



Chapter 2. Framework for Mobility and Growth

Rail Transit's Contribution to Downtown Mobility

The Monorail Green Line and Sound Transit's Central Link LRT will be the beginning of a transition to high-capacity modes. Combined with the regional ferry access at Colman Dock, these services will form the backbone of circulation in the corridors that they serve.

This study takes these projects as a given, but it is important to review their role within downtown and the region:

- The Central Link LRT will run from Westlake station downtown through the bus tunnel and the existing busway (equivalent to 5th Avenue South) to a stop at Lander, then tunnel under Beacon Hill and run the length of the Rainier Valley via Martin Luther King, Jr. Blvd. The final part of the route uses Pacific Highway through Tukwila to end at South 154th St., where shuttle buses will serve SeaTac Airport terminals and other City of SeaTac destinations. While a much more extensive network is planned, only this southern line is funded for completion within the period of this study (to 2010).
- The Monorail's Green Line will run from West Seattle to downtown, passing through downtown via 2nd Avenue, Stewart, 5th to Seattle Center. It then continues west across Lower Queen Anne on Harrison and turns north to serve the 15th Avenue NW corridor as far as NW 85th St. This system, too, is envisioned as the starter line for a much larger network, but only the Green Line is funded, and only this line can be expected to be in place by 2010.
- These are the only two modes that can be called "rail rapid transit," in the sense that they provide high-frequency, high-speed service all day.¹ In addition, of course, there are low-frequency, specialized commute services, notably Sounder, but these, like the ferries, are for regional access to the city, not for circulation within it. Streetcars are frequent rail services, but they are not designed for speed and cannot be called "rail rapid transit," although they are an important part of the local circulation system.

Obviously, the currently funded rail network is incomplete. It does not serve the city's "second downtown," the University District, nor does it serve the largest non-downtown commercial node in the city, Northgate. These are all priorities for Sound Transit, but will depend on voter authorization of new or extended taxes, just as any further Monorail growth will.

Many key destinations of greatest importance to the Center City may not receive rail transit service even if future funding sources are found. Of the many alternatives now under consideration for the northern extension of Sound Transit's Central Link LRT line, only one serves the huge concentration of employment at First Hill, and only two serve Capitol Hill, while the cheapest alternative bypasses both. Many of the dense areas east of downtown do not have rail transit in their immediate futures. No frequent rail transit is funded anywhere north of the Ship Canal except for the Monorail on 15th Avenue NW. Many major urban corridors, then, will continue to need high-intensity bus transit into the Center City for the foreseeable future.

Role of the Bus in Downtown Mobility

Some people view bus services as an inferior mode, and many understandably dislike the noise and vibration of conventional diesel buses. However, the reality today is that Seattle relies on an intensive bus system for circulation within and among its densest core neighborhoods. Any mobility plan that will meet the growing demands for transit in the foreseeable future will continue to rely on buses for a large share of the market.

Buses Are Not an Interim Step

It is tempting to see bus service as a necessary interim step pending new rail services. The fact is, though, that demand for bus service does not shrink as rail grows. Some bus service can be redeployed as feeder service to rail, so that it has less impact on the Central City, but other local demand within the Central City will take its place. The cities that come most often to mind as having thorough rail transit systems, such as New York, Paris, and London, all have surface bus systems operating at very high frequencies supplementing the rail service, including high volumes of service penetrating the densest parts of the urban core.

Why would someone ride a bus in Midtown Manhattan or the core of Paris? In some cases, the answer is fares. Some cities have different fare structures for bus and rail, often creating a time versus cost tradeoff for the rider. This creates the need or duplicative service to satisfy those who prefer a faster trip and those who prefer a lower cost -- often with the result that the whole system is more expensive to operate than if fares were all the same. Certainly, if the Seattle Monorail Project chooses to charge a higher fare than King County Metro, or if the two agencies do not provide free or low-cost transfers, the need for duplicative service will result, to the detriment of both agencies.

