4 OVERVIEW OF EXISTING AND PLANNED TRANSIT SERVICES

Image from Nelson\Nygaard

This section provides an overview of existing transportation services and providers in Seattle, highlighting new projects and potential areas of concern for the city of Seattle.

4 OVERVIEW OF EXISTING AND PLANNED TRANSIT SERVICES

SEATTLE'S PUBLIC TRANSPORTATION CHALLENGES

Seattle residents, visitors, and employees choose from a diverse set of transit service types including local bus services, light rail, commuter buses, commuter rail, monorail, water taxis, ferries, and streetcars. Most of Seattle's service is operated by county and regional providers, although the city of Seattle is the owner of the Seattle Center Monorail and the Seattle Streetcar. Even with new rail services such as light rail and streetcars, buses continue to carry the majority of local and regional transit trips.

While Seattle continues to expand its range of transit options, it faces a number of critical challenges:

- **Seattle has difficult geographic and topographical constraints.** Seattle's steep hills and many water crossings limit the range of transit modes that can be used effectively between key market centers. Seattle's center resembles an hourglass as both people and goods funnel through heavily-trafficked north-south corridors into a narrow downtown core. Bounded by Puget Sound, Lake Washington, and I-5, downtown Seattle has little room to expand. Freight, ferry passengers, vehicles, bicyclists, and pedestrians must cross and enter the center at limited bridge and ferry terminal access points.
- **Congestion affects the speed and reliability of transit services.** Downtown Seattle and the University District are particularly prone to congestion on city streets. Heavy congestion makes it difficult to move buses and at-grade rail lines quickly and affects reliability.
- **Many transit agencies from the region operate services that converge in Seattle.** A number of transit operators use downtown Seattle streets and transit facilities to deliver, circulate, and collect passengers. Seattle must manage the number of services and providers and minimize traffic congestion on city streets while playing a central role in the regional transportation system.
- **Most of Seattle's transit service is operated by two regional transit agencies and not a City agency.** The majority of Seattle's transit service is provided not by a Seattle transit agency, but by King County Metro and Sound Transit. Metro's transit funding allocation requirements have disfavored the highly urbanized area of Seattle when investing in new services and when making service cuts, although recent recommendations from the Regional Transit Task Force are that the allocations policy should be changed to emphasize productivity while ensuring social equity and geographic value.

Seattle's topography and geography narrow the city's transportation options and limit opportunities to use certain transit modes.

Image from Nelson\Nygaard

- **The tax base for transit services is unstable.** The current economic recession has led to a steep decline in sales tax revenues, an important source of operating revenue for both Metro and Sound Transit. The shrinking tax base means that both agencies are forced to make budget cuts which will likely result in severe service reductions.

WALK. BIKE. RIDE.

SDOT Seattle Department of Transportation

TRANSIT PROVIDERS

KING COUNTY METRO TRANSIT

King County Metro Transit (Metro), a division of King County Department of Transportation, began operations in 1973, subsuming Seattle Transit and the Metropolitan Transit Corporation, a private company serving suburban cities in King County. Metro did not become a division of King County Department of Transportation until 1994.

Metro is the biggest public transportation agency in Washington State and one of the 10 largest bus systems in the nation. In 2009, Metro carried approximately 112 million riders (boardings) on 220 fixed routes throughout the county. It serves 13 transit centers and operates services out of seven transit bases located throughout the county.

Service Overview

Metro operates a range of transit services using a multi-centered system throughout King County. Within Seattle, a large number of routes serve the central business district with the University District also serving as a major hub. The city network descended from the Seattle Transit system of converted streetcar routes and is a hub-and-spoke system centered primarily on downtown with some crosstown service.

Nearly 70 core city routes operate entirely within the city of Seattle. Due to the evolution of the system over time, the route numbering system is complex and not necessarily apparent. Two-digit routes are operated in Seattle, whereas the 300s are run in north King County. In addition:

- Many University District and northeast routes have a seven: 70, 71, 72, 73, 74, 75, 76, 77, 79, 271, 272, 277, 167, 578
- Several crosstown routes are 40s: 43, 44, 48, 49, 46
- Several West Seattle routes are 50s: 51, 53, 54, 55, 56, 57
- 98 and 99 are "rail," or in the case of the Route 99 a rubber-tired replacement route for the historic waterfront trolley route

Metro operates a network of core routes across the county that provides frequent, two-way service throughout the day. A number of the routes that operate in and around downtown Seattle use trolleys to navigate the steep hills in the area.

Trolley buses climb well on steep hills, are quiet and environmentally friendly. Metro has approximately 69 lane-miles of overhead two-way wire for electric trolleybuses.

Within downtown, Metro offers a "Ride Free Area" where all trips are free between 6:00 AM and 7:00 PM. The Ride Free Area extends from Jackson Street to the south and Battery Street to the north, and from the waterfront to 6th Avenue.

Metro operates a number of services, including the following:

- Dial-a-Ride (DART) service offers variable routing in some areas within King County, primarily locations outside of the city of Seattle. DART service operates on a fixed route with some fixed time points, but deviates to pick up or drop off passengers.

RapidRide's first line opened in October 2010 along Pacific Highway South and connects to Sound Transit's Central Link at SeaTac.

Image from Flickr user Oran Viriyincy

The City of Seattle has funded additional Metro bus service and corridor improvements in Seattle.

Image from istockphoto

- Metro's Access Transportation service is available for persons with disabilities who are unable to use the regular fixed route bus system or light rail due to their disability. It is described in more detail under "Accessible Transportation" below.
- Metro's vanpools serve 6,100 people on an average weekday in more than 1,000 vans.

Besides its own transit operations, Metro is the contract operator for the Seattle Streetcar, Central Link light rail services and some Sound Transit Regional bus service. It contracts for demand responsive and Access paratransit service.

Accessible Transportation

King County Metro offers a variety of services for people with special transportation needs. Metro's Access Transportation service is available for persons with disabilities who are unable to use the regular fixed-route bus system or light rail due to their disability. It provides next-day shared rides within ¾ of a mile on either side of non-commuter fixed route bus service during the time and on the days those routes are operating. Access Transportation service uses contractors to provide shared-ride van transportation within most of King County.

King County Metro established the Community Transportation Program to provide services beyond the accessible regular bus service and paratransit service required by the federal Americans with Disabilities Act of 1990 (ADA). The program is intended to provide service that is more flexible and responsive to the unique transportation needs of persons with disabilities. It includes:

- **The Taxi Scrip Program:** The Taxi Scrip Program serves low-income King County residents age 18 to 64 who have a disability or age 65 and over. This program enables qualified participants to buy up to six books of taxi scrip each month from Metro at a 50 percent discount. Taxi Scrip can be used like cash to pay for taxi rides from several local taxi companies.
- **Community Access Transportation (CAT) Advantage Vans:** This program is an effort to make use of an increasing number of high-quality retired Access and vanpool vehicles, as well as create new, innovative programs, such as the Hyde Shuttle (below). Through the CAT program, Metro provides vans, along with emergency response, vehicle maintenance and repairs, driver training, and technical assistance to participating human service agencies. Agencies agree to provide a minimum number of rides to Access users each month.
- **Senior Shuttles/Hyde Shuttles:** Senior Services offers demand-response transportation for seniors 55 years of age and older and people with disabilities of all ages, transporting eligible riders to medical appointments, hot lunch programs, senior center activities, grocery shopping, food banks and other social and cultural activities. The Shuttles target unserved and underserved people who fall through gaps in public transportation, including ethnic, limited English speaking, and rural populations. Community Vans provide transportation within specific geographic areas, such as the Hyde Shuttle which serves people living in First Hill, International District, Capitol Hill, Central Area, Southeast Seattle, West Seattle and North Seattle. The Senior Shuttles are part of King County Metro's Community Access Transportation program.

The Regional Reduced Fare Permit (RRFP), sometimes called a senior or disabled bus pass, costs $3.00 and enables seniors and people with disabilities to ride Metro buses at a significant discount. A Personal Care Attendant RRFP is available for persons who need assistance to ride the bus, and allows their attendant to ride at a reduced rate. Service animals (such as a seeing-eye dog) ride free.

Service Expansion and Improvements In Seattle

In recent years, Metro has been introducing new services that provide higher quality transportation options within the city and link neighborhoods to downtown:

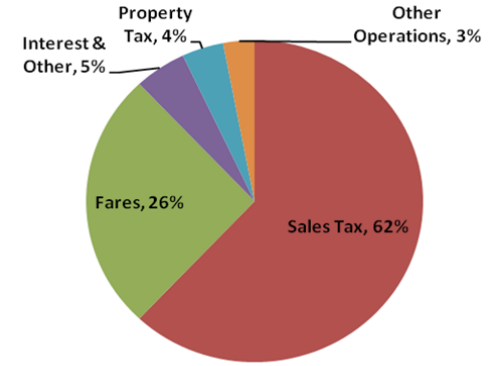
- **RapidRide**: Metro recently opened the first of its planned bus rapid transit system, which will include fully branded vehicles and facilities with corridor improvements geared toward reducing passenger travel time and increasing convenience. Two of the six planned routes will provide service completely within the city of Seattle.
- **Additional bus service and corridor improvements**: Using funds from Seattle's Bridging the Gap and Transit Now initiatives, the City of Seattle and Metro are teaming to provide additional bus service in high-volume corridors as well as improvements along other priority corridors within Seattle.

Challenges Facing Metro

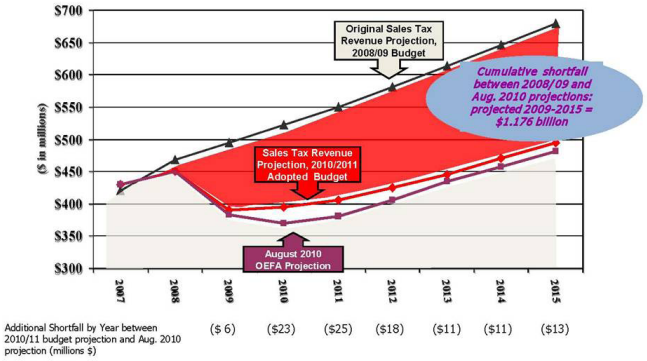
The recession that began in 2008 has led to shrinking sales tax revenues, Metro's largest source of funding. Since 62% of Metro's operating revenue comes from sales taxes, this decline has had a major impact on the agency. At the same time, Metro's ridership has grown and public expectations remain high. The Puget Sound Regional Council's Vision 2040 and Transportation 2040 plans predict population growth in the region. Specifically, these plans project a 42% increase in King County's population and a 57% increase in jobs from 2000 to 2040.

Assuming no change in revenue sources between 2009 and 2015, Metro projects a revenue shortfall of $1.176 billion and faces up to 600,000 service hour cuts.[1] With the 2010/2011 biennial budget, Metro proposed increasing fares, eliminating staff positions, cutting bus service by 75,000 hours, deferring bus service expansion, reducing operating reserves for four years, using fleet replacement reserves, and implementing schedule efficiencies estimated to save 125,000 hours.

KING COUNTY METRO'S OPERATING REVENUE SOURCES (by percent, for 2010/11)



KING COUNTY SALES TAX REVENUE SHORTFALL



Source: Regional Task Force Final Report and Recommendations, October 2010.

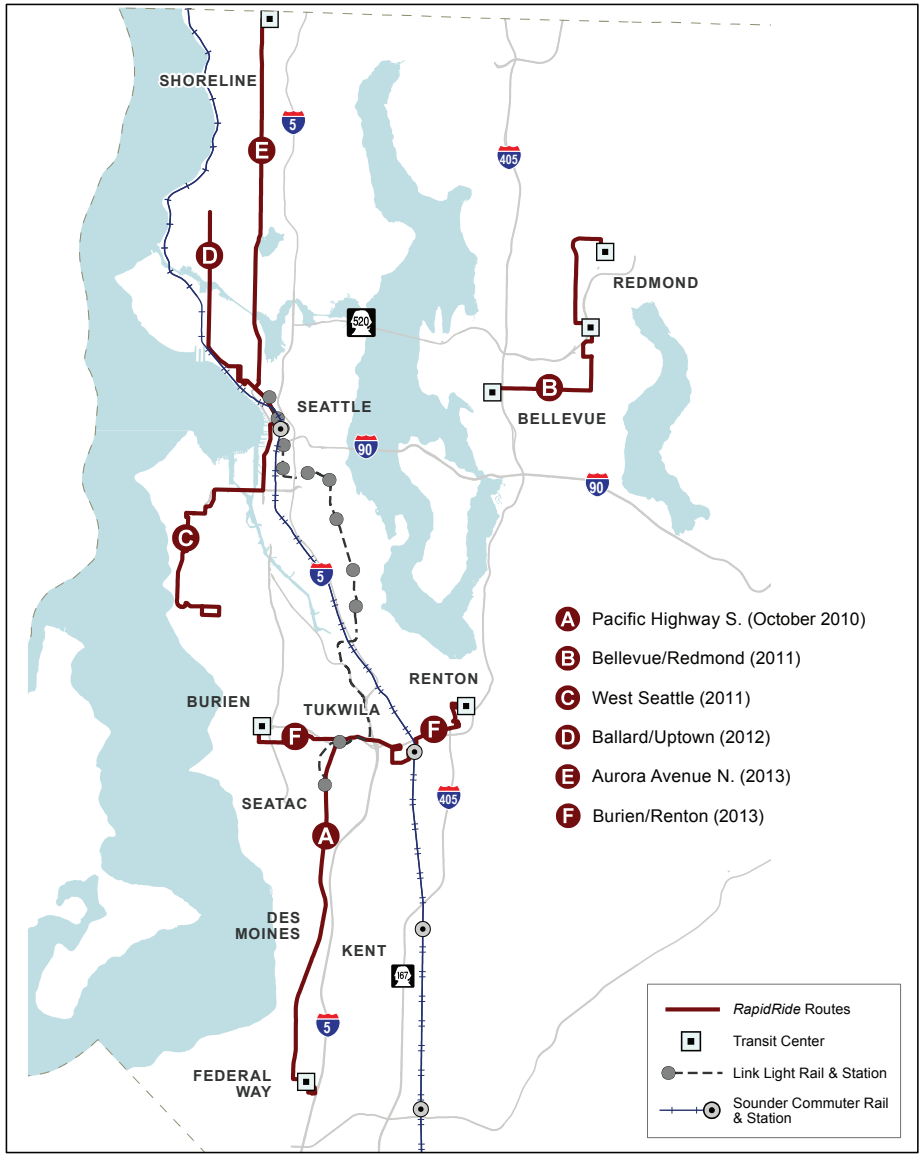
Metro's Limitations in Serving Seattle

Despite recent improvements, there is more that can be done to provide better transit service in Seattle. Frequent concerns are that the system can be difficult to navigate and many of the routes that serve Seattle's highest demand neighborhoods are slow and often over capacity.

King County Metro's 40/40/20 policy, in which 80% of new transit service goes to locations outside of the West Subarea (Seattle, Shoreline, and Lake Forest Park), does not invest resources to improve service for the majority of transit riders. The policy leads Metro to allocate resources based on geographic equity and not on population density or route productivity. In addition, Metro's service reduction policy, which makes serice cuts in proportion to the amount of service in each subarea, also means that Seattle bears the majority of service cuts. (The current proportions are 62% (West Subarea), 21% (South Subarea) and 17% (East Subarea). King County Council is made up of five suburban seats and four Seattle seats, making it challenging to change this policy. However, King County's Regional Transit Task Force recently recommended eliminating the policy and basing service expansions or reductions on productivity, social equity, and geographic value.

1 Regional Transit Task Force Final Report and Recommendations, October 2010.

PLANNED RAPIDRIDE ROUTES AND PROJECTED OPENING DATES



Source: Metro Transit

RapidRide

Metro Transit launched the first of six RapidRide lines in October 2010. One of the primary goals of the service is to reduce travel time for passengers by implementing a variety of features that decrease boarding time and increase travel speeds. The routes include the following features:

- **New, low-floor, articulated buses** with a branded look that distinguishes them from other Metro coaches
- **Increased bus stop spacing** to improve speed and reliability and create "stations" similar to what is found on light rail lines
- **Signal priority systems** that give buses "green time" at traffic lights and can extend a green light by 5-12 seconds
- **Signal coordination** to make traffic flow more smoothly along the length of a corridor
- **Real time-information** at stations to communicate estimated arrival times
- **Off-bus fare collection** to help to speed travel by reducing dwell time; passengers can board any of the three doors with prepayment, transfer, or ORCA card. This feature is still being tested as part of a pilot project and may not be implemented in all locations on all routes.

New RapidRide buses are designed to speed boarding.

Image from Flickr user Oran Viriyincy

Challenges for RapidRide

- **Time savings may be difficult to realize in Seattle**. RapidRide routes may produce more time savings on routes in suburban locations as they can better take advantage of High Occupancy Vehicle (HOV), Business Access and Transit lanes, and longer stop spacing. Realizing a significant time savings in Seattle may prove more challenging as busy city streets can interfere with bus speeds. To address this, SDOT is adding many new bus priority segments and working to optimize traffic signal priority systems to improve travel speed.
- **Offboard payment systems are critical for travel time savings**. Although Metro has implemented offboard payment systems on the A Line, the agency has not yet committed to doing so on other lines.
- **RapidRide may not fully utilize all-door boarding**. RapidRide's three-door buses allow for faster boarding times. However, Metro may not use all-door boarding at all stops throughout the day, which could impact time savings.

THE SEATTLE STREETCAR

The Seattle Streetcar Network Plan identified a system of streetcar lines centered on downtown. In addition to the existing South Lake Union Streetcar and planned First Hill Streetcar, the network plan identified the University District, Fremont/Ballard, the Seattle Center, and the Central District as other potential markets for streetcar system expansions.

South Lake Union Streetcar

The South Lake Union Streetcar is a 1.3-mile streetcar line operating between the South Lake Union neighborhood and the Westlake hub in downtown Seattle. The City Council endorsed the service as part of a larger effort to develop the South Lake Union area economically. Property owners contributed to the new route's construction through a Local Improvement District tax.

Service began in December 2007. Streetcars run every fifteen minutes, seven days a week. The South Lake Union Streetcar is owned by the City of Seattle; King County Metro operates the streetcar and provides 75% of the operating subsidy.

Image from Metro

Image from SLU website

TRANSIT PROVIDERS

SOUND TRANSIT

Sound Transit was created by the state legislature to build a high-capacity transit system that connects major regional job and housing centers in King, Pierce and Snohomish counties. Voters in 1996 approved a plan that provides the foundation of that system—regional express buses, commuter rail and light rail. In November 2008, voters in urban King, Pierce and Snohomish counties approved adding 36 miles of light rail to the nearly 16-mile system that opened in 2009.

