



SOUND TRANSIT

HCT Planning

Sound Transit Long-Range Plan Update

Issue Paper S.3: HCT System Development Issues in the South Corridor

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Sound Transit

FINAL

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Foreword

This issue paper is part of a series of reports designed to inform the Sound Transit Board in its decision-making on the Regional Transit Long-Range Plan update for the Sound Transit service area. Each issue paper provides information about a specific element or area of the Long-Range Plan and potential options. These reports focus on issues such as costs, ridership, engineering feasibility, and operations.

The environmental impacts of the updated Long-Range Plan and Options, as well as potential mitigation measures, are examined in the Draft Supplemental EIS for the Regional Transit Long-Range Plan (December 2004). The Draft SEIS supplements the 1993 EIS prepared on the Regional Transit System Plan, and it generally updates that information and analysis through the year 2030. Public and agency comments on the 2004 Draft Supplemental EIS have been received and will be responded to in a final SEIS to be issued in June 2005.

The Sound Transit Board anticipates identifying a draft updated Long-Range Plan in the spring of 2005. There will be an opportunity for public review and comment on the draft Plan. The Board will adopt a final updated Long-Range Plan after public comments are received on the draft plan and the final SEIS is issued.

References in these reports to Sound Transit's existing Long-Range Plan are to the 1996 Regional Transit Long-Range Vision, which functions as the agency's Long-Range Plan. Discussion of the updated Long-Range Plan refers to the Plan being developed by Sound Transit over the coming months.

The following issue papers are being prepared:

East Corridor

E.1 – I-90/East King County High-Capacity Transit (HCT) Analysis

North Corridor

N.1 – Bus Rapid Transit (BRT) in SR 99 Corridor

N.2 – I-5 Corridor Northgate to Everett HCT Assessment

N.3 – Seattle Streetcar Options

N.4 – SR 522 Corridor HCT Assessment

N.5 – Convertibility of BRT to Light Rail

South Corridor

S.1 – Tacoma Link Integration with Central Link

S.2 – Potential Rail Extensions to Frederickson and Orting

S.3 – HCT System Development Issues in the South Corridor

S.4 – Potential Tacoma Link Extension - West

S.5 – Rail between Burien and Renton

S.6 – Potential Tacoma Link Extension – East

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1. Study Purpose

This paper discusses the issues and considerations that may need to be addressed as high capacity transit (HCT) services that are operated by Sound Transit (ST) are implemented in various phases over time within the southern extent of the ST service area, referred to here as the "South Corridor." This area covers the south King and north Pierce County urbanized regions and includes many designated regional growth centers (e.g., downtown Tacoma) and manufacturing/industrial centers (e.g., Green River Valley).

With three modes of HCT services operated by Sound Transit within the South Corridor (Sounder commuter rail, Link light rail, and ST Express regional bus routes), plus the local and commuter bus services provided by King County Metro and Pierce Transit, a comprehensive and highly integrated transit system has been developed. These aspects of the corridor's transit system also impart a degree of complexity in planning for the evolution of this system as certain modes are extended and/or expanded over time, as the transit market changes and matures, and as supporting transportation facilities (e.g. new or expanded roadways) are developed.

This paper highlights some of the larger issues that Sound Transit may encounter as these changes occur and as it develops new project plans and implements them in phases. It is not intended to be an exhaustive, detailed review of all the potential issues; rather, it emphasizes the interrelationship between Sound Transit services modes and presents examples of likely considerations and potential outcomes as the agency moves forward in implementing its Long-Range Plan.

2. Key Findings

- Because Sound Transit will implement its Regional Transit Long-Range Plan over time in distinct voter-approved phases, some services may operate for a significant period of time at service levels lower than what is fully envisioned in the LRP. For example, providing all-day Sounder service requires negotiations with Burlington Northern Santa Fe (BNSF) for more track rights, which (as previous experience indicates) could result in significant capital and service costs that may constrain implementation.
- ST Express services have the potential to support the South Corridor rail markets during interim phases of completion, and may eventually migrate to providing direct connecting service to Sounder and Link as well as serving completely new markets.
- ST HCT services provided in an earlier phase by a certain mode (e.g. express bus) could be redundant with services of a different mode (e.g. light rail) planned for in future phases, creating choices for the agency about service restructuring and/or reduction, and the overall role of that service in the larger transportation system.
- When planning interim phase HCT services, the useful life of certain supporting capital facilities (e.g., park-and-ride lots, direct-access ramps, etc.) will have to be considered and weighed against the anticipated full implementation of the LRP to avoid investing in infrastructure that could later become under-utilized or obsolete.