However, even when fares are fully integrated, surface bus service continues to thrive alongside rail in dense urban cores. There are several reasons for this:

- Frequent buses are better than rail at serving short trips within dense urban fabric. A trip of 1/2 mile is likely to be faster in a local bus -- even one mixing with traffic -- than in a subway or elevated line, because the latter take more time to access from the street.
- Buses are easier to use spontaneously. Making a short trip within the downtown, you can walk toward your destination and catch a bus if it overtakes you. Some people even decide to make certain quick trips, such as for lunch, because they happen to see the appropriate bus coming.
- Buses can serve more destinations because they do not require complete new rights-of-way to be constructed for them, as most rail transit projects do.

The best evidence of the insatiable market for bus transit is the 1997 fare-policy change in New York City. Prior to the change, the city's bus and rail systems did not offer free transfers between each other. As a result, passengers tended to walk to their nearest subway station. When free transfers were instituted in 1997, the result was a 14% increase in bus ridership in one year, as well as a 4% increase in rail ridership.¹ Of course, the result was also a tremendous increase in overall mobility. Ridership growth occurred not just on bus routes in the outer boroughs that served areas with no subway service. It also occurred on routes running right on top of subway lines in the densest parts of Manhattan.

Even as it expands other transit modes, then, Seattle must expect a continued demand for bus transit. For example, the North Link extension to Northgate will replace two major express bus corridors, but it will also draw new ridership to the overall transit system, including downtown buses. Given the expected growth in downtown demand due to development, the overall need for bus service downtown may not decline substantially even when North Link is complete.

¹ Source: http://www.nymtc.org/files/transportation_statistics/tr-2001.pdf

² A wireless bus without noise or emissions will probably require "fuel cell" technology, which is still in early stages of development for cars and will take even longer to perfect for heavier vehicles such as buses.

Bus Service Quality Needs

Seattle’s downtown bus transit network has three major deficiencies, all of which must be addressed in order to meet the city’s goals for transit use. In general downtown bus service is ...

- **slow.** Some major segments are operating at barely above 4 miles per hour -- a brisk walking pace for many adults.
- **confusing.** There are literally hundreds of separate routings that a bus may follow through downtown. Despite considerable efforts in mapping it is often hard to figure out what a given bus is going to do, or whether it might be useful.
- **inadequate to future demand.** Even when the first LRT line and the Monorail are open, the number of buses moving through downtown in a given hour will continue to rise.

This chapter considers each of these problems in turn, with emphasis on the last. In many ways, the growth in downtown bus demand is the most urgent issue that makes a reinvention of downtown bus operations unavoidable.

Bus Service is Slow

Most transit systems in congested and growing urban areas are very gradually slowing down, typically by about 1% a year. This is just gradual enough that it never becomes a political problem -- as it might be, for example, if bus travel times jumped by 10% in any one year after being flat for a decade.

The problem is severe enough in King County that Metro has a department of Speed and Reliability, devoted to finding solutions to these problems. The causes of this gradual slowing are all present in the downtown, including:

- stop spacing
- signal delays
- traffic congestion

One common cause of delay that is not a major factor in downtown Seattle is the time required for fare collection. King County Metro uses a "pay as you leave" policy on all buses heading away from downtown. This permits downtown operations to board passengers at all doors. As new low-floor buses with wider doors improve boarding speed, this advantage will increase slightly.³ The new smart card technology for fare payment holds considerable promise to allow a free-fare zone and rear door boarding/alighting, within a zone fare system.

Figure 2-1 below shows average speeds for several downtown street segments with heavy bus service. In many cases, bus service is barely faster than walking.

Transit speed is a problem for two reasons:

- it is a disincentive to transit use as opposed to driving, especially for intra-downtown trips.
- It increases the cost of transit service, since the cost is a function of how long it takes to run the length of a route.

Finally, it is important to emphasize that the speed problem is about delay, not about top operating speed. Transit does not need to operate faster than the downtown speed limit, but it does need to be able to operate closer to that limit and spend less time stopping and starting, especially for obstructions related to auto traffic.