Service Overview

ST Express buses connect the region's major job and population centers. Sounder commuter trains run 74 miles every weekday between Everett and Tacoma. On the north line, four round-trips connect Everett, Mukilteo and Edmonds with Seattle. In the south line, nine round-trips run between Tacoma, Puyallup, Sumner, Auburn, Kent, Tukwila and downtown Seattle; a future extension south to Lakewood is scheduled to open in 2012. In 2009, trains began running on the Link light rail line between downtown Seattle and Sea-Tac International Airport (described on page 4-8). A light rail extension north to the University of Washington is under construction and scheduled to begin carrying passengers in 2016.

Because Sound Transit provides regional service, connecting major urban centers around the region, services in Seattle often have limited stops. Providing quality access to these stops is challenging, particularly given Seattle's topography.

Sound Transit contracts with local transit operators—Metro, Community Transit, and Pierce Transit—to provide 24 regional express bus routes connecting destinations throughout the Puget Sound region. One of Sound Transit's most important roles in the region is the development of transit infrastructure, including major park-and-ride facilities that are used by several agencies to collect and deliver passengers to Seattle, direct access to high-occupancy vehicle (HOV) lanes, and transit stations. Sound Transit's funding for these facilities allows Metro and other agencies to spend tax revenue on service provision.

Challenges Facing Sound Transit

With the continued economic recession, tax revenues needed to implement Sound Transit's planned Sound Transit 2 (ST2) projects and services have fallen below projections. Forecasts conducted during Fall 2009 showed that projected revenues through 2023 were about 20 percent below projected costs of the program. More recent forecasts show that the shortfall has increased to 25 percent. While there are signs that the economy is beginning to recover, to date this has not resulted in a turnaround of negative revenue trends. Also, while total Sound Transit ridership continues to increase, recent growth rates have been below expectations. Clearly, the recession has affected growth in transportation demand and particularly journey-to-work commuter travel. As a result, each transit service in Sound Transit's Draft 2011 budget is undergoing a thorough review for opportunities to reduce operating costs.

Sound Transit provides regional express bus service connecting destinations throughout the region including Seattle.

Image from Nelson\Nygaard

Link light rail serves communities in southeast Seattle as it operates from downtown Seattle to the airport.

Image from Nelson\Nygaard

Sound Transit will dig tunnels between the University of Washington and Capitol Hill as part of the University Link extension.

Image from Sound Transit

LINK LIGHT RAIL

The next planned Link light rail line, the University Link extension, will extend Central Link northward from downtown Seattle to the University of Washington via Capitol Hill and is scheduled to open in 2016. It is a 3.15-mile line that travels completely underground, making only one stop at Capitol Hill. A planned station on First Hill was eliminated due to soil conditions that would increase cost and construction risks. To address this shortcoming, the proposed First Hill streetcar will connect Capitol Hill Station to the International District Station.

The 2011 Service Implementation Plan responds to the challenge with several proposals for Board consideration, including deferring some ST2 bus service expansion and reducing the least productive ST Express services. These changes, together with schedule efficiencies that are being implemented administratively, would reduce bus operating costs by almost $7.5 million during the first full year following implementation. While no route reductions are currently proposed for Sound Transit's rail services, potential future service deferrals, operating efficiencies and other cost saving measures are being evaluated for Link and Sounder.

Future Sound Transit Improvements

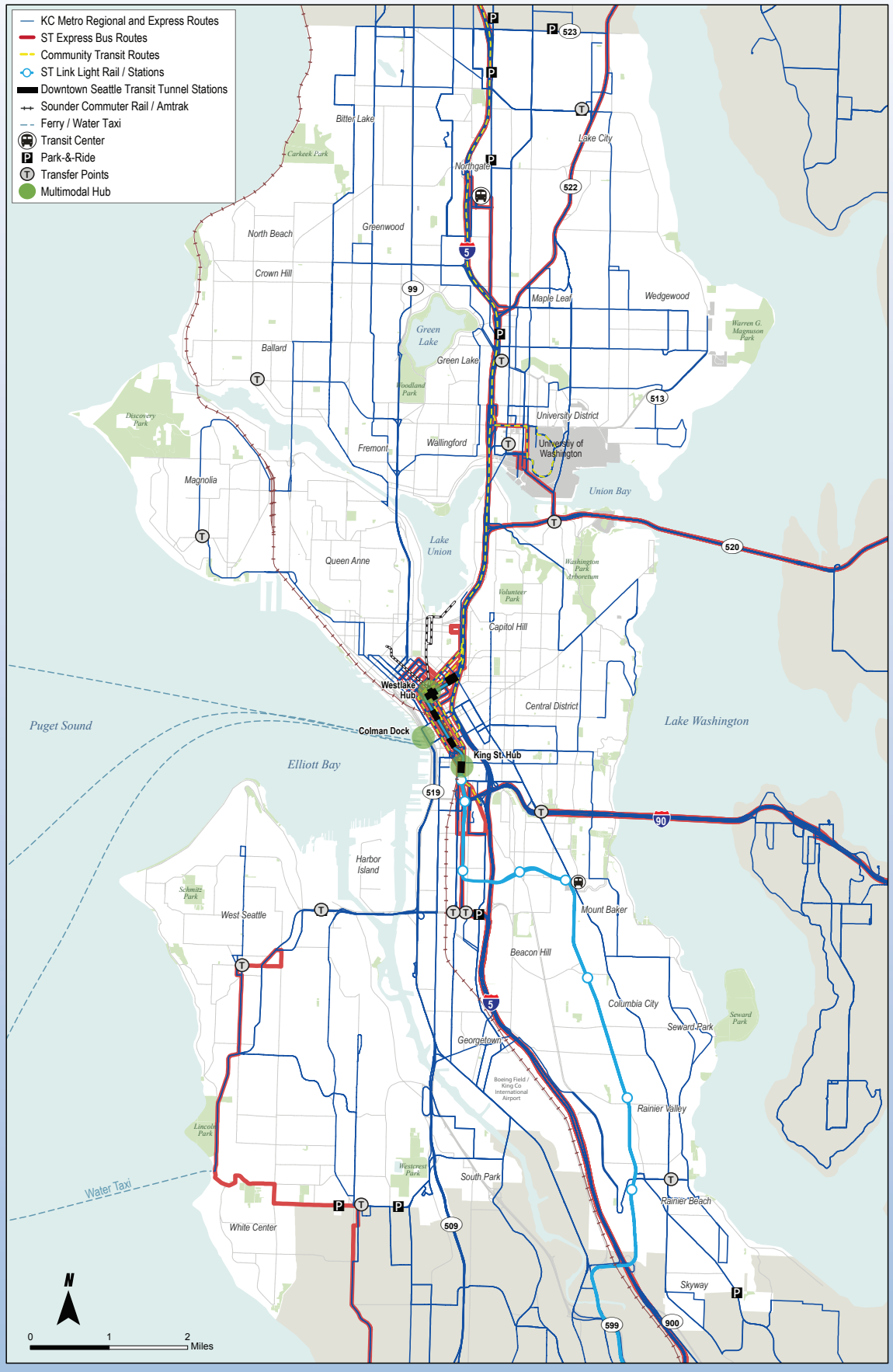
Sound Transit 2, a November 2008 ballot measure, allocates funding for a number of transportation improvements, including:

- Up to 30 percent more ST Express regional bus service on the busiest routes
- 36 miles of new light rail service with at least 19 new stations
- New First Hill streetcar connecting Capitol Hill and International District
- Sounder commuter rail to South Tacoma and Lakewood
- Four new round-trip Sounder trains between Lakewood and Seattle
- Sounder station improvements north and south
- Permanent Sounder stations in Tukwila and Edmonds
- Bus Rapid Transit service across SR 520

The proposed Sound Transit improvements are detailed in the adjacent map.

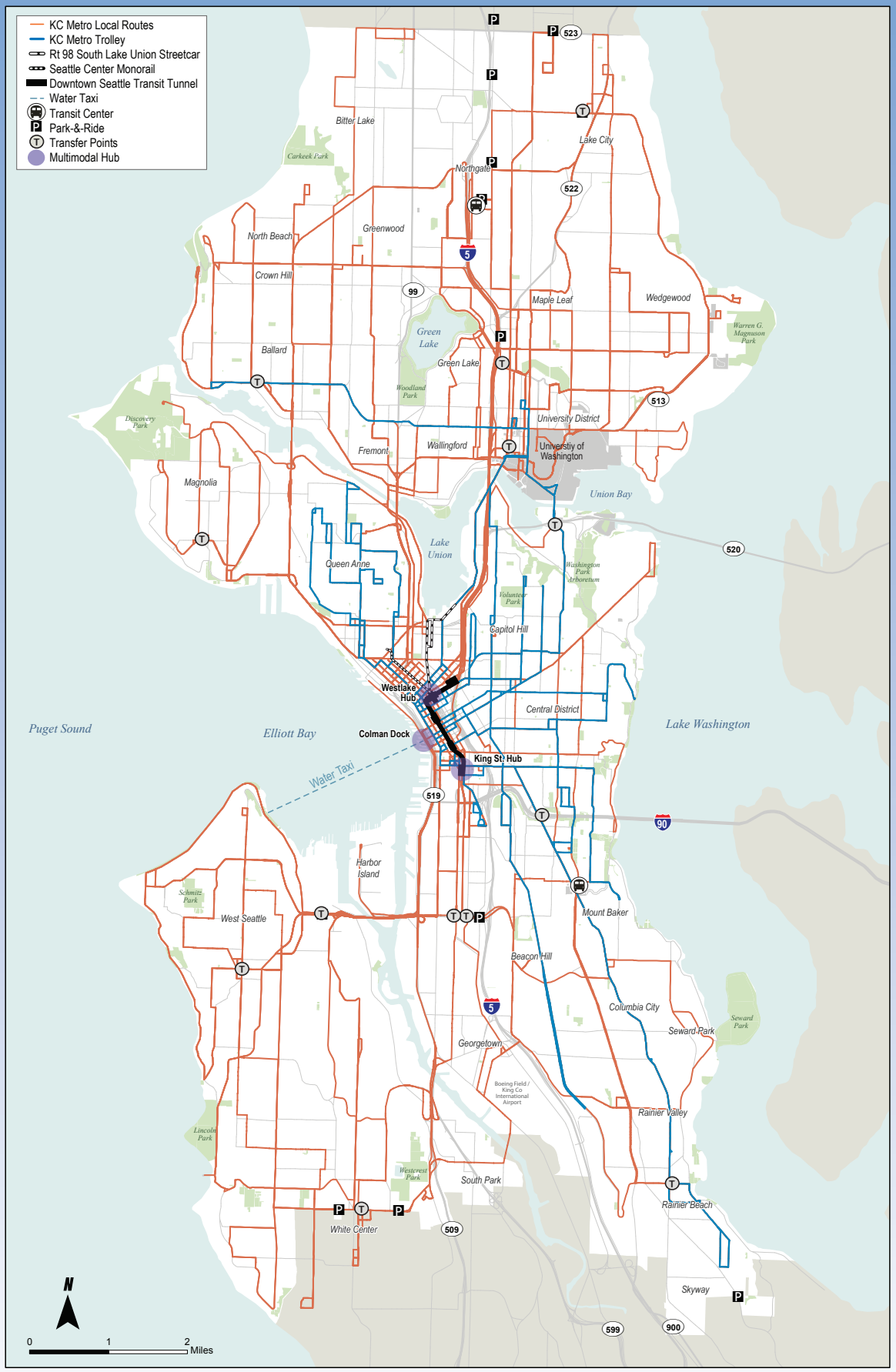
Source: Sound Transit

FIGURE 4-1 EXISTING TRANSIT SERVICES OPERATING IN SEATTLE AND REGIONALLY



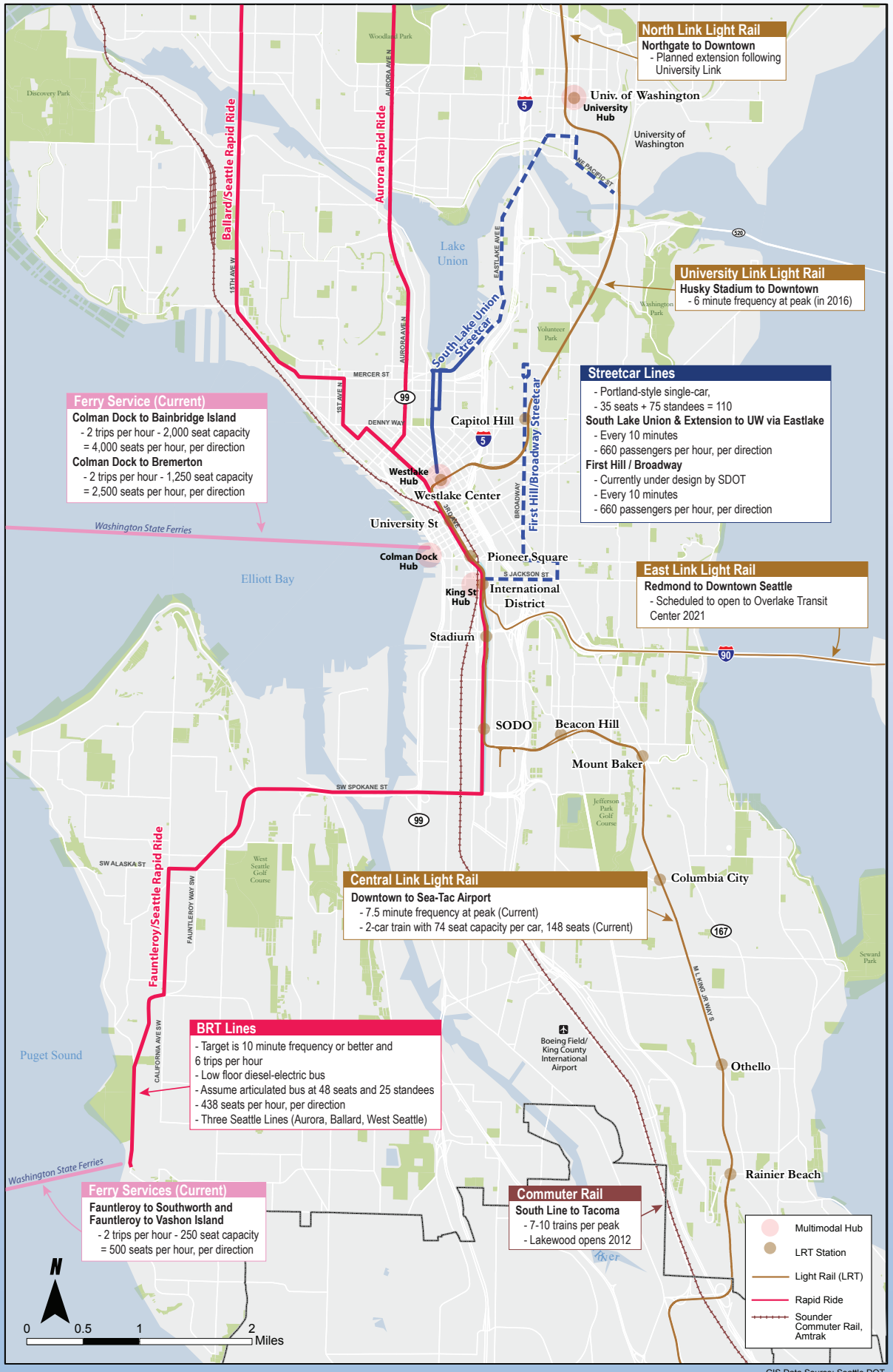
Source: City of Seattle

FIGURE 4-2 EXISTING TRANSIT SERVICES OPERATING PRIMARILY IN SEATTLE



Source: City of Seattle

FIGURE 4-3 EXISTING AND PLANNED HIGH AND INTERMEDIATE CAPACITY TRANSIT



Nelson|Nygaard consulting associates

OTHER TRANSIT PROVIDERS

COMMUNITY TRANSIT

Community Transit (CT), which began service in 1976, is the main public transit authority of Snohomish County. It provides local transit service in Snohomish County, with commute service to downtown Seattle, the University District, and other King County cities, such as Bellevue and Redmond. Commute service to downtown Seattle is provided on 18 routes, most of which operate during peak periods only. In total, Community Transit operates 65 fixed routes, including 33 local, 31 commuter, and one Swift bus rapid transit route (does not include the five Sound Transit routes that CT is contracted to operate between Snohomish County and King County).

CT also operates a vanpool program and provides paratransit service. It carries about 35,000 riders a day on 282 coaches and recorded more than 11.8 million passenger trips in 2008. Every city in the county except Everett is part of Community Transit's Public Transportation Benefit Area (PTBA). A signature element of CT service is highway express service from Snohomish County to Seattle's University District and to Downtown Seattle.

In June 2010, CT approved a major service change with service cuts to deal with increasing budget problems. As a result, Sunday and holiday service has been cancelled.

Community Transit provides commute service to Seattle and other King County cities.

Image from Nelson\Nygaard

PIERCE TRANSIT

Pierce Transit was established in 1979 when the public voted to create the Pierce County Public Transportation Benefit Area Corporation. Based in Lakewood, Washington, Pierce Transit operates fixed-route bus service and SHUTTLE services for people with disabilities within the PTBA. Pierce Transit also provides vanpool, ridematching and express transportation between Pierce County and other neighboring counties. Pierce Transit's connects with surrounding regional transit systems, including ferries and trains. Additionally, Pierce Transit runs 11 transit centers and stations. Pierce Transit connects with Sound Transit at Sounder stations and regional express bus stops throughout Pierce County; Intercity Transit at several Pierce and Thurston County locations; King County Metro Transit at several locations in King County; Pierce County Ferry to Anderson and Ketron Islands at Steilacoom; Washington State Ferries at Point Defiance; Amtrak in downtown Tacoma; and Greyhound at the Tacoma Dome Station.

Pierce Transit is the contract operator for five Sound Transit Seattle Express routes. Routes 590: Tacoma-Seattle, 592: DuPont-Seattle, 593: South Tacoma-Seattle, and 595: Gig Harbor-Seattle operate during weekdays only. Route 594: Lakewood-Seattle operates daily. All routes make the following inbound stops in Seattle: SODO Busway, 4th Avenue and Jackson, 4th Avenue and Union, and Howell and 9th Avenue. Outbound stops include: Stewart and 9th Avenue, 2nd Avenue and Seneca, and 2nd Avenue and Washington.