3. Major Study Elements

The major elements addressed in this issue paper include:

- Issues regarding phased implementation of the Regional Transit Long-Range Plan.
- Relationship between Sounder, Link, and ST Express services within the corridor at interim and final stages of development.

3.1 Existing versus Future HCT Service

3.1.1 Existing/Planned Services under *Sound Move*

Sound Transit provides regional HCT transit services in the South Corridor in accordance with *Sound Move*, the capital and service plan approved by voters in 1996. *Sound Move* is the first implementation phase of the Regional Transit Long-Range Vision. The Vision -- adopted by the ST Board in 1996 -- is the agency's long-range plan. It describes agency policies and its ultimate service goals and system configuration, and provides direction regarding development of future phases.

Sound Move represents a blend of transit services in the South Corridor that complement each other, integrate with the local transit services, take advantage of existing and planned transportation infrastructure (i.e., rail and highway), and connect key employment/activity centers with each other and with the residential market.

Sound Transit has to date provided nearly all the *Sound Move* services and constructed most of the supporting capital facilities. The descriptions below cover the full implementation of *Sound Move*.

ST Express Regional Bus Routes

South Corridor ST Express serves the following markets:

- DuPont, Lakewood, Tacoma, Federal Way, SeaTac, Seattle
- Tacoma, University District (Seattle)
- Lakewood, Puyallup, Sumner, Auburn
- Bonney Lake, Sumner, Puyallup, Tacoma
- Federal Way, Auburn, Kent, Renton, Bellevue
- Gig Harbor, West Tacoma, Seattle (funded by Pierce Transit)
- West Seattle, SeaTac, Renton, Bellevue

ST Express buses are operated by the local transit agencies (King County Metro and Pierce Transit) under contract with Sound Transit. Routes that serve Seattle and Bellevue operate on freeway High-Occupancy Vehicle (HOV) lanes where they exist (currently only on I-5, SR 167 and I-405 within King County.) They also utilize ramp facilities constructed by Sound Transit and WSDOT that directly connect the HOV lanes to major transit centers in Federal Way, Bellevue and Renton.

Sounder Commuter Rail

Sounder operates during the peak commute periods along trackage owned by Burlington Northern Santa Fe (BNSF) railroad (between Tacoma and Seattle) and Sound Transit (between Lakewood and Tacoma.)

Stations to access Sounder service are located at major hubs along the line: Lakewood, south Tacoma, downtown Tacoma (Tacoma Dome), Puyallup, Sumner, Auburn, Kent, Tukwila and Seattle. Current plans -- and the operating contract with BNSF -- provide for 18 weekday train runs: six morning northbound runs (from Lakewood to Seattle) and six afternoon runs in the reverse direction; and three southbound morning runs (from Seattle to Lakewood) and three afternoon reverse runs. All stations except Seattle have adjacent free parking facilities.

Tacoma Link Light Rail

This light rail system connects downtown Tacoma with the Tacoma Dome Transit Station where Sounder and ST Express bus connections can be made. It also connects to the local bus service at the downtown transit center and the Tacoma Dome. Tacoma Link uses single-car vehicles connecting five stations along a 1.5 mile line. Trains arrive and depart each station approximately every ten minutes.

Central/Airport Link

Central and Airport Link will provide light rail service between S. 200th Street station and downtown Seattle, with stations at Sea-Tac Airport, S. 154th Street/International Boulevard in Tukwila, and at numerous stops through the southeast Seattle area. Link uses multi-car trains providing high-capacity all-day service, with the highest frequency and capacities occurring during peak commute periods.

Local Transit Service

It is also important to note that King County Metro Transit and Pierce Transit provide both local and commuter bus routes, making for a comprehensive transit system in the South Corridor. These partner agency routes integrate and support Sound Transit services in many locations, particularly at major transit centers in Burien, Renton, Sea-Tac Airport, Federal Way and at all Sounder Stations.