An important step in attacking the operating speed problem is to establish policies for acceptable minimum operating speeds for local surface transit. These should become part of the street classification system, and can be tied to different classifications of street. They can be expressed either as a percentage of the street’s speed limit (typically 40% or so) or they can be expressed as absolute numbers. For example, based on the strategies outlined in the next section, it should be possible to achieve and maintain an average speed of 9 mph over any half-mile segment of the downtown street network, with the possible exception of 1st Avenue.

Figure 2-1: Average Bus Operating Speeds On Key Downtown Streets

Avenue / Street	Segment	Average Local Transit Operating Speed (Miles/Hour)			
		6-9 AM	9 AM - 12	12-3 PM	3-6 PM
NORTHBOUND	1st Ave Jackson to Union	7.26	6.90	6.68	6.15
	Union to Denny	8.88	8.62	8.32	7.52
	3rd Ave Washington to Union	5.41	5.65	5.25	4.57
	Union to Olive	6.90	6.42	6.20	5.05
	4th Ave Jackson to Union	8.71	8.67	8.44	7.53
	Union to Olive	6.74	7.55	8.20	6.07
Pike St 1st to 4th*		5.93	5.20	4.63	4.58
SOUTHBOUND	1st Ave Denny to Union	9.13	8.57	7.90	7.93
	Union to Jackson	7.60	7.05	6.64	6.04
	2nd Ave Pike to Jackson	8.51	7.88	7.34	6.40
	3rd Ave Stewart to Union	7.96	7.45	7.15	6.04
	Union to Jackson				5.20
	Pine St 5th to 1st*		6.22	5.57	5.30

* These times include operation on 1st south to/from Union, the next available timepoint, but are indicative of congestion impacts in the Westlake and Pike Market areas.

³ To be fair, the "pay as you leave" policy is controversial and not widely used in the industry. Its problem in the Seattle region is that many stops outside of downtown Seattle are as busy as a downtown Seattle stop, and in the afternoon, this can produce long queues within the bus as passengers wait to exit past the farebox. It is also intrinsically harder to enforce fares if they are to be collected after the service is provided. Still, King County Metro cannot afford to return to a "pay as you board" system downtown. The next step would likely be a "proof of payment" system, in which passengers can board by any door at any time, but may be required to show proof of payment to a fare inspector. This system is routine on most light rail systems. Converting to "proof of payment" is costly -- the speed improvements that result are valuable, but the resulting operating cost savings are not great enough to pay for a new workforce of fare inspectors. Still, this investment may be appropriate at some point in the future.

Bus Service is Confusing

The 1998 *Downtown Circulation Study* was the city’s first major effort to work with King County Metro to make downtown transit service more understandable and thus more useful to the public. That study observed that "the current downtown transit network is extremely difficult to understand and to use. Our assessment is somewhat surprising given that downtown Seattle consumes over 30% of King County Metro Transit’s operating hours."⁴ That study also pinpointed one of the main sources of the problem: "Many transit routes turn several times within the downtown area. This negatively impacts travel times [because turning usually takes longer than going straight] and confuses riders who expect to be carried along the entire length of a corridor. It creates a downtown transit network that is so confusing that Metro does not map it."

The study led to some improvements in downtown routings, but the system is still extremely confusing. Metro now provides a map of routes that are considered useful for intra-downtown travel, but this map shows only routes that *each* run every 20 minutes or better all day and run well into the evening. Most of the bus routes going through downtown do not meet this standard, though if their routings were consolidated on fewer streets, the result would be a combined service that *does* meet this standard, or at least comes closer to it.

Figure 2-3 on the next page shows the existing all-day transit routings within the downtown, showing all routes that run every 30 minutes or better all day. This map conveys both the high quantity of resources devoted to downtown and the difficulty of figuring it out. For example, some services heading into town on Pine turn left on 3rd, others turn left on 1st, and still others terminate at 2nd. By contrast, if all the buses on Pine went through to 1st, the combined frequency would be so great that it would be easy to transfer to a bus on 3rd if

that was your destination, and it would also be possible to clearly present Pine Street service as a direct corridor where every bus is going through to Pike Place Market.