FERRIES

Washington State Ferries (WSF) manages the largest network of ferries in the country and the third largest in the world. Almost 12 million passengers and more than 9 million vehicles use the ferry system to cross Puget Sound every day. Of this total, 9 million passengers and nearly 3 million vehicles board or disembark from Colman Dock in downtown Seattle.

From Colman Dock, WSF connects Seattle to Bainbridge in the Puget Sound and to Bremerton on the Kitsap Peninsula. From Fauntleroy in West Seattle, WSF transports passengers to Southworth and Vashon Island.

The Seattle-Bainbridge, Seattle-Bremerton, and Seattle-Vashon ferries are a critical part of the Washington state highway system, and the terminals serve as the transportation hubs between the east and west side of Puget Sound. Most passengers transferring from ferries at Colman Dock to local or regional transit services must walk uphill to Second, Third or Fourth Avenues. The distance and grade required for these transfers has been a longstanding issue.

KING COUNTY WATER TAXI

The King County Ferry District operates the King County Water Taxi, a passenger-only ferry system that provides service on:

- **The West Seattle/Downtown Seattle Route**: The West Seattle route travels across Elliott Bay from Pier 50 on the downtown Seattle water¬front to the Seacrest Dock in West Seattle. The travel time is approximately ten minutes. Two free Metro DART shuttles and Routes 773 and 775 operate between local neighborhoods and the Seacrest Dock.

A ferry approaches the Seattle Ferry Terminal at Colman Dock, the primary ferry hub in Seattle.

Image from Flickr user City of Seattle

King County Water Taxi provides commute-hour service between downtown Seattle and West Seattle and Vashon Island.

Image from Wikipedia

- **The Vashon Island/Downtown Seattle Route**: The King County Water Taxi Vashon Island/ Downtown Seattle route provides service between Vashon Island's north-end ferry terminal and Pier 50 on the downtown Seattle waterfront. Metro Transit routes 118 and 119 provide connections to arriving and departing Water Taxi sailings on Vashon Island.

In downtown Seattle, the Water Taxi ferry docks at Pier 50 (next to Colman Dock), which is served by Metro Transit routes 16, 66, and 99 and is within a quarter-mile of dozens of additional transit connections.

The Vashon Island passenger-only ferry provides year-round weekday commuter service, with three sailings in the commute direction in the morning and three in the evening. The West Seattle ferry provides seasonal passenger-only service between April and October, with trips seven days per week between 11 and 16 hours per day, plus weekday commuter service to West Seattle during the winter months of November through March.

HUMAN SERVICE TRANSPORTATION

A range of other transportation services are provided by numerous human service transportation organizations. King County's Coordinated Transit-Human Services Transportation Plan identified approximately 1,700 organizations and programs in King County with a role in human service transportation provision. These organizations include faith-based organizations, private for-profit entities, residential facilities, public transit programs, senior centers and programs,

colleges and universities, community action programs, school districts, low-income housing projects, child care centers, veterans organizations, and head start programs.

- **Special Needs Transportation Community Brokerage:** Hopelink operates a brokerage, which provides a variety of transportation assistance and management services. Currently, eight school districts and five medical facilities including Harborview Medical Center and Seattle Children's Hospital contract for brokerage services. Hopelink serves as the Medicaid broker under contract to the Department of Social and Health Services. Hopelink uses contracted for-profit and nonprofit service providers, fixed-route transit passes, gas cards, and volunteers to provide service.
- **Wheelchair Accessible Taxicab Services:** In 2007, Seattle and King County jointly began a demonstration project with Yellow Cab to operate 16 wheelchair accessible taxicabs throughout most of King County. Professional, licensed taxicab drivers provide curb-to-curb service, including assisting passengers in boarding the taxis and securing their wheelchairs. Fares for these accessible taxicabs are the same as standard taxi rates. Seattle and King County intend to issue permanent licenses for wheelchair accessible taxicabs so this service can continue to be available.
- **Volunteer Driver Programs:** There are a number of organizations that provide special needs volunteer driver transportation in Seattle; many of them are program-based or are oriented to specific trip types. Examples of such programs include: the American Cancer Society, the Bailey-Boushay House, Catholic Community Services, Northwest Kidney Centers, Seatac Community Center-Senior Program, Seattle Parks & Recreation, Senior Services, US Veterans Administration, and Volunteers of America. These programs transport riders to medical appointments, grocery shopping and meal programs by engaging volunteer drivers, driving their own vehicles or program-owned vans, to serve those in need.
- **Program Transportation:** There are a variety of human service organizations that provide program transportation. Examples include: The Children's Hospital provides a free, wheelchair-accessible van service to and from the hospital for patients and families traveling through SeaTac Airport, the Amtrak train station, ferry terminals, or the Greyhound bus station in Seattle. The Seattle Cancer Care Alliance Shuttle provides transportation between Children's Hospital, Seattle Cancer Care Alliance, Fred Hutchinson Cancer Research Center, and the University of Washington Medical Center. Providence ElderPlace operates lift-equipped vehicles to transport seniors to the ElderPlace Center for day health and other medical and dental visits.

PRIVATE TRANSPORTATION

Seattle has a robust private transportation and shuttle market. Many private for-profit shuttle operators provide for-hire van and bus service in the city. Many institutions and private companies also provide transportation for employees traveling between distant facilities or between home and campus in areas where public transit service is limited. Perhaps the most visible of these services is the Microsoft Connector shuttle, which picks up Seattle residents bound for work in Redmond in the morning and returns them to Seattle in the evening. The Microsoft shuttles serve areas of Seattle that do not have high frequency, direct public transit service to Overlake in Redmond. However, many other Seattle institutions such as Fred Hutchinson Cancer Center, the University of Washington, Seattle Children's Hospital, Harborview Medical Center, Swedish Hospital and others provide their own privately operated shuttles to transport employees and customers between facilities in Seattle. These shuttles are free to employees and do not allow general public passengers.

In 2005, the Seattle City Council adopted legislation to provide regulations for shuttle bus load zones. The ordinance defines a shuttle bus as "a vehicle that carries 11 or more passengers on a fixed, predetermined route, separate from charter or sightseeing buses." No vehicles other than permitted shuttle buses are allowed to park, stop, or load in established shuttle bus zones. Permit holders are required to pay $300 each per year for use of these zones.

Private shuttles are not allowed to use curbspace designated for public transit vehicles to stop or layover. In some areas, primarily residential neighborhoods, SDOT has allowed privately operated shuttles to set up unmarked stops at designated 3-minute passenger load zones. This use matches the intent of the curb use, to quickly load and unload passengers. Buses are not allowed to dwell at the curb and approval from adjacent landowners is required for this use to occur.

THE CITY OF SEATTLE'S ROLE IN TRANSIT

Seattle Department of Transportation (SDOT) is responsible for Seattle's streets, bridges, staircases, sidewalks, alleys, and paths. Although the city of Seattle has a limited role in transit provision, it plays a strong role in creating infrastructure and policies that support transit services and encourage walking and biking. The City does a variety of things to support transit modes in running faster and more reliably, especially in high volume corridors and between neighborhoods and business centers. This includes planning and constructing bus bulbs, transit lanes, queue jumps, and transit signal priority. These treatments help to support new projects such as Metro's RapidRide, the Seattle Streetcar, Sound Transit's Link light rail system as well as transit services in the core route network (UVTN).

In 2006, Seattle voters passed Bridging the Gap (BTG), a transportation funding package that allocates $13.5 million for improving transit service and $23.5 million for capital investments over nine years. Using these funds, SDOT has added the following:

- **New bus service**: The City pays for additional bus service on 19 Metro routes (with additional funding from Metro's Transit Now initiative).
- **Transit priority corridors**: SDOT is making street improvements to increase bus speeds in key corridors and to improve passenger waiting areas. All of the improvements are in high volume corridors, connecting Seattle's most populous neighborhoods, and two were created to support RapidRide service. The corridors are: NW Market/45th Project, Rainier/Jackson Project, Ballard-Uptown Project, and West Seattle Project.
- **Targeted spot improvements**: SDOT also makes targeted spot improvements within other heavily used bus corridors, aimed at increasing transit speed and making bus stops more comfortable and accessible.

Policy Framework

The city of Seattle has developed a policy and planning framework that supports multimodal transportation, including:

- A Complete Streets policy that directs SDOT to balance the needs of all modes within the street system.
- Aggressive transit-supportive land use and development goals that focus new growth where greater densities support transit service. Seattle's urban villages" are intended to accommodate future growth in households and employment.
- The Urban Village Transit Network (UVTN) is Seattle's vision for a network of high quality, reliable transit corridors that support and connect Seattle's urban villages, as set forth in the Seattle Comprehensive Plan. The following page features a map and description of Seattle's UVTN (Figure 4-4).
- Parking policies are a key tool for SDOT to manage transportation demand in the Center City, University District and commercial districts throughout the city. SDOT uses a range of tools including limited time stays, on-street parking fees, residential parking permit programs, restrictions on park-and-ride lots, and regulation of private off-street parking providers.

TRANSIT IMPROVEMENTS IN BALLARD: A TRANSIT PRIORITY CORRIDOR

The City of Seattle and King County Metro are working together to develop transit improvements for the Ballard-Uptown Corridor, one of SDOT's Transit Priority Corridors. Transit improvements are designed to improve the speed and reliability of transit, connect communities and keep people moving quickly in this heavily used transit corridor.

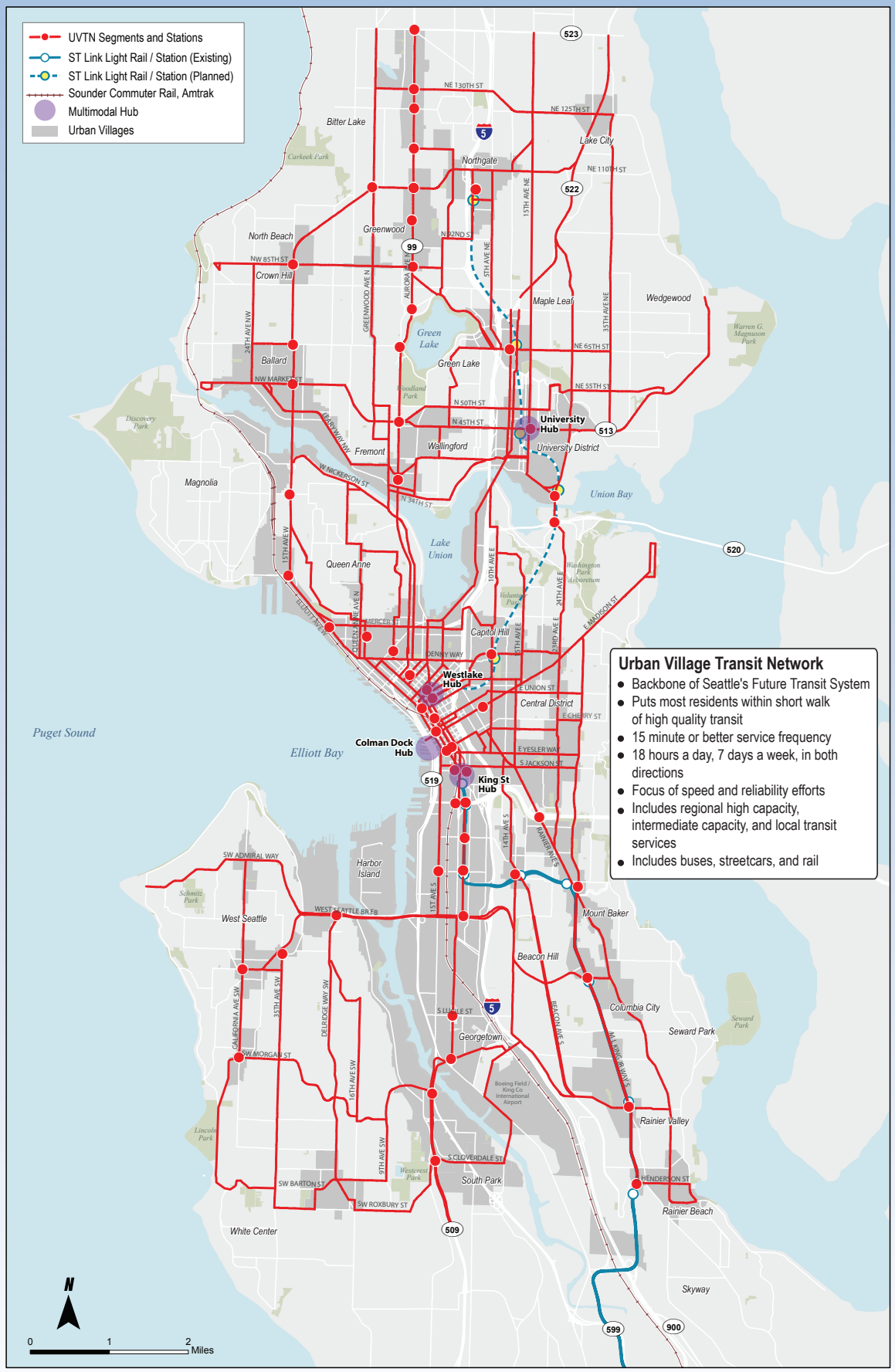
To create more efficient transit service and make the bus a more viable option, SDOT is proposing the following traffic signal and road improvements for the corridor:

- Implement transit signal priority to keep lights green longer or to change red lights to green faster for buses
- Add a queue jump on bus lanes on approaches to signalized intersections to allow buses a head start when the light turns green
- Build sidewalk extensions (bus bulbs) to provide additional waiting areas for passengers and to save time for buses that can avoid pulling in and out of the parking lane to pick up passengers

SDOT completed improvements along Aurora Avenue to expand passenger wait areas and improve pedestrian access to bus stops in preparation for RapidRide service in 2013.

Image from Metro

FIGURE 4-4 THE URBAN VILLAGE TRANSIT NETWORK MAP



Source: City of Seattle

Nelson|Nygaard consulting associates

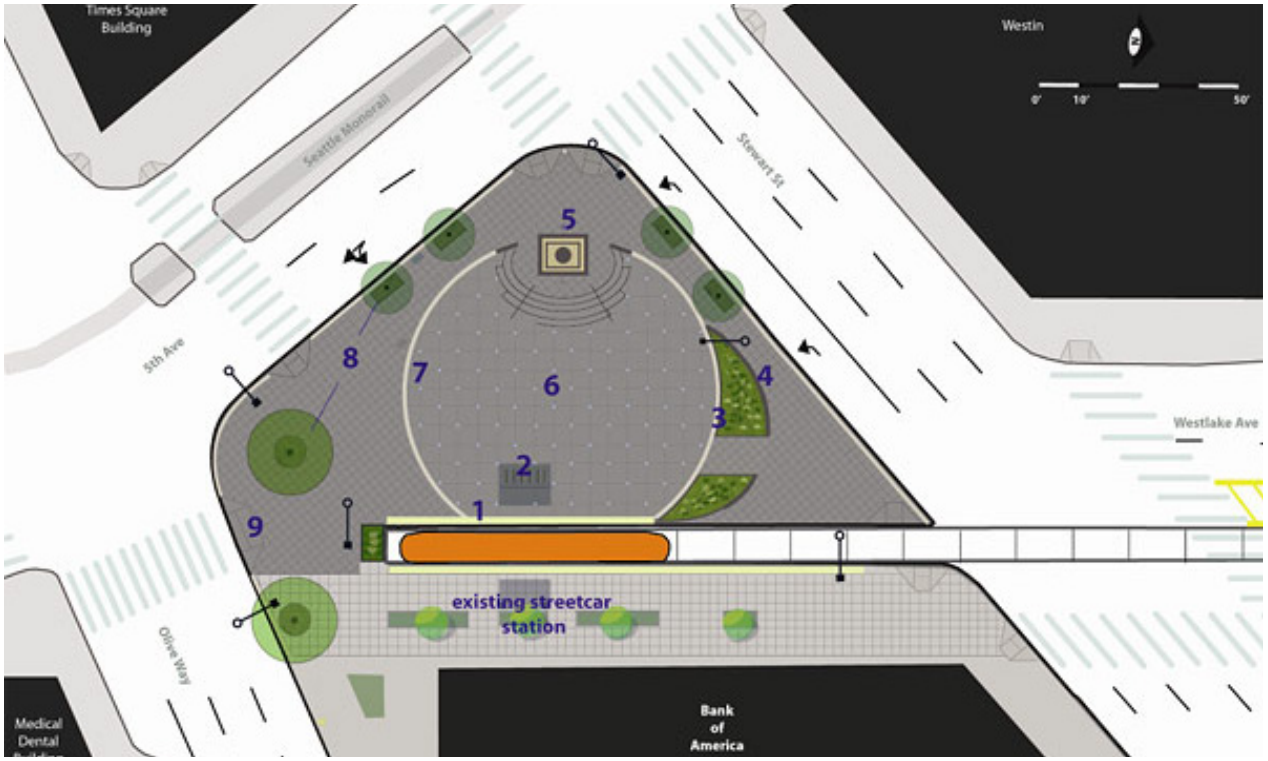
DOWNTOWN TRANSIT FACILITIES

WESTLAKE HUB

Seattle's Westlake Hub is one of the major transit transfer hubs in Downtown Seattle. Located as a junction in the Downtown, Denny Triangle and Belltown grids, the area is a convergence zone for pedestrians and transit. The area houses the southern termini of the South Lake Union Streetcar and the Seattle Monorail. The Westlake Tunnel Station exits to the area and bus routes provide transfer stops on Third Avenue, Fourth Avenue, Olive Way and Stuart Street, which are primary transit routes to I-5. In Fall 2010, Westlake Avenue between Olive Way and Stewart Street was closed to build a transit mall and bicycle- and pedestrian-oriented plaza at the current terminus of the South Lake Union Streetcar. This project includes improvements to both Westlake Square Park and McGraw Square Park, which were, until recently, separated by Westlake Avenue.

Improvements and modifications include (as indicated in above graphic):

1. Improved pedestrian environment and connections to retail core and the Downtown Seattle Transit Tunnel
2. Enhanced transfer opportunities between the Seattle Streetcar, Monorail, light rail tunnel, and major bus routes
3. Covered bicycle parking and amenities as well as safer biking conditions
4. New street trees, improved landscaping, architectural lighting, and seating
5. Renovations to the historic McGraw Square Park



Improvements at Westlake Hub are numbered here and described below.

