR 520, I-405 and I-90. In addition, this work needs to explore ways to integrate this system with the proposed BRT system to be built in I-405. The goal should be to develop an alternative that can come closest to matching the speed, reliability and capacity of the light rail alternatives.

Seattle and Bellevue CBD Impacts
Additional work is needed on bus operations issues in the Seattle and Bellevue CBDs associated with the introduction of BRT service on I-90. For Seattle, the major issue will be the speed, quality and reliability of surface bus operations on downtown surface streets, especially in downtown Seattle once light rail volumes build to the point that buses can no longer operate in the DSTT. For the Bellevue CBD, the focus should be on the volume of buses, adequacy of the Bellevue Transportation Center, and capacity of streets to accommodate potential BRT operations.

Updated Cost Estimates
Numerous BRT planning level cost estimates have been prepared in the past, with the most recent estimates developed in support of the Trans-Lake Washington Project. However, Sound Transit has not developed an estimate and new estimates need to be prepared based on the knowledge gained from other BRT studies and existing Regional Express facilities and services.

Updated Ridership Estimates
Numerous planning level ridership estimates have been prepared in the past for a BRT alternative, with the most recent estimates developed in support of the SR 520 Bridge Replacement and HOV Project. However, Sound Transit has not developed an estimate for the most likely initial Eastside segments. New estimates need to be prepared using the ST forecasting model and which are based on the knowledge gained from existing Regional Express services.

Appendix A -
Summary of Decisions Leading to Recommendations for Rail on the Eastside

Summary of Discussions Leading to Recommendation for Rail on the Eastside

February 1994

Regional Transit Project

I. What's in the Recommended Plan?

The three-county Regional Transit System Plan, adopted in May 1993 by the Joint Regional Policy Committee (JRPC), includes an integrated bus and rail system. On the east side of King County, the plan proposes a rail alignment from Seattle to Bellevue via the Interstate-90 center roadway. From Bellevue, the alignment branches north to Totem Lake along I-405, and east through Overlake to Redmond. In addition, the plan proposes a supporting bus network for the eastside that addresses issues outlined in earlier ETP issue papers.

An all-bus transitway alternative was also evaluated during the environmental review process, as was a transportation systems management (TSM) alternative.

II. Background

For planning purposes, the JRPC has divided King County into three corridors: north, south, and east. The east corridor boundaries are Lake Washington on the west, the Urban Growth Boundary on the east, the Snohomish County line on the north, and May Creek (just north of Renton) on the south. The area includes the cities of Mercer Island, Issaquah, Bellevue, Redmond, Kirkland, Bothell, Woodinville, and a number of smaller cities and towns.

The Eastside Transportation Program (ETP) is an established subregional decision-making body composed of elected representatives from many of the cities listed above, along with the City of Renton, King County, Metro, Puget Sound Regional Council, the State Department of Transportation, Eastside Transportation Committee, and the State Transportation Improvement Board. The ETP has a staff-level Technical Advisory Committee and a Steering Committee of elected officials.

During the development of the System Plan, the ETP held numerous meetings in 1991-92, and a half-day workshop in July 1992 to examine and discuss the various alternatives and supporting data, particularly in relation to the transit needs of Eastside jurisdictions. Subsequently, ETP reached consensus on various elements of the plan, formalized its positions, and transmitted them to the eastside representative to the Metro Planning Subcommittee and JRPC. In May 1993, the JRPC adopted a System Plan that included rail on the Eastside and, for the most part, addressed ETP's concerns. The following four positions had been transmitted by the ETP during development of the System Plan:

- December 1991: Three policy papers relating to east corridor transit service needs.
- April 1992: A resolution supporting rail as an element of one or more alternatives for the Regional Transit Project (RTP) with six conditions regarding equity, phasing, accountability, land use considerations, tax revenue streams, and evaluation criteria.

- August 1992: A resolution endorsing an Eastside element of the System Plan that included local or feeder bus service, a TSM plan, rapid transit (including rapid rail across I-90 to Redmond and Totem Lake, and a regional bus system serving Bothell, Renton, Issaquah, and the University of Washington), a plan for system development responsibilities, and a financing plan.

- April 1993: A letter supporting Governor Mike Lowry's proposal for funding the System Plan and urging the State Legislature to move quickly to enact legislation that will implement the financing package.

III. ETP Discussion Areas

While the JRPC was debating bus vs. rail technologies, prior to adopting the System Plan, the ETP's discussion centered on the following four topic areas:

- Land Use Implications: Which technologies best support the Vision 2020 and Growth Management Act philosophies of linking land use and transportation?

- Bus Service Implications: How would the technology choice affect regional Eastside service currently using the downtown Seattle transit tunnel (i.e., all bus, part bus, or all rail)? How do the alternatives differ in terms of regional vs. Eastside-only service levels?

- Productivity Comparisons: How do ridership and travel times differ between the technologies?

- Costs: How do the construction costs differ between the various technologies?

Land Use Implications

Vision 2020, the four-county growth and transportation strategy adopted in 1990, calls for connecting regional, metropolitan, and subregional centers with rapid transit. By connecting Bellevue to the region's three other regional and Metropolitan Centers (Tacoma, Seattle and Everett), the Eastside's centers would be linked to all other major centers. ETP endorsed maintaining consistency with Vision 2020 goals by connecting centers.