3.1.2 South Corridor HCT Services under the Long-Range Plan

The Regional Transit System Long-Range Vision (a.k.a. the Long-Range Plan, or LRP) was adopted by the ST Board in 1996. The LRP provides the goals and policies which the Board that guide the development of the system over time.

Sound Transit is currently in the process of updating the Long-Range Plan, which is anticipated to be complete by summer 2006. This updated LRP will then be used to guide the development of the next phase of projects, called Sound Transit 2 (ST2).

It is envisioned that the LRP will be implemented in a series of phases that would eventually result in the regional transit system outlined in the LRP being fully realized. Assuming that the updated LRP does not substantially change from the currently adopted LRP, the HCT services described below would operate in the South Corridor at some future date.

Souder Rail Service

Souder would provide trips between Seattle and DuPont with stops at regional centers including Tukwila, Kent, Auburn, Puyallup, Tacoma and Lakewood, and connect these points in both directions over the entire day (versus the commute-period service operated under *Sound Move*.)

Link Light Rail Service

Link would create a north-south light rail service -- generally within the Interstate 5 (I-5)/SR 99 corridor -- connecting Seattle and Tacoma with stops at major activity centers including Tukwila, SeaTac, Des Moines and Federal Way.

Another light rail line is identified in the LRP that is generally within the Interstate 405 (I-405) corridor from Lynnwood through Bellevue to Renton, and (in the South Corridor) from Renton to SeaTac, where a possible connection between this line and the north-south Link line could be made.

ST Express Regional Bus Route Service

The LRP envisions regional bus routes that would connect urban centers and points between, and provide connections to Souder and the Link light rail lines. Within the South Corridor, this system of bus routes could be structured similarly to that which is currently operated under *Sound Move*, with potential additional routes between downtown Tacoma and the South Pierce County area, and between DuPont and Puyallup within South Pierce County. Where appropriate and possible, these routes would operate on freeway and arterial HOV lanes.

3.2 Future South Corridor HCT System Development Issues

3.2.1 Sounder Rail Service

BNSF Agreement

In implementing Sounder as part of *Sound Move*, ST negotiated an agreement with BNSF for passenger rail service. This agreement describes the maximum number of north- and southbound passenger train runs per period of the day that ST can operate, along with the improvements to track and signals required at specific levels of passenger rail service.

Sounder service operating under *Sound Move* is covered by this agreement and includes running a total of 18 weekday trains between Seattle and Lakewood. Beyond these 18 trains, the BSNF agreement allows up to 30 weekday trains (i.e., an additional six in each direction) in the future.

All-Day Service along the Sounder Route

The LRP envisions "all-day, everyday" Sounder service, potentially between DuPont and Seattle. Providing service to the 30 trains allowed under the current BNSF agreement approaches this goal, but would not necessarily fully satisfy it.

To provide passenger service beyond that covered in the current agreement means re-opening negotiations with BNSF which may require further significant capital improvements. The rail right-of-way between DuPont and Tacoma Dome Station is now under ST ownership; therefore service levels along this segment are not constrained by agreement with another owner, but could still be limited by other factors.

Under *Sound Move*, Sounder riders must select from a limited number of trains in the morning or evening to make their trip. To make the same trip during non-Sounder operating hours, a comparable regional transit service does not exist for some riders. These riders would need to use two or more local and/or regional bus routes to accomplish this trip. Besides the introduction of transfers, this alternate trip would likely require longer travel time compared to taking the Sounder train. Thus, if Sounder was operating all day, then these riders could make their trip without much of the inconvenience experienced with the alternate trip. In this way, all-day Sounder service could potentially create a larger overall demand for transit service within the South Corridor.

Potential "Shadow" Sounder Bus Service

Considering that reaching the LRP goal of all-day Sounder service could be financially and practically challenging, and that the timeframe for this is likely beyond the ST2 planning horizon, other transit modes could be utilized in the interim. One idea that has emerged through the LRP updating process is to provide a "shadow" bus route that complements Sounder service. During the periods when Sounder is not operating, this shadow route would provide a similar service, connecting many, if not all, of the Sounder stations in the South Corridor (e.g., along the SR 167 corridor) with the major employment/activity centers in downtown Seattle and Tacoma.