Image from SDOT

6. Improved safety achieved by eliminating a leg of the five-way intersection
7. A new left-turn-only lane from Stewart Street to 5th Avenue and channelization changes to Westlake Avenue
8. Approach of Westlake Avenue to Stewart Street reduced to a single southbound travel lane
9. A second streetcar platform to improve rider access to and from the plaza

The project grew out of the City's Center City Strategy and will develop Westlake as one of the city's major transportation hubs.

A new bicycle and pedestrian-friendly transit mall creates new identity for Westlake Hub in north Seattle.

Image from SDOT

DOWNTOWN TRANSIT FACILITIES

SEATTLE FERRY TERMINAL (COLMAN DOCK)

The Seattle Ferry terminal at Colman Dock serves the Bainbridge Island and Bremerton passenger-vehicle routes and the Vashon Island passenger-only ferry route. It also serves routes going to West Seattle from Pier 50.

Pedestrian/Bicycle Linkages

The Marion Street pedestrian walkway overpass enhances access to the dock, and walk-on/off passengers have access to downtown and transit routes. Wide sidewalks along Alaskan Way provide access to waterfront destinations. Bike paths on Alaskan Way link downtown with residential neighborhoods to the north and southwest.

Intermodal Connections

Metro bus routes that stop along the west side of Alaskan Way adjacent to the terminal provide connections. The Waterfront Streetcar, which ran along the Seattle waterfront, is indefinitely suspended due to the demolition of the maintenance barn and Broad Street Station; it has been replaced by Metro bus Route 99. The majority of transit riders transfer to or from services on Second, Third, Fourth Avenues and services in the Downtown Seattle Transit Tunnel that serve more destinations.

There are impediments for transit riders using Alaskan Way bus services:

- Transit routes generally cannot be timed to ferry arrivals or departures
- Those transferring to bus routes on First, Second, Third, and Fourth Avenues may cross the Alaskan Way, a busy street, and walk uphill before boarding their bus. Pedestrians may also choose to cross over the pedestrian walkway over Alaskan Way.
- The Alaskan Way Viaduct project will make waterfront access difficult for the duration of the project.

Challenges

While Colman Dock is a critical component of the downtown transportation system, impediments at critical intersections and intermodal transfer points compromise its connections to the city and region. These operational inefficiencies increase travel times and lead many patrons to bring their vehicle on the ferries, contributing to the existing vehicular capacity crunch at the dock. Specifically, the existing dock and terminal exits for driving and walking patrons are compromised by the proximity to Alaskan Way. At Colman Dock, waiting areas and amenities for walk-on passengers are sufficient but modest, and seating is undersupplied.

In coming years, the number of daily commuters and visitors to the Seattle Ferry Terminal is expected to grow with the majority of the growth coming from walk-on passengers.
Image from Flickr user WSDOT

DOWNTOWN TRANSIT FACILITIES

KING STREET HUB

King Street Hub, comprised of King Street Station and the International District/Chinatown Station in the southern portion of downtown Seattle, is one of the primary multimodal centers in Seattle. King Street Station is located on Jackson Street between Third and Fourth Avenue South and the International District/Chinatown Station is located on Fifth Avenue between Jackson Street and King Street.

King Street Station is served by the Amtrak Cascades, Empire Builder and Coast Starlight lines as well as Sound Transit's Sounder commuter trains (North and South lines). From King Street Station, connections can be made to a variety of transit services at or near International District/Chinatown Station, including local and regional King County Metro routes, Sound Transit Express buses, Sound Transit Link light rail, Northwestern Trailways, and the future First Hill Seattle Streetcar scheduled to open in 2013.

The International District/Chinatown Station is located in the Downtown Seattle Transit Tunnel. This area has a number of challenges with respect to pedestrian linkages and intermodal connectivity, including inconvenient pedestrian pathways approaching and within the station.

The large percentage of passengers who arrive on Sounder Commuter Rail at King Street Station must make their way up narrow staircases to transfer to Link trains or buses. These staircases are a limiting factor in getting people efficiently off the train and platform, often causing delays at the foot of the staircase to street level. Passengers must then cross Fourth Avenue South, a busy arterial street, and walk approximately 100 yards to bus stops that have inadequate waiting areas.

King Street Station seen from Jackson Street between 4th and 5th Avenues

Image from Flickr user The West End

Passengers arriving to King Street Station can transfer to Downtown-bound buses at nearby International District/ Chinatown Station.

Image from Flickr user Oran Viriyincy

Those transferring to Link trains must make their way through a poorly marked pedestrian corridor and then descend into the Transit Tunnel.

Image from Flickr user The West End

DOWNTOWN TRANSIT FACILITIES

DOWNTOWN SEATTLE TRANSIT TUNNEL

Overview

The Downtown Seattle Transit Tunnel (DSTT) opened in 1990. The tunnel was an innovative and efficient approach to routing buses arriving from the city's periphery through downtown. When the tunnel opened, it removed a significant amount of rush hour buses from congested downtown streets.[2]

The 1.3-mile-long tunnel runs under Third Avenue and Pine Street and its five stations provide access to major downtown attractions and employers. The tunnel's companion is Third Avenue, which is bus-only during peak hours. Both Third Avenue and the DSTT fall within the Ride Free Area.

The transit tunnel connects to the SODO Busway, which allows buses their own right-of-way extending out from the city center. The tunnel connects riders with Sounder commuter trains on the southern end and the Monorail and South Lake Union Streetcar at its current northern stations.

Tunnel Retrofit

In 2005, the tunnel was closed for two years so that it could be retrofitted to accommodate both buses and Link light rail trains. The original tunnel design included rails, but upgrades were required given changes in rail technology. In anticipation of the

tunnel closure, King County, the City of Seattle, Sound Transit, and Community Transit devoted $16 million to improve surface streets' ability to accommodate increased bus volumes. Improvements included:

- Designating Third Avenue as a transit priority route by restricting through traffic and business access during peak commute times
- Adding transit priority features and contra flow lanes on Olive Way, Ninth Avenue, and Fifth Avenue
- Improving traffic signs and wayfinding, including new electronic displays regarding peak-hour restrictions on Third Avenue

Currently, Link light rail and Metro bus service operate in the transit tunnel, but eventually buses will be removed to make way for additional Link light rail service.

Image from Sound Transit

Link Light Rail

Beginning in 2009, the tunnel began to carry Link light rail trains as well as 22 bus routes. About 55,000 bus riders use the tunnel each weekday, along with most of the 24,000 Central Link passengers. Metro plans to continue to operate up to 60 buses per hour in tandem with Central Link light rail.

Future Plans

As the Link light rail system expands, buses will be removed from the tunnel to allow for frequent rail headways; however, Metro and Sound Transit have not yet determined when this change will be needed. Drawing from the lessons of the tunnel closure, SDOT will need to implement measures to ensure there is adequate surface street capacity for buses. Given limited street capacity in downtown, finding more efficient ways to move transit passengers to and through downtown will be essential.

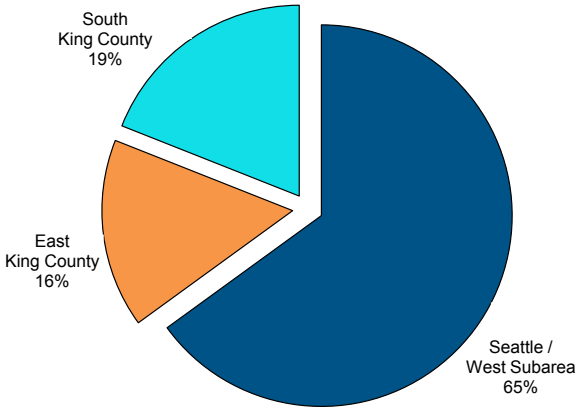
2 www.pugetsoundtransportation.com

WHO RIDES METRO?

This section focuses on the demographics of transit ridership in Seattle. Data for this section is taken from the 2009 King County Metro Rider, Non-Rider Survey. This is a survey conducted by King County Metro every two years to assess who is riding Metro buses and to compare rider and non-rider characteristics. A detailed summary of the 2009 Rider/ Non-Rider Survey can be found on the King County website.[1] The survey was stratified by geographic region: the Seattle West Subarea (Seattle/North King County), which includes Seattle, Shoreline, and Lake Forest Park; East King County; and South County.

1 http://metro.kingcounty.gov/am/reports/2009/2009-RNRFinal.pdf

RESIDENCE OF REGULAR METRO RIDERS



65% of Metro's regular rider households live in the Seattle West Subarea.

Definition: Including yourself, how many people in your household age 16 or over have taken at least 5 one-way rides on a Metro bus in the last 30 days?

Source: Metro 2009 Rider Survey

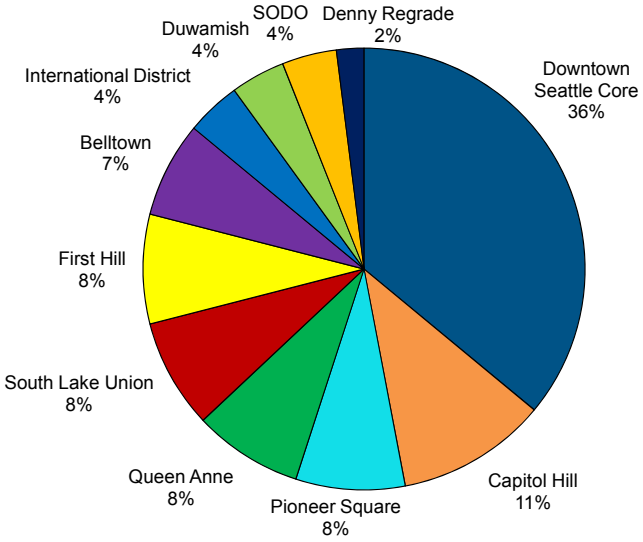
RESIDENCE OF METRO RIDERS AND NON-RIDERS

	Area of Residence			
	King County Total	Seattle West Subarea	South King County	East King
Total Households	786,534	299,573	276,345	210,616
Regular Riders	24%	40%	13%	14%
Infrequent Riders	13%	16%	9%	12%
Non-Riders	64%	44%	78%	75%
	100%	100%	100%	100%

Source: Metro 2009 Rider Survey

Seattle West Subarea households are about three times as likely as South and East King County households to have regular Metro riders.

WHERE ARE METRO PASSENGERS COMMUTING TO IN DOWNTOWN SEATTLE AND THE SURROUNDING AREA?



Of those commuting for work to downtown Seattle and the surrounding area on Metro buses from locations outside the city, over one-third (36%) work within the downtown Seattle Central Business District.

DEMOGRAPHIC CHARACTERISTICS OF REGULAR RIDERS

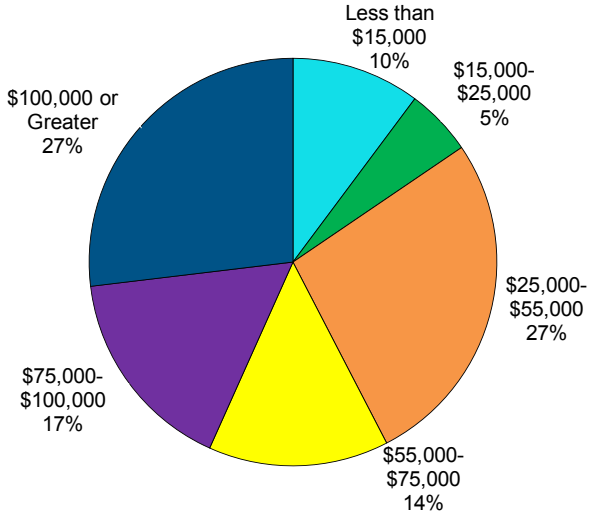
- Regular riders make about 25 trips per month on average compared to two trips per month for infrequent riders.
- Of regular riders, 32% use Metro for all transportation needs, 55% use for some transportation needs, and 12% use for few of their transportation needs.

The average age for regular riders is 44, significantly younger than the average age for infrequent riders (52).

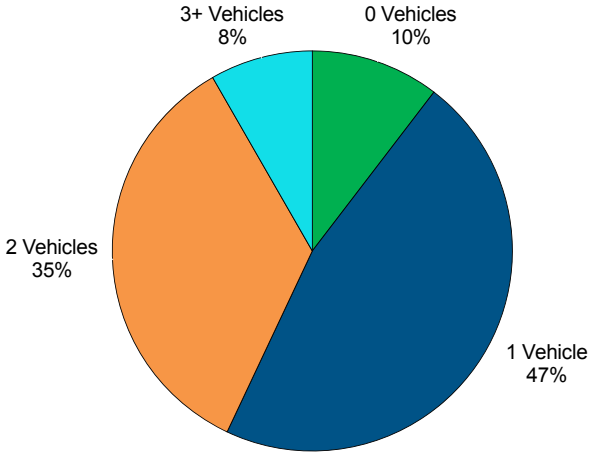
Image from Oran Viriyincy

CHARACTERISTICS OF REGULAR METRO RIDERS WHO LIVE IN THE SEATTLE WEST SUBAREA

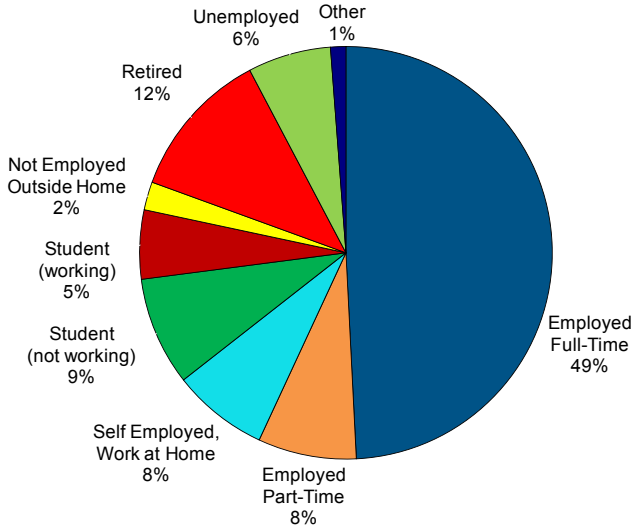
HOUSEHOLD INCOME



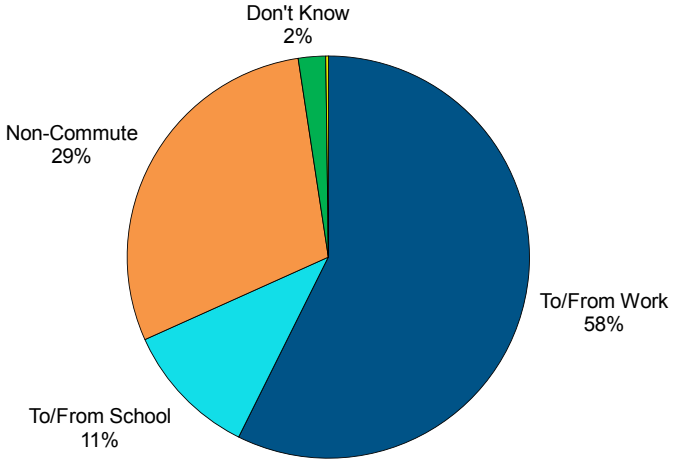
NUMBER OF WORKING VEHICLES AVAILABLE FOR USE



EMPLOYMENT STATUS

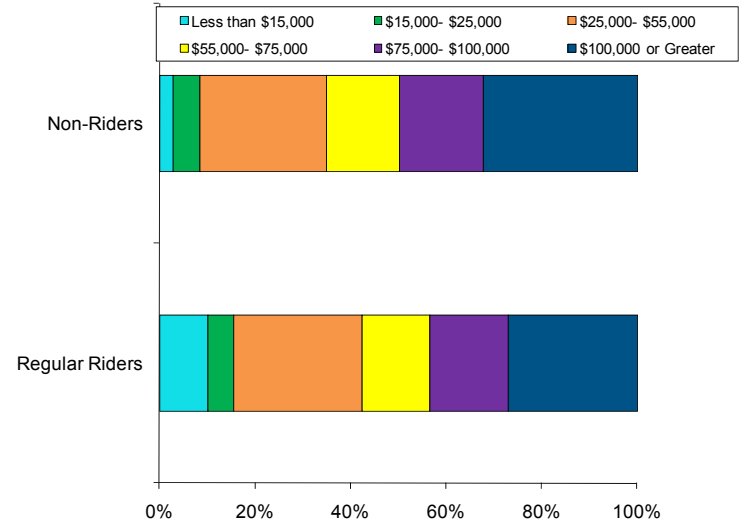


TRIP PURPOSE

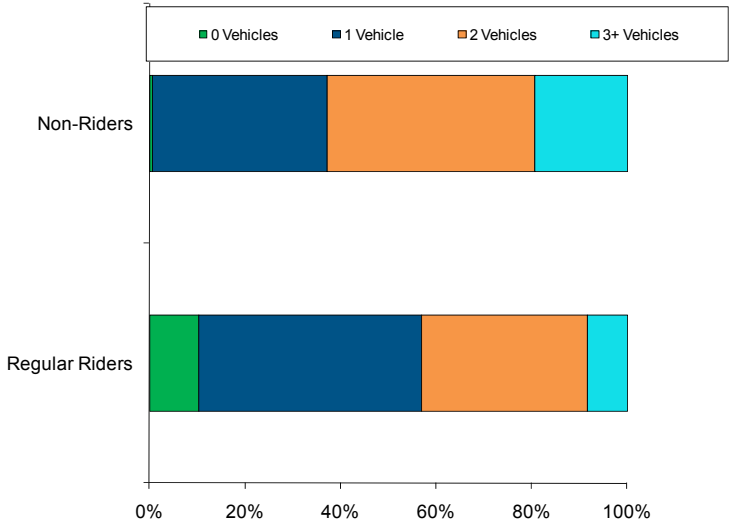


WHO RIDES AND WHO DOESN'T?