During debate on the System Plan, Eastside elected officials were presented with maps of the System Plan, the Urban Growth Boundary, and current and projected population and employment densities. Because it is the Eastside's recognized metropolitan center, Bellevue needs to be served first, before the alignment is split to other Eastside destinations. The Steering Committee's discussions centered around which destinations on the Eastside (after downtown Bellevue) would support the land use vision and goals for the Eastside.

Totem Lake, Redmond, and Overlake nominated themselves to be Urban Centers, while Issaquah did not. Because of this,elected officials recommended extending the rail system to Redmond and Kirkland, but not to Issaquah. This reinforced the Vision 2020 philosophy of connecting centers.

Bus Service Implications

Bus traffic on Seattle streets also will rise as service on the region grows with implementation of the bus service portion of the plan. The information presented in Table 1 compares the estimated 2020 bus capacity of downtown Seattle streets and of the bus tunnel, compared with transitway and rail alternative needs.

As shown in Table 1, Seattle streets would have residual capacity for buses if a three-corridor rail system were constructed and a feeder bus system operated. If a transitway (bus only) system were implemented, however, the number of buses in the peak p.m. hour would exceed the capacity by 225 buses, creating a 30 percent overload on city streets.

Taking the bus scenario one step further, if a rail system were implemented in the north and south corridors using the tunnel, and the Eastside had a bus system, the east's buses would have to use Seattle surface streets with all the other general-purpose traffic. It was not envisioned that the city would provide additional transit exclusivity on city roadways. Therefore, transit service quality would decline in this scenario for the east corridor, while service for the north and south corridors would be enhanced with rail.

Another ETP discussion centered around the need to support the rail system with bus service by moving people from neighborhoods and activity centers to rail stations. Service Planners would reinvest bus service that duplicates rail service. Additional service would be provided with new revenues. The Totem Lake/Redmond alignments provided the most opportunity to reduce cross-lake investments. Those investments can then be reallocated to feed the rail system, resulting in higher ridership productivity for the Eastside overall, and maximizing of the bus network on the Eastside.

Productivity Comparisons

Ridership modeling indicated that the highest ridership would occur between Bellevue and the Redmond/Overlake area. The Kirkland and Issaquah alignments generated fewer riders, and were about equal. Renton supported the least ridership.

As shown in Table 2, travel time for a rail trip from downtown Bellevue to Redmond would be competitive with private automobile (36 minutes for rail vs. 31 minutes automobile). By contrast, a transitway trip would take 46 minutes. Likewise, a trip from downtown Seattle to Redmond would be faster on rail (53 minutes rail, 56 minutes automobile), but slower by transitway (63 minutes). The Steering Committee expressed concern that travel times be competitive with automobile trip times.

Of the region's four Metropolitan Centers, Bellevue, Seattle, and Tacoma have the highest employment and housing densities, which would generate ridership sufficient to support a regional system. If a rail system were to connect Seattle, Tacoma, and Everett, and a bus system connected Bellevue to the other three centers, Eastside travelers would be required to transfer to the regional rail system to make connections to the other centers. The modeling exercises that compared the TSM and rail alternatives indicate transit ridership would decline if the system had no rail component on the Eastside. One reason for the decline would be that the trip time for many Eastside system users would increase because of the declining speed and reliability for the bus portion of the system; particularly the intra-eastside and SR-520 trips.

Costs

The information presented to ETP (see Table 3) indicates the cost of building a regional rail system would be much higher than that of building a transitway. It would also generate more riders. After comparing productivity between the two systems, the ETP favored the rail alternative, even though the costs would be higher. A key factor in this decision was that loss of the downtown Seattle transit tunnel to rail for the north and south corridors would result in unacceptable service levels for the Eastside.

The $200 million cost of connecting Bellevue to Seattle by rail would be a relatively small portion of the Eastside system costs because the I-90 center roadway has already been designed and partially constructed for rail.

The majority of the Eastside costs ($750 million) would result from tunneling through downtown Bellevue. Elected officials questioned if there were less-costly alternatives to tunneling. The question was addressed later in a special study completed December 1993, which is the topic of a second briefing paper for the East Corridor titled Bellevue CBD Alignment Alternatives Evaluation.

TABLE 1

SUMMARY OF DOWNTOWN SEATTLE CAPACITY CONSTRAINTS

	Downtown Seattle		
	Downtown Seattle Transit Tunnel	Surface Streets	Total
Estimated Capacity	200	450	650
System Capacity Needed			
2020 TSM/Transitway	270	605	875
2020 Rail Alternative	0	470	470

TABLE 2

DOOR-TO-DOOR TRAVEL TIMES (MINUTES)

Downtown Bellevue to:	Current Bus	Current Auto	Transitway	Rail	Future Auto
Redmond	56	22	46	36	31
Kirkland	39	16	38	35	20
Renton	60	29	54	43	41
Seattle	50	27	44	36	36
Downtown Seattle to:	**Current Bus**	**Current Auto**	**Transitway**	**Rail**	**Future Auto**
Redmond	69	43	63	53	56
Kirkland	59	35	56	56	44
Renton	53	34	46	45	38
Bellevue	52	33	42	37	36

TABLE 3

TECHNOLOGY COMPARISON INFORMATION

Parameters	Transitway	Core Rail
East Corridor Cost ($ Millions)	$194	$1,360
System Annual Ridership	135,000	152,000
Cost/New Rider	$12.80	$10.00