The disadvantage of a shadow bus route is that it, like other ST Express and local routes, would be subject to varying traffic conditions, and could potentially require a significant investment in supporting capital improvements to achieve the same level of schedule reliability as that for Sounder trains. Also, shadow service could require a net increase in ST Express operating hours and fleet size. A possible advantage of shadow bus service is that besides directly serving the off-peak Sounder market, the route(s) could also include some intermediate stops that are not directly served by the location of the Sounder stations (e.g., the office/manufacturing/industrial employment market in the Green River Valley.) These issues can be more fully analyzed and understood at the project-level in ST2 or other future planning efforts.

Competition from Other ST Services

Sound Move provides Sounder passenger rail service between Lakewood, Tacoma and Seattle primarily during the peak commute periods. *Sound Move* also provides ST Express bus service between these locations during both peak periods (i.e., 6 to 9 a.m. and 3 to 6 p.m. respectively) and off-peak periods. Further, the LRP envisions extension of Sounder service to DuPont which is currently served by an ST Express route.

The scheduled travel times for the ST Express routes between the Tacoma Dome and the King Street Station area on the south end of downtown Seattle are roughly equivalent to Sounder travel times (60 minutes for Sounder; approximately 50 minutes for ST Express) but the ST Express travel times are much more variable since they are dependant on traffic flow conditions along the HOV lanes on I-5 within King County and general purpose lanes on I-5 within Pierce County. To reach central or northern downtown Seattle locations, Sounder riders must transfer to other bus services at King Street Station (or walk multiple blocks), while ST Express bus routes travel through downtown Seattle with many stops along the way. A similar situation is true for downtown Tacoma where Sounder riders must transfer to reach downtown while many ST Express bus routes travel through downtown and serve multiple stops there.

To summarize, while Sounder riders have a more reliable, yet somewhat slower, transit trip compared to some ST Express riders, they may be required to transfer to complete their trip. And while ST Express riders have a potentially faster one-seat trip to their destination, they may experience delays subject to traffic conditions. These factors must be considered by the Lakewood-Tacoma-Seattle (and eventually DuPont) regional transit riders in making a choice of their mode for travel.

This situation highlights the choice that Sound Transit ultimately will face as Sounder service is expanded, i.e., should ST Express service that provides the same connections be reduced or eliminated (with possible reallocation of service hours), or should it be preserved in some form? As with the shadow Sounder service discussed above, the factors that influence the decisions about changing/removing ST Express service where it is at least partially redundant with other ST services can be more fully analyzed and understood at the project-level in ST2 or other future planning efforts.

3.2.2 Link Light Rail between Tacoma and Seattle

Phased Extension of Light Rail in the South Corridor

The LRP envisions a rail system that connects Seattle to Tacoma running generally parallel to I-5 and SR 99. In *Sound Move*, the southern terminus of this system is located south of Sea-Tac Airport at a station near S. 200th Street. It is from this station that extensions southward toward Tacoma would occur in future phases.

Another *Sound Move* rail system, Tacoma Link, connects downtown Tacoma with the Tacoma Dome. It is possible (and the subject of a separate Issue Paper) that the Tacoma Link system could either be extended northward toward Seattle from the Tacoma Dome, or that a separate light rail system could originate at the Tacoma Dome and extend northward (requiring transfers for some riders between the two rail lines at the Tacoma Dome.)

It is likely that extensions of Central/Airport Link southward, or extensions of Tacoma Link northward, would not create a contiguous light rail line between Seattle and Tacoma in a single future phase. It is more likely that one or both lines could be extended to intermediate points in ST2, and then extended again in a subsequent phase(s) to connect and complete the system. This is sometimes referred to as a "golden spike" approach. This situation of phased-completion of the Seattle-Tacoma light rail system has impacts on ST's other HCT services, mainly ST Express.