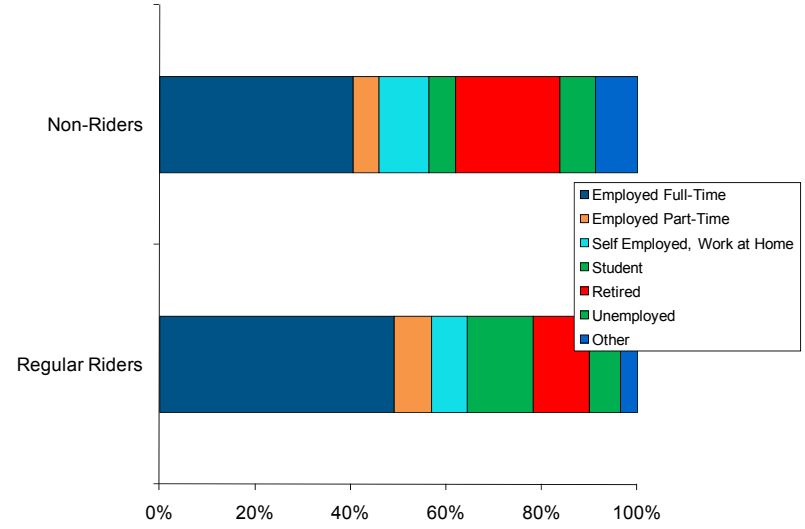
HOUSEHOLD INCOME OF REGULAR METRO RIDERS COMPARED TO NON-RIDERS



OF WORKING VEHICLES AVAILABLE FOR USE TO REGULAR METRO RIDERS COMPARED TO NON-RIDERS



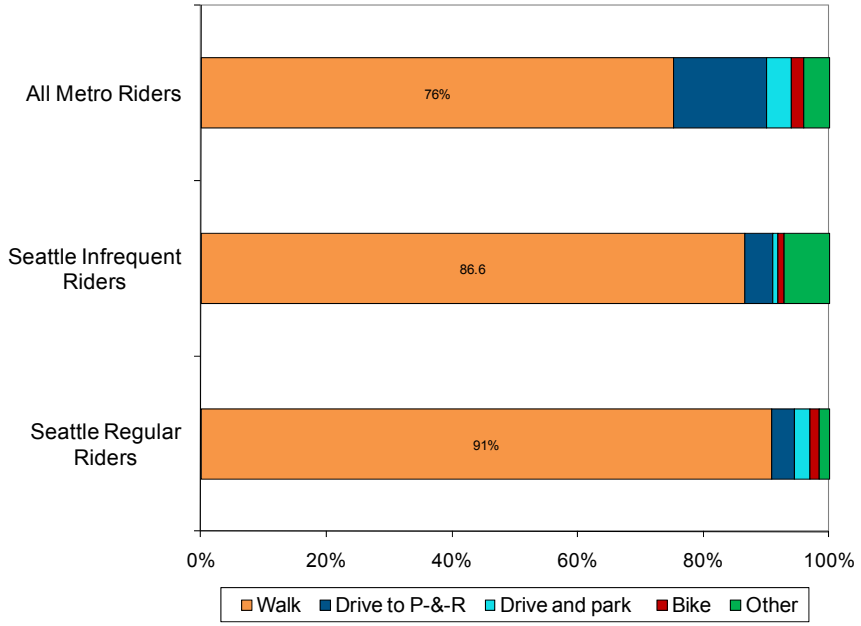
EMPLOYMENT STATUS OF REGULAR METRO RIDERS COMPARED TO NON-RIDERS



In the Seattle West Subarea:

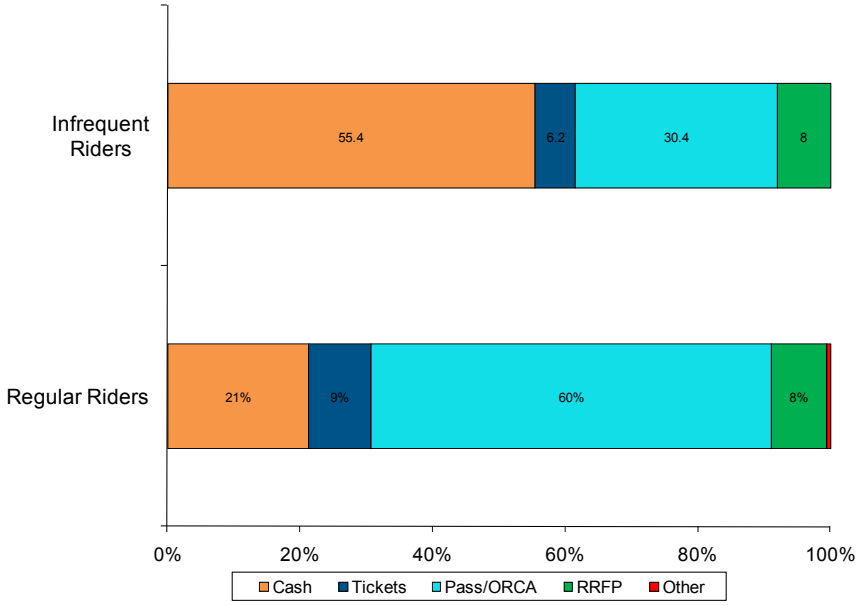
- A higher percentage of infrequent riders (32%) than regular riders (27%) have a household income over $100,000
- 10% of regular riders and 3% of non-riders have a household income less than $15,000
- 19% of non-riders have access to three or more vehicles, whereas only 8% of regular riders do
- 10% of regular riders and 1% of non-riders don't have access to a working vehicle
- 49% of regular riders and 40% of non-riders are employed full time
- 11% of regular riders and 22% of non-riders are retired

TRAVEL MODE FROM HOME TO BUS STOP



The vast majority of all Metro riders (77%) walk from their home to the bus stop. In the Seattle West Subarea, 87% of infrequent riders walk and 91% of regular riders walk to the bus stop.

FARE PAYMENT: USUAL METHOD FOR PAYMENT



In the Seattle West Subarea, 60% of regular riders board with a transit pass or ORCA card, whereas only 30% of infrequent riders do.

TRANSIT PERFORMANCE

This section focuses on transit performance in the city of Seattle, including transit ridership, performance of transit routes and UVTN corridors, travel time, and transit greenhouse gas emissions.

RIDERSHIP

Between 2004 and 2008, King County Metro ridership increased by 20%, as shown in the upper line in Figure 4-5. Over this period the amount of service provided, measured in revenue hours (where a transit vehicle is available to carry passengers), increased by only 13%. As a result, the lower line in Figure 4-5 illustrates that productivity (riders per revenue hour of service) increased over the same period, although at a lower rate than ridership.

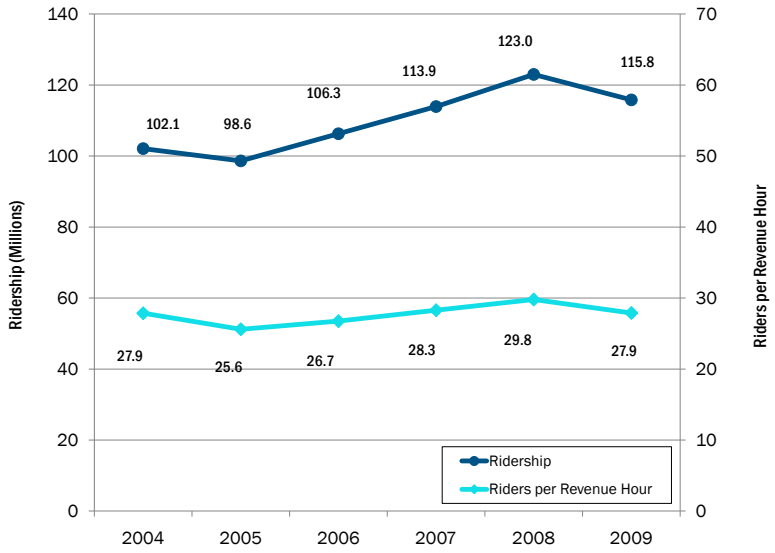
King County Metro ridership declined by about 6% in 2009, down from about 123 million rides to nearly 116 million, potentially due to decreased fuel prices and a slow economy. Productivity (riders per revenue hour) declined by about 6% as revenue hours increased slightly.

Figure 4-6 shows systemwide ridership for transit providers in the Seattle region for 2009, not including demand-response service and vanpools. The city of Seattle makes up the majority of King County Metro Transit's West Subarea, which also includes Shoreline and Lake Forest Park. Routes in this planning area comprise about two-thirds of overall King County Metro ridership. On Washington State Ferries, foot passengers comprise just over half of overall ferry ridership, but 68% of ridership on routes serving Seattle.

The level of transit utilization is typically measured in the number of rides provided relative to the population served. Based on ridership on Metro buses in the West Subarea and on the Seattle Streetcar, there were about 120 transit rides per capita in the city of Seattle in 2008, falling to about 115 rides per capita in 2009.[1] This is nearly double the level of utilization for King County Metro's overall service area—about 65 rides per capita in 2008 and about 60 in 2009.

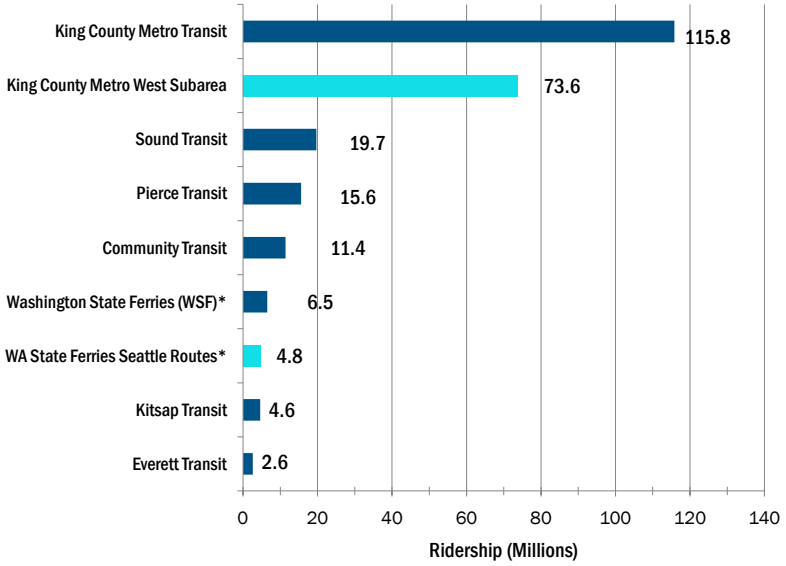
1 Calculated by dividing combined ridership on buses in the West subarea and on the Seattle Streetcar by the estimated population for the City of Seattle (including Shoreline and West Forest Park, which are in the West Subarea) from the most recent available American Community Survey and U.S. Census data for each jurisdiction. The overall King County Metro service population is from the National Transit Database.

FIGURE 4-5 HISTORICAL KING COUNTY METRO TRANSIT RIDERSHIP, 2004-2009



Source: National Transit Database, 2004-2009. Revenue hours include time when a transit vehicle is available to carry passengers and layovers, but exclude "deadhead" time, such as when a bus travels from a garage to the start of a route. Riders per revenue hour is a measure of service productivity.

FIGURE 4-6 TRANSIT RIDERSHIP BY AGENCY, 2009



Source: National Transit Database, 2009. West Subarea data from King County Metro 2009 Route Performance Report; Seattle Streetcar Ridership from City of Seattle; Washington State Ferries data from 2009 Annual Report. * Ferry ridership includes foot passengers only.

ADA PARATRANSIT

The Americans with Disabilities Act (ADA) requires curb-to-curb paratransit service to be provided within three-quarters of a mile of fixed-route transit services during the same days and times that bus routes operate. Although ADA paratransit is only a small fraction of the overall transit ridership shown in Figure 4-5, it provides a critical service to people with disabilities and/or seniors who are unable to use fixed-route transit service.

Figure 4-7 shows that ADA paratransit ridership on King County Metro's Access Transportation service increased by about 5.6% (60,000 rides) from 2004 to 2008, although the increase leveled off starting in 2007. Productivity (riders per hour) remained relatively constant.

The cost of providing ADA paratransit service has increased significantly in recent years. The cost per hour increased by 25% from 2004 to 2008, at a higher rate than either inflation (15% increase) or the hourly cost of bus service (11% increase), as shown in Figure 4-8. On an hourly basis, paratransit service is less expensive to operate than bus service, with a cost of about $66 per hour in 2008, compared to about $143 per hour for bus service. However, it is far less efficient because vehicles carry only two to three trips per hour they are in service. The cost per ride on paratransit was about $39 in 2008 (see Figure 4-9), which compares to slightly less than $4 for the average bus trip. The cost per ride on paratransit increased by 23% from 2004 to 2008, while the cost per ride on fixed-route buses declined slightly over the same period.

While there will always be a need for paratransit, transit agencies around the nation are seeking ways to better accommodate seniors and people with disabilities on standard fixed-route service, particularly as the population ages over the next two decades. Shifting some trips to fixed-route buses, such as by providing low-floor buses and offering travel training, reduces paratransit operating costs and has the added benefit of improving mobility and self reliance for customers, who often prefer to use regularly scheduled, fixed-route service.

FIGURE 4-7 ADA PARATRANSIT RIDERSHIP

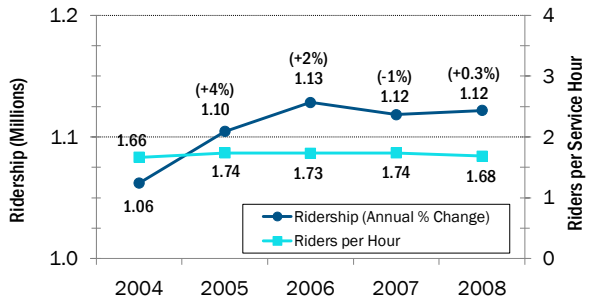


FIGURE 4-8 ADA PARATRANSIT COST PER HOUR

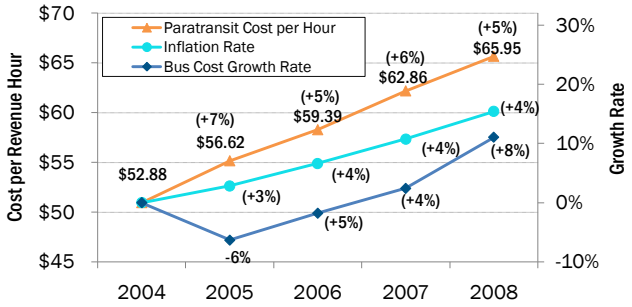
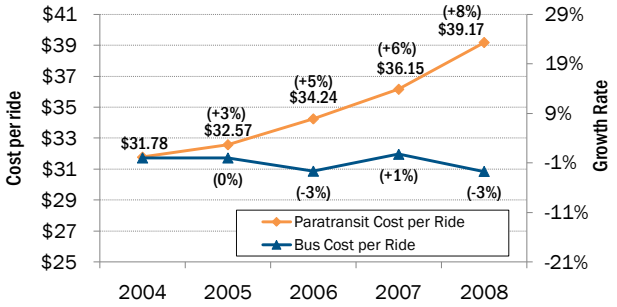


FIGURE 4-9 ADA PARATRANSIT COST PER BOARDING



Source: ADA paratransit data from King County Metro. Bus data from National Transit Database, 2004-2008. Numbers in parentheses represent annual change. Inflation rate is based on the Consumer Price Index (CPI) for the Seattle area.

BUS SERVICE PERFORMANCE

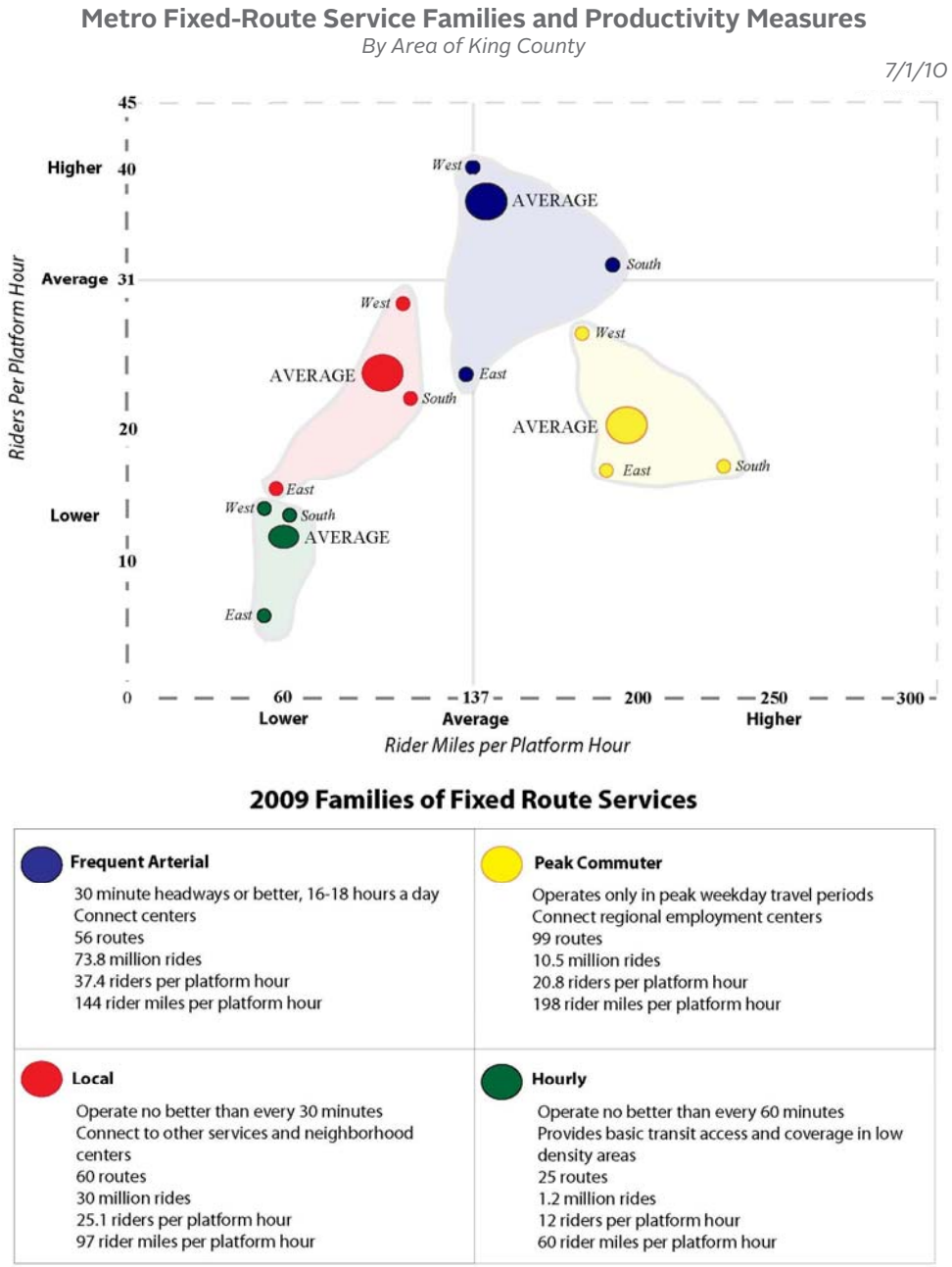
Like every transit agency, King County Metro balances productivity and coverage goals in providing transit service. Figure 4-10 compares productivity for different families of Metro fixed-route bus service using two measures of productivity. Each family serves a different purpose, as described at the bottom of the chart. The graphic further classifies each family based on Metro's three geographic subareas—west, east, and south—that are used for planning and evaluating the geographic equity of bus service (see discussion of the King County Metro 40/40/20 policy on page 4-3). The city of Seattle is within the West Subarea, which also includes Shoreline and Lake Forest Park.