The recommended transit framework, presented in the next section, echoes the recommendations of the 1998 study, as well as the experience of other cities such as Portland that have achieved a much simpler downtown route structure. Even San Francisco, with all its complexity, can draw all transit services on one map that is intricate but legible. Seattle should demand no less.

Bus Service Demand is Growing

Despite the growth in rail modes, bus service within the downtown will need to continue to expand in the long term. The case for this can be seen in the Figure 2-2 below. This calculation requires many assumptions, and these are outlined in the Appendices. The estimates for future transit trips by bus attempt to strike a balance between possible revisions that would push the total bus needs up and those that would push them down.

But the bottom line remains that a decade from now, with two major rail transit projects completed and 120 buses returned to the transit tunnel, there will be more buses on the streets of downtown Seattle than there will be when the transit tunnel is closed for rail reconstruction. For this reason, the recommended transit network presented in this chapter considers the Downtown Transit Tunnel Closure Mitigation surface improvements as a first step, and makes many of its recommendations permanent.

Figure 2-2: Downtown Peak Hour Bus Needs

How Many Buses Are Needed in Downtown in 2015?

City policies and modeling call for only a modest increase in vehicle trips in and to downtown. This means transit must carry most of the forecasted growth in person trips. We estimated the number of peak hour buses needed in downtown in 2015 above and beyond the current number of 600-625, even with completion of the four funded rail projects. A “Minimal” estimate assumes these modes are at full capacity; a “Projected” estimate is based on ridership projections. The estimate is summarized below and shown in detail in Appendix A. Essentially, the estimate shows that the bus tunnel and the streets of the Center City will probably need to be able to carry over 900 buses in the peak hour in 2015. Surface needs are based on the ability of the bus tunnel to carry 120 buses per hour in joint operations with Central Link.

New Transit Trips per Day (2015 vs. 2002)	162,000	
Amount in Peak Hour	24,300	
Number Accommodated by Non-Bus Modes	Ridership	Capacity
Monorail	3,700	5,400
Central Link (LRT)	3,100	3,300
S. Lake Union Streetcar	400	1,100
Sounder Commuter Rail	3,500	4,700
Total New Peak Hour Transit Trips by Non-Bus Modes	10,700	14,500
Remaining Transit Trips to Be Accommodated by Bus	13,600	9,800
Passengers per Bus Trip	40	
Bus Vehicle Trip Needs	Projected	Minimal
New Bus Trips Needed, Peak Hour	340	245
Total Bus Trips Needed, Peak Hour	955	860
Total Surface Bus Trips Needed, Peak Hour	835	740

A decade from now, with two major rail transit projects completed ... there will be more buses on the streets of downtown Seattle than there will be when the transit tunnel is closed for rail reconstruction.

⁴ *Downtown Circulation Study Advisory Group Recommendations*, SDOT PPM, November 1998, available at www.cityofseattle.net/transportation/dcshome.htm

Transit Framework

A framework for accommodating Seattle's growth in 2015 is shown in Figure 2-4.

This Framework builds from Seattle's existing assets and follows lessons from comparable cities. It comprises the following key, high-frequency elements:

- **Monorail** connects downtown to Queen Anne, Ballard, and West Seattle. It is a critical component of the overall network, but it does not serve all areas of the city.
- **Light Rail** connects downtown to Rainier Valley and Tukwila.
- **Bus transit** will continue to be the workhorse of the overall transit system, given the limitations of monorail and rail transit. This Framework significantly rearranges the bus network to become more legible and useful. It creates 10 primary radial corridors that serve the new downtown "Transit Spine" (see below). Each of these radial corridors will have peak-hour frequencies of 7 minutes or better so that waiting passengers can usually see the next bus coming. In order to implement these corridors, transit prioritization treatments, and in some cases dedicated lanes, will be necessary, particularly as the bus routes cross the "bottleneck ring" around the edges of downtown.
- **Streetcars**, discussed in the next section, will provide an especially attractive service to support development and tourism.