Interrelationship of Link with ST Express

ST Express routes currently provide some of the same connections that could ultimately be possible with a complete, or partially complete, Seattle-Tacoma light rail system. For example, the ST Express 590-594 route series operates all day at 30-minute or better frequency, has stops in downtown Tacoma and at the Tacoma Dome, and in downtown Seattle, and provides direct non-stop service between the two downtowns. Another route, ST 574, connects downtown Tacoma to Sea-Tac Airport, with stops at the Federal Way Transit Center, Star Lake Freeway Station, and Kent/Des Moines Freeway Station. Upon completion of the Federal Way HOV direct-access ramps on I-5, a new ST Express route will operate with direct, all-day service between Federal Way and Seattle.

Should light rail be extended from S. 200th Street to Federal Way in a future phase, then the new Federal Way-Seattle ST Express route mentioned above may be redundant. Under this scenario, it is conceivable that other ST Express routes connecting Tacoma and Seattle could be considered for restructuring, since the light rail system would have connections at Sea-Tac Airport and (likely) at the Kent/Des Moines Road/I-5 vicinity. Routes to/from the south of Federal Way could potentially be terminated at a Federal Way light rail station, requiring through riders to transfer there. These are just some of the options that would be possible given a phased extension of Link, and are representative of the kinds of restructuring/reallocation/reduction schemes for ST Express that the ST board may consider as future phases of projects are developed.

Future Role of ST Express with Completed Link System

If/when a single light rail system connects Seattle and Tacoma, then the question arises that is similar to that posed above for competing services with Sounder, i.e., *Should ST Express routes provide connections along the same general service corridor as other ST HCT modes (in this case Link)?*

Part of the answer to this question lies in the determination of whether light rail in the South Corridor can serve the same market as ST Express routes. It is possible that new markets in the South Corridor that are not currently served today -- or in the future with a complete Link light rail (and Sounder) system -- could be served by ST Express routes, and that ST Express could also be used to support, and not compete with, Link and Sounder by providing direct connections to their stations from outlying areas within the ST service boundaries. Using ST Express regional bus routes to provide these kinds of services would have to be weighed against the role of the local transit providers in serving local markets and providing feeder-type services to the rail system. These issues would need to be more fully analyzed and understood at the project-level in ST2 or other future planning efforts.

3.2.3 ST Express Regional Bus Routes

Some ST Express bus routes under *Sound Move* provide single-seat connections to and between the major employment/commercial centers that may not be similarly served by Link or Sounder under interim phases or completion of the rail system under the LRP (i.e., a single-seat rail ride is unlikely to be available between certain areas). These routes include:

- Route 560 - connecting West Seattle, Burien, Sea-Tac, Renton and Bellevue
- Route 565 - connection Federal Way, Auburn, Kent, Renton and Bellevue
- Route 582 - connecting Bonney Lake, Sumner, Puyallup and Tacoma
- Route 585 - connecting Lakewood, Puyallup, Sumner and Auburn

The LRP also envisions a route serving the south Pierce County area utilizing a planned new roadway that connects this area to I-5 (the "Cross-Base Highway"). Such a route may provide connections between DuPont, South Hill, Puyallup (among others).

While these routes make possible all-day direct transit connections to/between many regional centers, some important destinations are bypassed or not efficiently served because of the design of the highway/arterial system that they travel. An example of this is the Route 560 that travels between Sea-Tac Airport and Renton via SR 518 and I-405, but does not stop in the Southcenter area of Tukwila, nor does it stop at the Tukwila Sounder Station. This is primarily due the difficulty and delays of getting to/from the freeway system to serve these areas, making the travel times too long for some riders.

This category of ST Express route will likely continue to be integral to the system of HCT regional services, in that some markets can be more conveniently and effectively served by express bus. However, in order for these routes to operate efficiently and serve multiple destinations, major capital improvements that support their operation -- such as the HOV direct-

access ramps constructed under *Sound Move*, or arterial HOV lanes and/or signal prioritization for buses -- may be needed.

When planning these types of routes in future phases, the value of making major bus capital improvements to support these kinds of routes will have to be weighed against using the resources toward completion of the other modes. It may be that a choice to not make an investment to serve a certain market directly with buses is offset by the choice to more-fully develop the rail system, thus serving that market by bus connections to rail, and introducing a transfer.

In summary, this paper is intended to highlight some of the issues that will need further consideration as Sound Transit moves forward with updating the Long-Range Plan and planning future implementation phases. Additional analyses of these and other issues will be prepared as part of ST2 planning.