Within each service family, a large bubble represents average productivity and the smaller bubbles represent the average performance within each subarea. The placement of these bubbles along the vertical axis shows ridership per platform hour (including layover time and travel between the route and the operating base) while along the horizontal axis their placement indicates the number of rider miles per platform hour. In general, transit service for the city of Seattle (West Subarea), exhibits the highest ridership per hour within each service family, reflecting its higher density urban environment. Each family of service is discussed below:

- Frequent Arterial services (54% of Metro service hours) tend to operate in the densest corridors with the strongest demand in both directions, and have the highest ridership per hour.
- Local services (28% of Metro service hours) are slightly below the overall average productivity in terms of both ridership and rider miles per hour.
- Peak Commuter services (15% of Metro service hours) typically serve longer distance trips with relatively few stops and have the highest rider miles per hour.
- Hourly services (just 3% of Metro service hours) are the least productive of Metro services, but provide basic transit coverage in low-density areas.

Figure 4-11 compares performance measures for selected Seattle transit routes, including King County Metro bus routes in the West Subarea, several Sound Transit express bus routes, and Central Link. The highest performing bus routes are shown in the upper right quadrant of the graphic. These routes have above average productivity (number of passengers carried per hour of revenue service) and cost

FIGURE 4-10 KING COUNTY METRO SERVICE FAMILIES



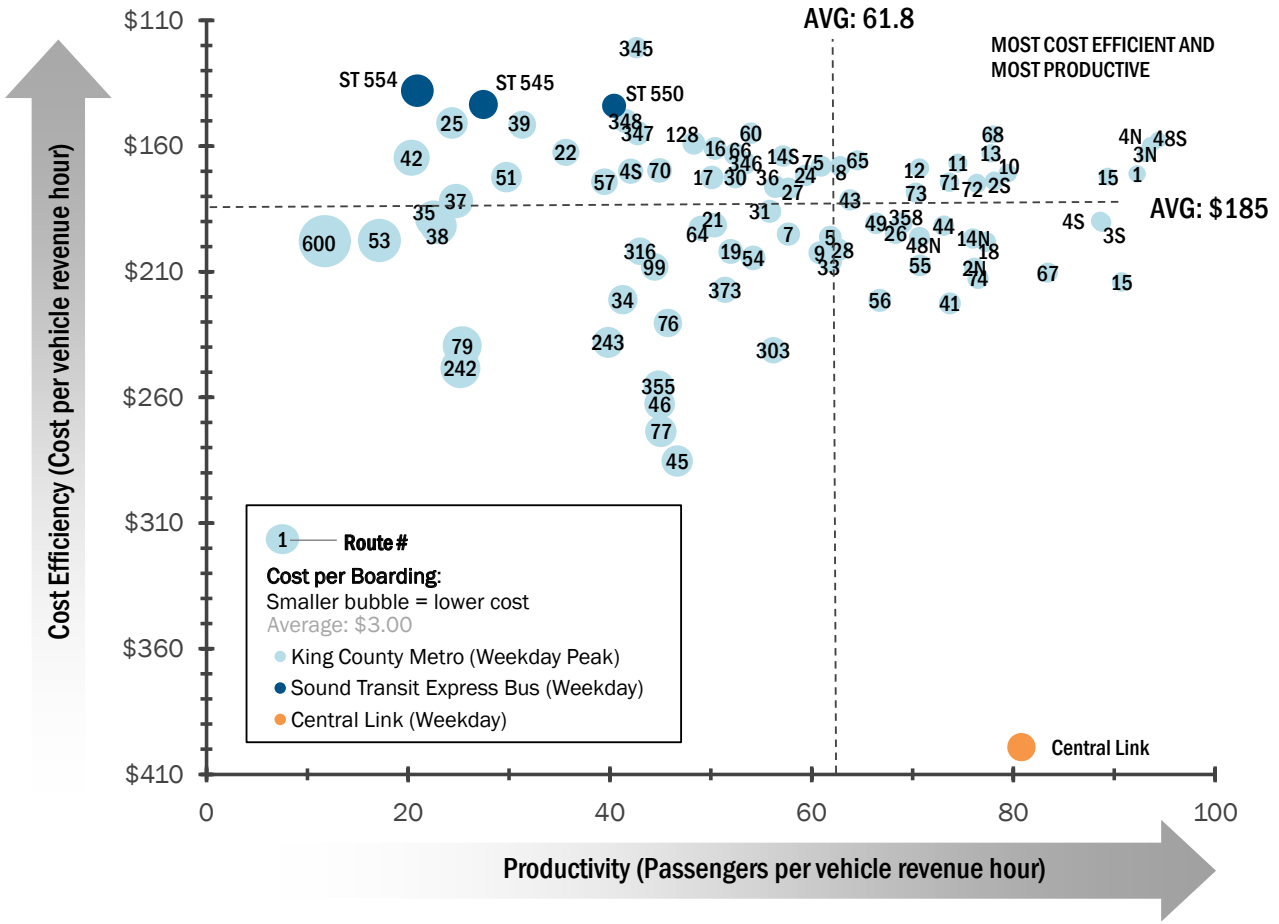
Source: King County Regional Transit Task Force Final Report and Recommendations, October 2010

efficiency (operating cost per hour of revenue service); cost efficiency is affected by deadheading, such as when a transit vehicle travels to/from an operating base and does not pick up passengers. The size of each bubble indicates the cost effectiveness (cost per boarding) of the route, with a smaller bubble representing a lower cost per passenger. The routes that are most cost-efficient and most productive have the lowest cost per boarding, trending toward the upper right quadrant of the chart.

Weekday productivity of Central Link is comparable to the most productive Metro bus routes, although its operating costs are higher as is typical of light rail. (As discussed in Section 6, these costs are higher than peer systems, but are only based on a partial first year of operation.) Several Sound Transit express bus routes serving Seattle are also shown, representing Sound Transit routes with different levels of productivity listed from highest to lowest ridership per hour: 550 (Bellevue), 545 (Redmond), and 554 (Issaquah).

Figure 4-12 lists performance data and measures for each route.

FIGURE 4-11 WEEKDAY PEAK PERFORMANCE MEASURES FOR SEATTLE TRANSIT ROUTES IN 2009



Source: Data for King County Metro bus routes are for the West Subarea, which includes Shoreline, and include only peak periods—5:00 to 9:00 am and 3:00 to 7:00 pm on weekdays. Variations of service on each route, such as express trips, are combined. The "N" and "S" indicate north and south segments of a route. Data for Sound Transit express bus routes and Central Link is for the full weekday period.

FIGURE 4-12 PERFORMANCE DATA AND MEASURES BY ROUTE, PEAK HOURS FOR SELECTED ROUTES IN KING COUNTY, 2009

		2009 Annual Data					2009 Performance Measures			
Route	Neighborhood	Boardings	Revenue Hours	Revenue Miles	Operating Cost	Operates Outside City Limits?	Boardings / Revenue Hour	Boardings / Revenue Mile	Cost / Boarding	Cost / Revenue Hour
KING COUNTY METRO WEST SUBAREA (WEEKDAY PEAK)										
1	Kinnear	362,935	3,934	39,721	$672,790		92.3	9.1	$1.85	$171
2S	Madrona	505,188	6,469	56,319	$1,124,817		78.1	9.0	$2.23	$174
2N	West Queen Anne	498,399	6,546	57,803	$1,365,310		76.1	8.6	$2.74	$209
3S	First Hill	526,886	5,934	41,958	$1,129,938		88.8	12.6	$2.14	$190
3N	North Queen Anne	313,248	3,366	30,693	$548,673		93.1	10.2	$1.75	$163
4S	Judkins Park	452,421	5,106	39,312	$969,141		88.6	11.5	$2.14	$190
4N	East Queen Anne	348,633	3,726	36,292	$595,053		93.6	9.6	$1.71	$160
5	Shoreline CC/Northgate TC/Greenwood	831,254	13,443	161,359	$2,637,091	Yes	61.8	5.2	$3.17	$196
7	Rainier Beach	1,139,567	19,755	208,173	$3,852,680		57.7	5.5	$3.38	$195
8	Mount Baker	876,969	13,961	158,979	$2,346,481		62.8	5.5	$2.68	$168
9	Rainier Ave	268,650	4,417	53,500	$894,364		60.8	5.0	$3.33	$202
10	Capitol Hill	564,292	7,104	55,542	$1,213,033		79.4	10.2	$2.15	$171
11	Madison Park	435,575	5,848	53,947	$975,309		74.5	8.1	$2.24	$167
12	First Hill	506,985	7,173	49,878	$1,210,792		70.7	10.2	$2.39	$169
13	Seattle Pacific U.	457,747	5,888	49,908	$959,085		77.7	9.2	$2.10	$163
14S	Mount Baker	349,655	6,118	56,073	$1,003,331		57.2	6.2	$2.87	$164
14N	Summit	194,167	2,556	20,079	$502,793		76.0	9.7	$2.59	$197
15	Blue Ridge	783,709	8,638	110,015	$1,849,190		90.7	7.1	$2.36	$214
15	Ballard	144,507	1,618	22,489	$278,419		89.3	6.4	$1.93	$172
16	Northgate TC	510,562	10,128	117,597	$1,629,931		50.4	4.3	$3.19	$161
17	Loyal Heights	418,965	8,362	100,899	$1,442,245		50.1	4.2	$3.44	$172
18	Crown Hill	686,978	8,891	115,230	$1,761,687		77.3	6.0	$2.56	$198
19	West Magnolia	70,609	1,359	16,226	$274,375		52.0	4.4	$3.89	$202
21	Arbor Heights	416,003	8,258	131,361	$1,581,113		50.4	3.2	$3.80	$191
22	White Center	219,699	6,167	81,747	$1,002,334	Yes	35.6	2.7	$4.56	$163
23	White Center	218,226	5,189	71,394	$882,099	Yes	42.1	3.1	$4.04	$170
24	Central Magnolia	310,101	5,221	72,547	$896,187		59.4	4.3	$2.89	$172
25	Laurelhurst	146,900	6,035	66,200	$909,939		24.3	2.2	$6.19	$151
26	East Green Lake	489,859	7,170	81,229	$1,395,588		68.3	6.0	$2.85	$195
27	Colman Park	177,498	3,077	31,001	$544,500		57.7	5.7	$3.07	$177

FIGURE 4-12 PERFORMANCE DATA AND MEASURES BY ROUTE, PEAK HOURS FOR SELECTED ROUTES IN KING COUNTY, 2009

		2009 Annual Data				Operates Outside City Limits?	2009 Performance Measures			
Route	Neighborhood	Boardings	Revenue Hours	Revenue Miles	Operating Cost		Boardings / Revenue Hour	Boardings / Revenue Mile	Cost / Boarding	Cost / Revenue Hour
28	Whittier Heights/Broadview	651,091	10,396	138,661	$2,092,436		62.6	4.7	$3.21	$201
30	Sand Point	312,649	5,963	75,308	$1,027,094		52.4	4.2	$3.29	$172
31	Magnolia	211,695	3,791	51,697	$705,005		55.8	4.1	$3.33	$186
33	Discovery Park	246,128	3,979	56,995	$818,954		61.9	4.3	$3.33	$206
34	Rainier Beach	46,902	1,136	14,387	$251,279		41.3	3.3	$5.36	$221
35	Seattle CBD	10,139	451	5,065	$85,132		22.5	2.0	$8.40	$189
36	Beacon Hill	964,761	17,112	180,904	$3,014,180		56.4	5.3	$3.12	$176
37	Admiral District	71,234	2,880	50,409	$523,784		24.7	1.4	$7.35	$182
38	SODO	8,522	371	2,972	$71,054		23.0	2.9	$8.34	$192
39	Rainier Beach	184,020	5,879	75,496	$890,646		31.3	2.4	$4.84	$152
41	Lake City	1,151,841	15,628	277,066	$3,478,809		73.7	4.2	$3.02	$223
42	Rainier Beach	18,411	905	11,344	$149,068		20.3	1.6	$8.10	$165
43	U. District	714,983	11,205	92,611	$2,032,738		63.8	7.7	$2.84	$181
44	Ballard	733,559	10,034	91,448	$1,923,186		73.1	8.0	$2.62	$192
45	Queen Anne	44,574	955	10,993	$272,463		46.7	4.1	$6.11	$285
46	Shilshole	66,941	1,490	20,485	$391,156		44.9	3.3	$5.84	$262
48S	Mount Baker	1,009,461	10,700	117,511	$1,686,235		94.3	8.6	$1.67	$158
48N	Loyal Heights	750,010	10,610	115,910	2,083,832		70.7	6.5	$2.78	$196
49	U. District	579,283	8,727	67,594	$1,664,756		66.4	8.6	$2.87	$191
51	West Seattle	35,133	1,182	17,653	$203,659		29.7	2.0	$5.80	$172
53	Admiral District	8,257	482	7,734	$95,152		17.1	1.1	$11.52	$198
54	Fauntleroy	483,566	8,921	138,257	$1,823,788		54.2	3.5	$3.77	$204
55	Admiral District	357,821	5,058	77,252	$1,049,106		70.8	4.6	$2.93	$207
56	Alki	220,977	3,311	53,891	732,886		66.7	4.1	$3.32	$221
57	W. Seattle Junction	80,837	2,049	28,405	$356,750		39.5	2.8	$4.41	$174
60	White Center	457,274	8,474	93,315	$1,312,096		54.0	4.9	$2.87	$155
64	Lake City	174,143	3,552	44,823	$684,435		49.0	3.9	$3.93	$193
65	Lake City	435,750	6,750	79,593	$1,118,227		64.6	5.5	$2.57	$166
66	Northgate	308,233	5,882	62,250	$959,515		52.4	5.0	$3.11	$163
67	North Seattle	247,212	2,964	34,648	$623,616		83.4	7.1	$2.52	$210
68	Northgate TC	300,317	3,852	49,149	$598,228		78.0	6.1	$1.99	$155
70	U. District	464,136	10,332	86,190	$1,753,186		44.9	5.4	$3.78	$170

FIGURE 4-12 PERFORMANCE DATA AND MEASURES BY ROUTE, PEAK HOURS FOR SELECTED ROUTES IN KING COUNTY, 2009

		2009 Annual Data				Operates Outside City Limits?	2009 Performance Measures			
Route	Neighborhood	Boardings	Revenue Hours	Revenue Miles	Operating Cost		Boardings / Revenue Hour	Boardings / Revenue Mile	Cost / Boarding	Cost / Revenue Hour
71	Wedgwood	437,394	5,937	78,351	1,035,119		73.7	5.6	$2.37	$174
72	Lake City	464,530	6,082	81,628	1,063,423		76.4	5.7	$2.29	$175
73	Roosevelt/Jackson Park	506,055	7,195	96,180	1,284,495		70.3	5.3	$2.54	$179
74	Sand Point	239,570	3,132	41,135	$666,169		76.5	5.8	$2.78	$213
75	Lake City	849,900	13,946	182,852	2,343,008		60.9	4.6	$2.76	$168
76	Wedgwood	182,319	3,985	51,504	$918,065		45.8	3.5	$5.04	$230
77	North City	179,692	3,989	62,255	$1,091,084	Yes	45.0	2.9	$6.07	$274
79	Lake City	44,657	1,762	23,693	$421,834		25.3	1.9	$9.45	$239
99	International Dist.	105,928	2,384	18,524	$496,135		44.4	5.7	$4.68	$208
128	Admiral District	392,592	8,126	126,086	$1,290,700	Yes	48.3	3.1	$3.29	$159
242	North Seattle	102,575	4,075	81,651	$1,011,915	Yes	25.2	1.3	$9.87	$248
243	Jackson Park	56,229	1,412	24,971	$336,191	Yes	39.8	2.3	$5.98	$238
303	Shoreline	212,482	3,781	68,618	$912,107	Yes	56.2	3.1	$4.29	$241
316	Shoreline	152,677	3,553	51,336	$717,094	Yes	43.0	3.0	$4.70	$202
345	Shoreline	164,856	3,868	51,100	$467,284	Yes	42.6	3.2	$2.83	$121
346	Aurora Village	181,759	3,404	53,604	$567,873	Yes	53.4	3.4	$3.12	$167
347	Mountlake Terrace	200,947	4,701	66,970	$727,828	Yes	42.8	3.0	$3.62	$155
348	Richmond Beach	194,237	4,675	66,995	$701,575	Yes	41.5	2.9	$3.61	$150
355	Shoreline CC	183,558	4,096	62,527	$1,045,783	Yes	44.8	2.9	$5.70	$255
358	Aurora Village	1,155,474	16,756	242,547	$3,193,130	Yes	69.0	4.8	$2.76	$191
373	Aurora Village TC	218,425	4,248	56,180	$922,654	Yes	51.4	3.9	$4.22	$217
600	Group Health Express	14,248	1,214	29,642	$240,264	Yes	11.7	0.5	$16.86	$198
	King County Metro TOTALS:	30,816,152	498,793	6,035,835	$92,374,471	AVERAGES:	61.8	5.1	$3.00	$185
SOUND TRANSIT EXPRESS BUSES (WEEKDAY)										
522	Woodinville	842,670	32,955	502,320	$4,908,348	Yes	25.6	1.7	$5.82	$149
545	Redmond	1,504,146	54,801	809,336	$7,861,254	Yes	27.4	1.9	$5.23	$143
550	Bellevue	1,570,667	38,872	504,119	$5,595,783	Yes	40.4	3.1	$3.56	$144
554	Issaquah	583,462	27,917	476,118	$3,850,933	Yes	20.9	1.2	$6.60	$138
CENTRAL LINK (WEEKDAY)										
Central Link	Sea-Tac Airport	1,736,521	21,494	408,103	$8,579,187	Yes	80.8	4.3	$4.94	$399

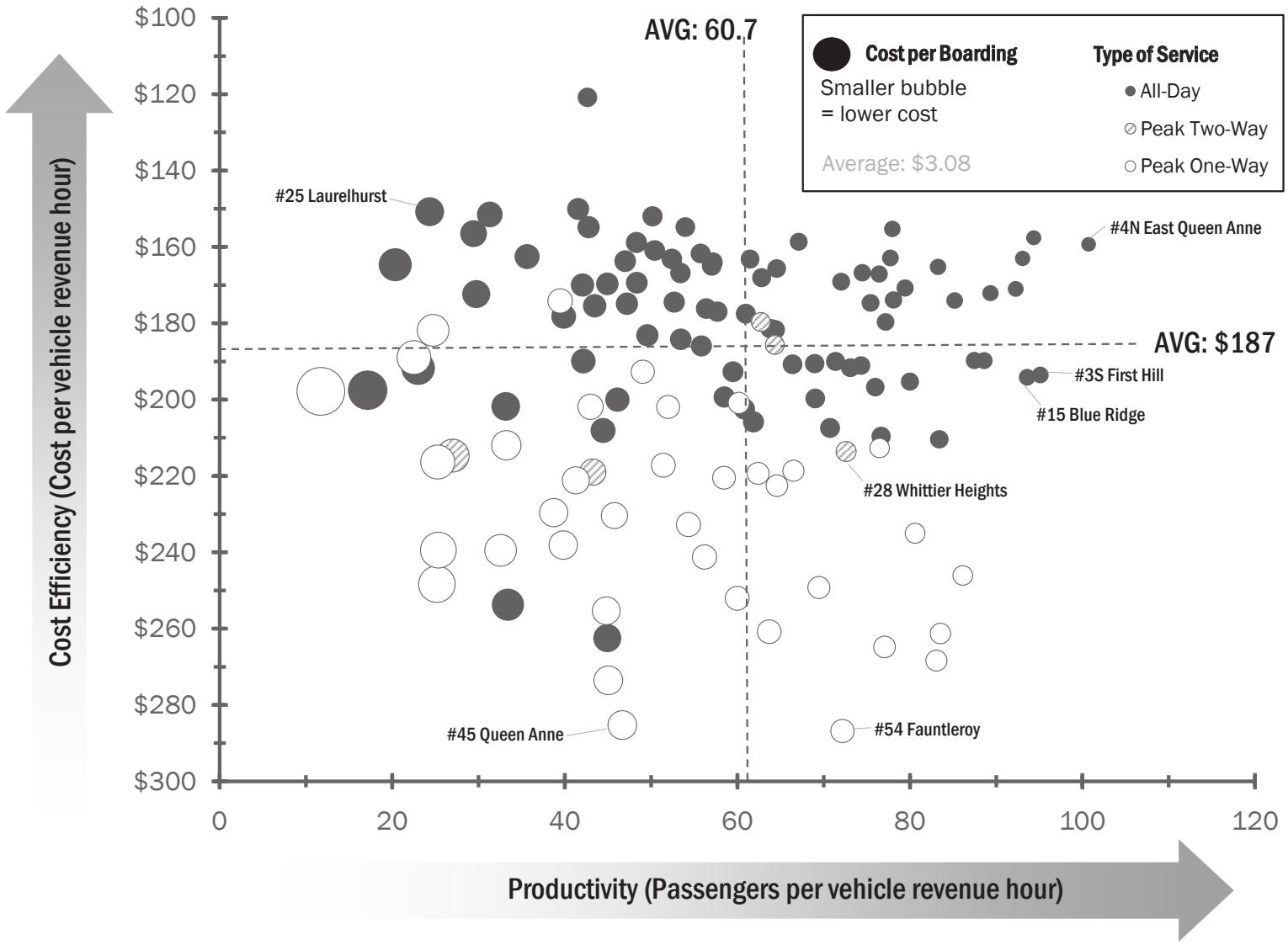
Source: King County Metro, Performance Data by Subarea, 2009. Peak period includes four hours each weekday morning and evening (5:00 – 9:00 am and 3:00 – 7:00 pm). Variations of routes were combined and some routes not making stops in Seattle were excluded. Sound Transit express bus and Central Link data for weekdays only, from 4th Quarter 2009 Performance Report and route-level data for 2009.

The graphic in Figure 4-13 differentiates peak period service on all-day routes and on routes that operate only during peak periods in either one or two directions.

All-day bus routes are the most cost-efficient, and typically cost less than average; these are found above the dashed horizontal line. One-way peak-only routes are generally the least efficient, since their cost of operation is spread across only one direction of revenue service in each period of peak travel. Most express routes fall into this category.

Routes of both types vary greatly in terms of productivity. The routes that are most cost-efficient and most productive have the lowest cost per trip and are generally in the upper right quadrant of the chart—these are mostly all-day routes.

FIGURE 4-13 PEAK PERFORMANCE MEASURES BY TYPE OF SERVICE FOR SEATTLE BUS ROUTES (WEST SUBAREA) IN 2009



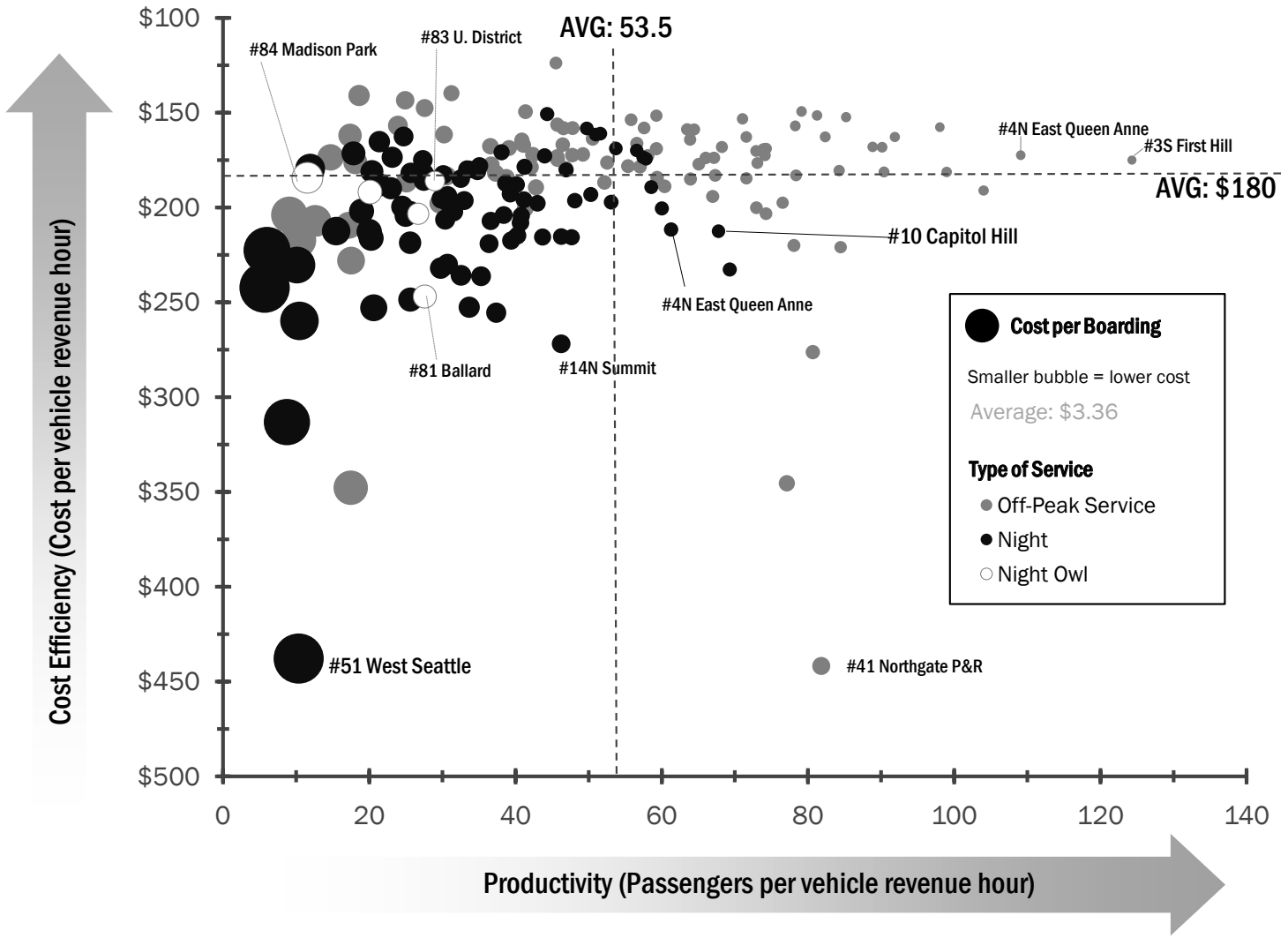
Source: King County Metro. Note: Variations of some routes are shown as separate data points. West Subarea includes Shoreline.

Figure 4-14 illustrates performance for off-peak bus routes (5:00 am to 7:00 pm weekends and 9:00 am to 3:00 pm weekdays) and night service (7:00 pm to 5:00 am). A broad range of service enables transit use for non-commute purposes and for work trips outside of traditional commute periods. All-day transit mobility can help households reduce auto ownership and cut household transportation costs.

Many of Metro's core routes that operate all day are more productive outside of peak hours than they are during the peak, in part due to the high frequency of buses during peak hours. For example, buses arrive every 7.5 minutes on Route 4N East Queen Anne during weekday peak hours compared to every 15 minutes midday, evenings, and weekends.

A number of night routes have moderately high productivity. The graphic also illustrates Metro's five night owl routes in Seattle (81-85) that enable use of the transit system 24 hours a day. Each route provides two nightly trips between approximately 2:00 and 4:00 am, seven days a week, bridging the gap between the last and first trips on regular routes. Routes 7 and 49 (one trip only) also provide night owl service in Seattle.

FIGURE 4-14 OFF-PEAK, NIGHT AND NIGHT OWL PERFORMANCE MEASURES FOR SEATTLE BUS ROUTES (WEST SUBAREA), 2009



Source: King County Metro. Note: Variations of some routes are shown as separate data points. West Subarea includes Shoreline.

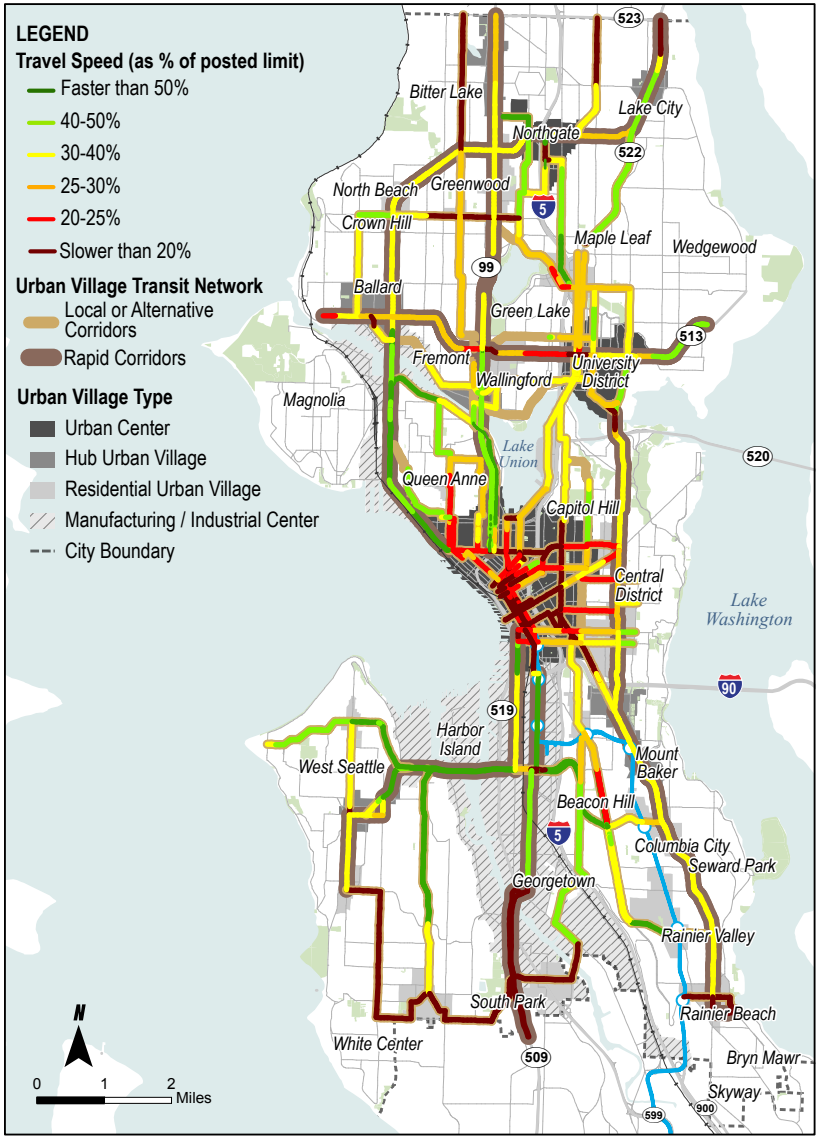
UVTN TRANSIT PERFORMANCE

Figures 4-15 to 4-18 illustrate transit performance measures that affect service quality for the Urban Village Transit Network (UVTN)–the core network of transit corridors connecting urban villages and centers in Seattle. The City defines the UVTN corridors while transit agencies operate service on the corridors. The UVTN performance measures, shown for each street segment and reflecting both directions of travel, provide a customer-focused view of transit performance.

- **Travel speed**, measured as a percentage of the posted speed limit, indicates whether transit is affected by traffic congestion along a route and points to a possible need for transit priority measures.
- **Reliability of travel time** measures variation in travel times and is an important indicator of service quality. This measure compares actual travel times on each street segment against base travel times (determined from the posted speed limit). On a UVTN corridor where passengers can expect frequent bus arrivals, a consistent travel time can be more important than the more traditional performance measure of whether buses are on schedule.
- **Passenger load** is a key factor in passenger experience on buses. Overloaded buses require longer passenger loading and unloading time, affecting travel time as well as passenger comfort.

The results presented in Figures 4-15 to 4-18, along with frequency of service and span of service (hours of operation), were calculated in 2008 (using 2007 data) as part of SDOT's regular monitoring of transit performance on the UVTN.

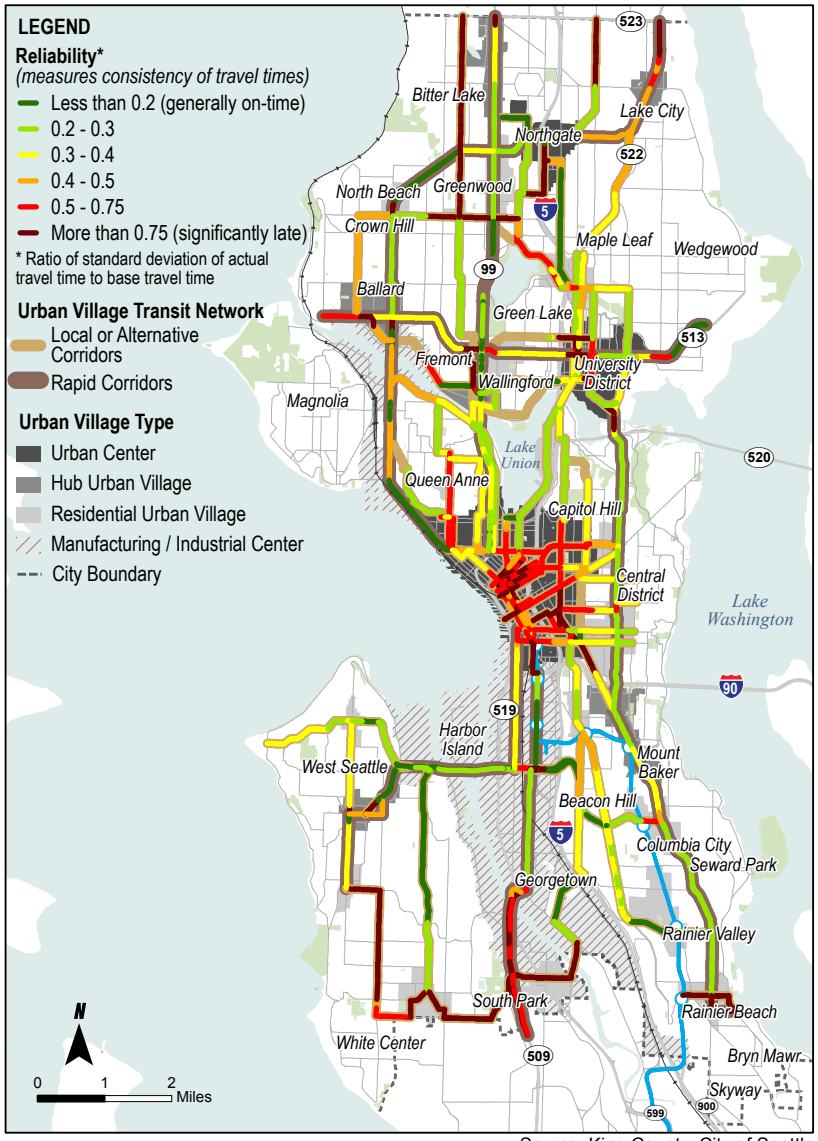
FIGURE 4-15 TRANSIT OPERATING SPEED ON UVTN, 2007



Source: King County, City of Seattle

Transit travel speeds are an issue throughout the City Center, including Capitol Hill, Madison Park, Madrona, and Leschi cross-town corridors, Broadway, and inner Rainier and Queen Anne Avenues into downtown. North of downtown, corridors with the most significant travel speed issues include cross-town on 45th and 85th and north-south corridors such as Greenwood. Transit speeds are also an issue in West Seattle, including north-south on 35th, on SR-509 and cross-town near the southern edge of the city.

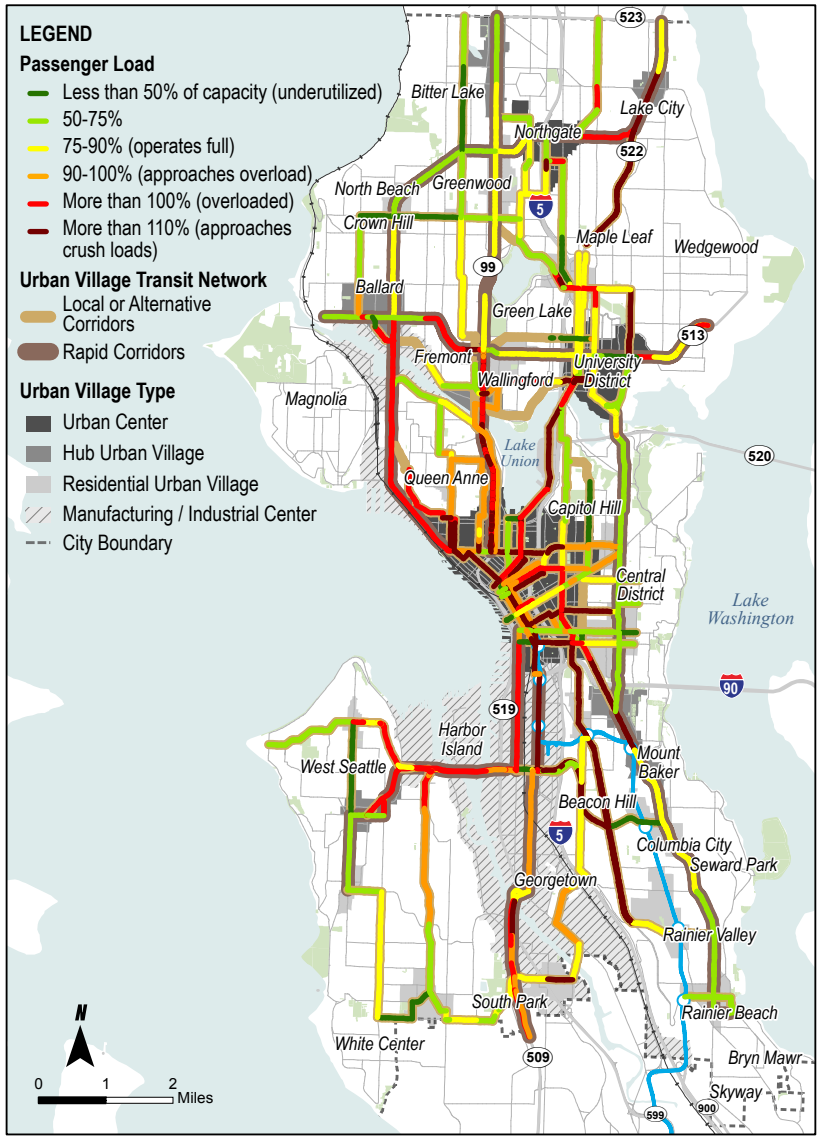
FIGURE 4-16 TRANSIT TRAVEL TIME RELIABILITY ON UVTN, 2007



Source: King County, City of Seattle

Travel time reliability issues are focused on most of same corridor segments where travel speeds are problematic, as well as segments in the University District, 15th Avenue between Queen Anne and Crown Hill, the Fremont Bridge, Northgate Way, and Lake City Way.

FIGURE 4-17 PASSENGER LOAD ON UVTN, 2007

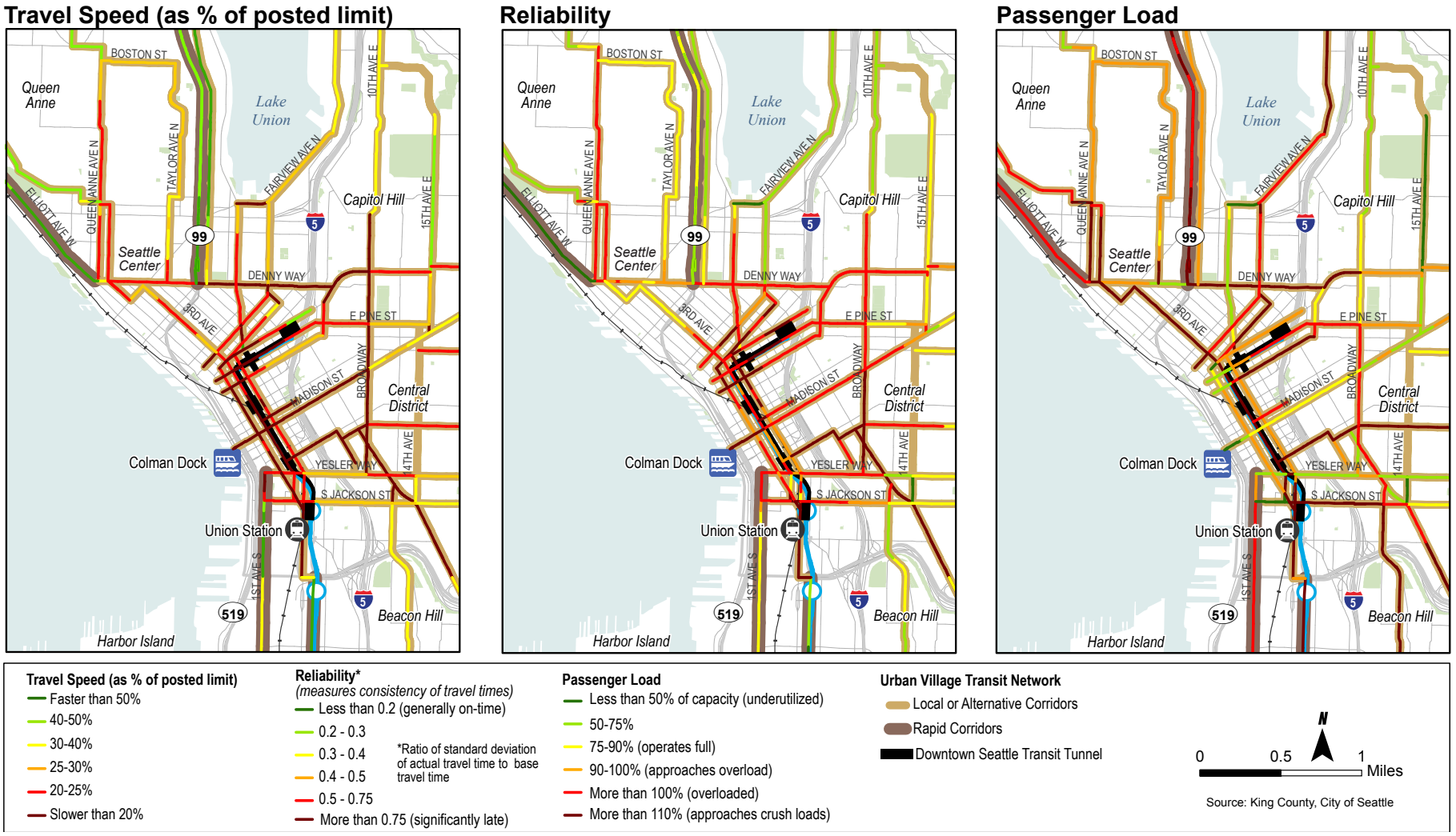


Source: King County, City of Seattle

Passenger loading issues are significant on a number of corridors, despite peak frequencies of 10 minutes or less, including corridors into downtown from the north, e.g. 15th/Elliott Ave from Ballard, Aurora/Hwy 99 from Fremont, and Eastlake from the University District; between Lake City and both Northgate and Maple Leaf; cross-town corridors in Central Seattle (notably James Street); West Seattle to downtown; the SR-509 corridor into downtown; and from Mount Baker and Rainier Valley to downtown, where Central Link may help alleviate overloading.

DOWNTOWN TRANSIT PERFORMANCE

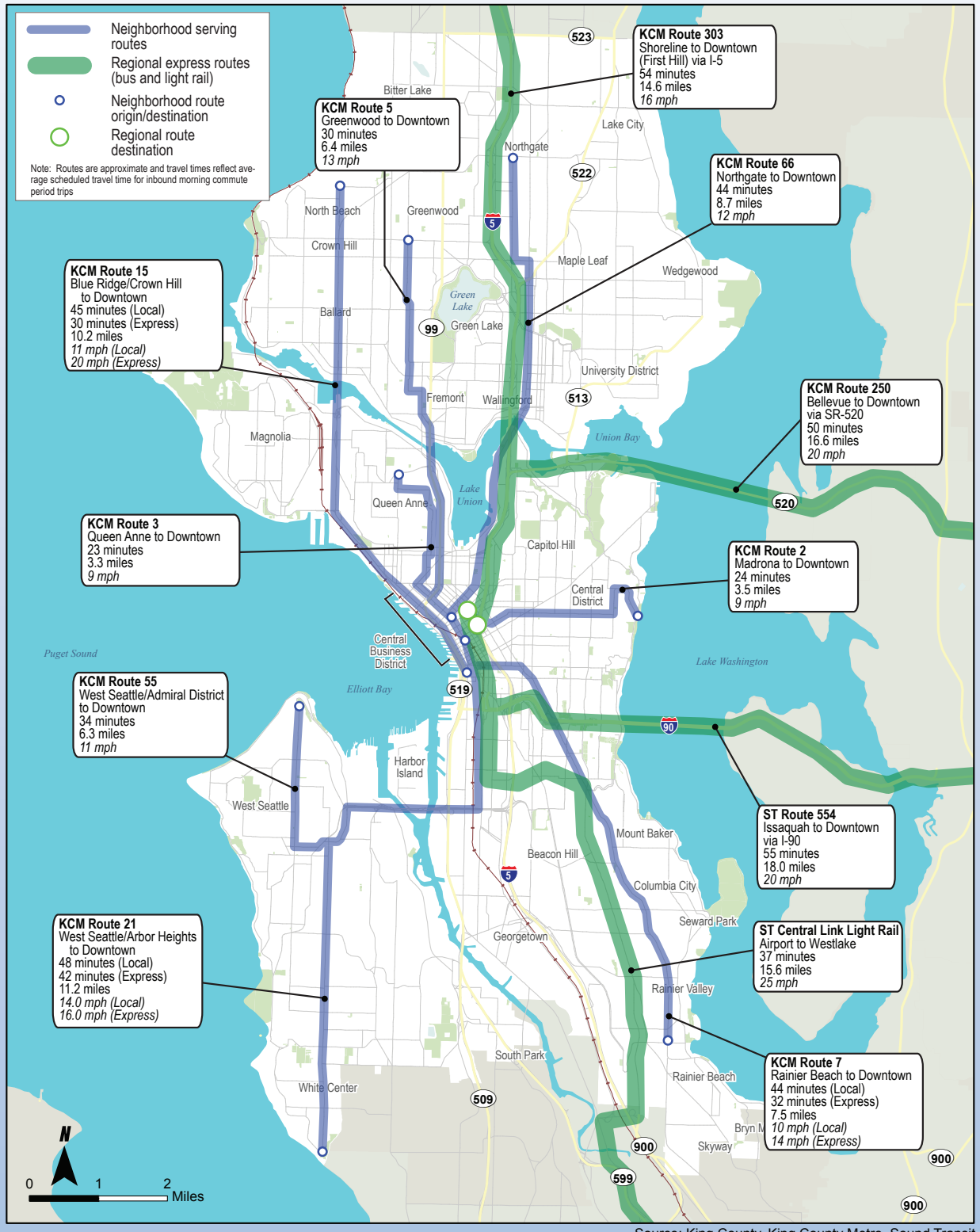
FIGURE 4-18 DOWNTOWN UVTN PERFORMANCE



This series of maps shows travel time reliability, travel speed, and passenger load for UVTN segments in downtown Seattle. Travel speed and reliability are key issues in downtown, while passenger load is more of an issue on some north-south and east-west corridors into downtown.

TRANSIT TRAVEL TIME

FIGURE 4-19 SAMPLE LOCAL AND REGIONAL TRAVEL TIMES TO DOWNTOWN SEATTLE



Source: King County, King County Metro, Sound Transit

The graphic above illustrates the scheduled travel time between stops for transit trips on selected bus routes within Seattle compared to longer distance trips to downtown from around the region, where express routes often achieve faster travel times using highway priority lanes. For example, a 6.3 mile trip from the Admiral District to downtown takes 34 minutes (an average speed of 11 miles per hour) and a similar length trip from Greenwood to downtown is scheduled to take about 30 minutes (13 miles per hour). By comparison, a 14.6 mile trip from Shoreline to downtown (First Hill) via I-5 is scheduled to take about 54 minutes (over 16 mph) and the 15.6 mile trip from Sea-Tac Airport to downtown on Central Link light rail takes 37 minutes (25 miles per hour). A trip from Bellevue to downtown Seattle covers almost 17 miles in 50 minutes (20 mph).

TRANSIT VEHICLE EMISSIONS

Emissions from road transportation comprise 40% of greenhouse gas (GHG) emissions in the city of Seattle. Figure 4-20 lists total and per vehicle-mile emissions for cars and light trucks, buses, and vanpools within Seattle, based on a 2008 inventory. Emissions from cars and light trucks are the largest source of road emissions in the city (slightly more than commercial trucks) and increased by 6% from 1990 to 2000. Emissions from buses and vanpools in the city are a small share of the total but increased by 38% over the same period. Although not listed in the inventory, GHG emissions from Seattle's electric-powered modes—trolley buses and streetcars as of 2008 are included in the table. Electricity generated in Seattle is among the cleanest of U.S. cities; only 3% of Seattle City Light power generation comes from fossil fuels, for which the city purchases carbon offsets. This makes electric-powered bus and rail environmentally-friendly and also helps insulate Seattle transit providers from fluctuations in diesel fuel prices. However, only about 5% of passenger miles on transit in the Seattle region were provided by electric trolley buses or rail in 2008, although this share will increase with continued implementation of the planned Link light rail system.

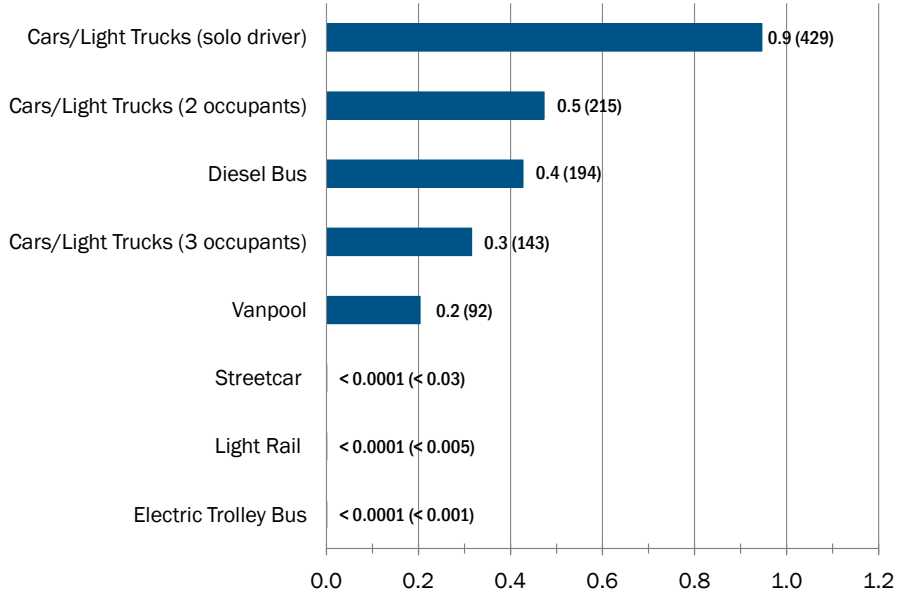
Based on data and travel estimates for the city or the region, Figure 4-21 shows the level of GHG emissions per passenger-mile traveled, which depends on occupancy of passenger and transit vehicles. For cars and light trucks, emissions are shown for one-, two-, and three-occupant scenarios. Per passenger-mile emissions for diesel-powered buses fall between the level for two and three-occupant cars and light trucks, while emissions for electric trolley buses, streetcars, and light rail are negligible.

FIGURE 4-20 SEATTLE TRANSIT SERVICE GHG EMISSIONS

Vehicle	Vehicle Miles Traveled (1000s)	Total Emissions (MgCO2e)	Emissions Per Vehicle Mile		Sources /Notes
			gCO2e	Pounds CO2e	
Cars and Light Trucks	3,292,000	1,413,000	429.2	0.95	1
Buses (City of Seattle)	26,900	64,400	2390.8	5.27	1
Vanpool (City of Seattle)	1,200	587	487.1	1.07	1
KC Metro Trolley Bus	2,900	0.29	0.1	0.00	2
South Lake Union Streetcar	57	0.01	0.2	0.00	2
Central Link	1131	0.09	0.1	0.00	3

Sources/Notes: (1) City of Seattle, 2008 Seattle Community Greenhouse Gas Inventory, http://www.seattle.gov/archive/climate. (2) Calculated from 2008 National Transit Database based on electricity emissions factors from City of Seattle GHG Inventory. (3) Calculated from 2009 National Transit Database based on electricity emissions factors from City of Seattle GHG Inventory.

FIGURE 4-21 GHG EMISSIONS PER PASSENGER MILE



Emissions per passenger mile depend on occupancy of cars and light trucks and transit vehicles. Based on total passenger miles traveled on King County Metro buses in the Seattle region in 2008, emissions per passenger mile for Metro buses are lower than average emissions for passenger vehicles (assuming one or two occupants) but higher than three-occupant passenger vehicles, vanpools, and electric-powered transit vehicles.

Source: Calculated based on City of Seattle Greenhouse Gas Inventory (2008) and National Transit Database (2008; 2009 for light rail/Central Link). Vehicle miles traveled for cars and trucks are based on SDOT traffic modeling and are shown in different occupancy scenarios. Transit passenger miles traveled are based on agency reporting to the National Transit Database.

TRANSIT PERFORMANCE SUMMARY

Despite the challenges affecting transit in Seattle, transit ridership in the city is nearly double the regional level on a per-capita basis, and Seattle transit ridership comprises nearly two-thirds of King County Metro ridership. Bus routes in Seattle average higher productivity than those in other areas of the system, as measured in the number of riders per hour, and there are highly productive routes during both peak commute hours and off-peak hours. All-day bus routes on dense urban corridors with strong demand in both directions are generally the most cost-efficient to operate.

Performance measures for the UVTN, the city's core network of transit corridors, provide a customer-centric view of transit performance across providers and routes. The measures of passenger experience on UVTN corridors include:

- **Transit travel speed**. The most significant travel speed issues are in the City Center (including cross-town corridors) and on corridors linking inner neighborhoods to downtown. Both north and south of downtown, significant travel speed issues are present on cross-town corridors and north-south corridors coming into the city.
- **Travel time reliability**. Travel times are highly variable on many of the same corridor segments where travel speeds are problematic, indicating a need for transit priority measures.
- **Passenger loading**. Buses are overloaded on a number of corridors despite frequent peak service.

Scheduled transit travel times on bus routes from Seattle's neighborhoods to downtown or across town are slower, on average, than regional bus trips into Seattle. Central Link provides relatively fast travel times into downtown and may alleviate passenger loading issues on parallel corridors.

Transit modes powered by electricity, including trolley buses, Seattle Streetcar, and Central Link, are nearly carbon-neutral given Seattle City Light's high share of renewable energy sources. However, even diesel-powered King County Metro buses have lower per passenger-mile emissions than two-occupant vehicles, though more than three-occupant vehicles or vanpools.