In order to accommodate the growth needs of the Central City, the proposed bus network meets the following criteria:

- Bus frequencies and capacities are sized to meet travel demands unmet by other modes.
- Network is simple and easy to understand, both for intra-downtown trips as well as trips throughout the rest of the city.
- Bus travel times are protected in key locations to maintain excellent frequency, travel time and reliability, as defined by adopted standards.
- Bus service is clearly integrated into Tunnel, light rail, Monorail and Sounder services.

The core of the network is a Transit Spine along 3rd Avenue that also spills over onto 2nd and 4th at peak. Neighborhood corridors radiate out from the Transit Spine like fingers, combining together various existing routes into more easily understood corridors. Several of these key corridors are described below:

The Transit Spine and other North-South Buses

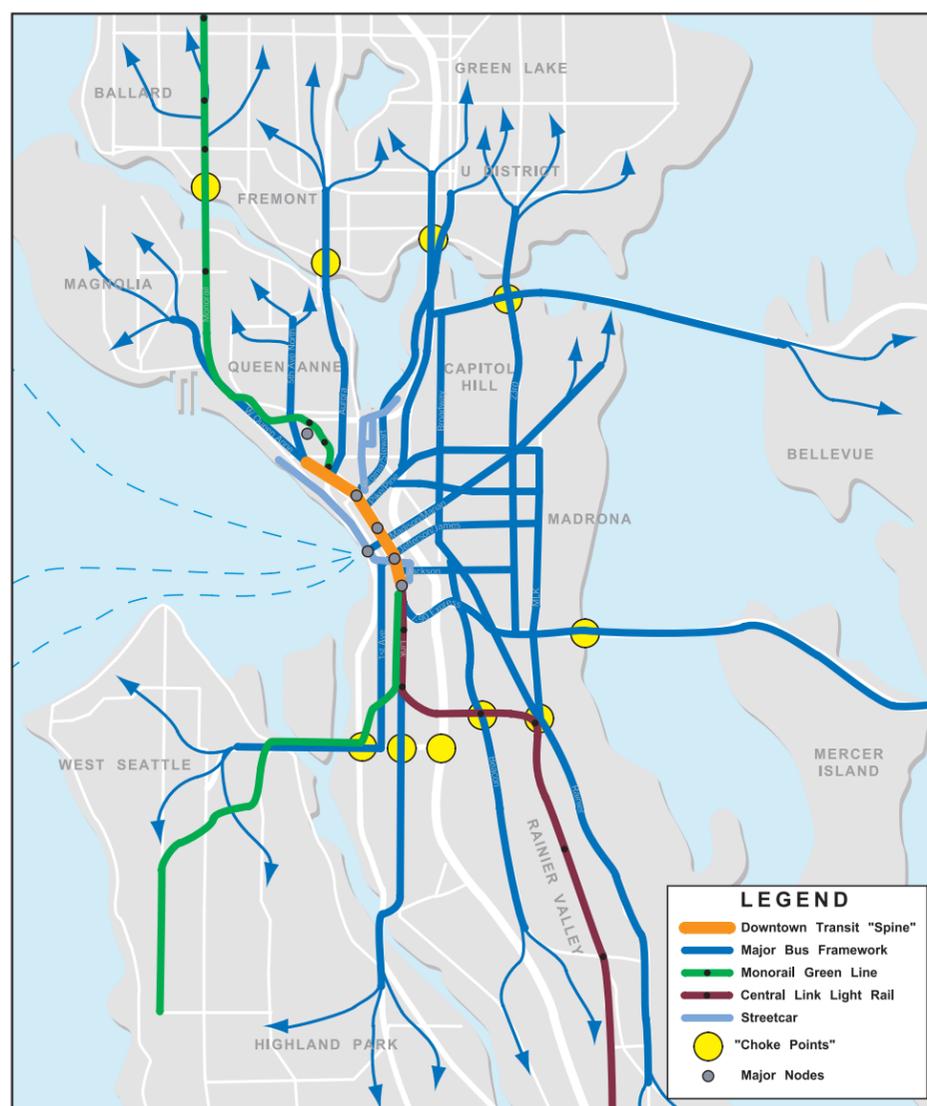
- **Third Avenue Transit Spine.** Most north-south transit is pulled together in the center of downtown along a 3rd Avenue Transit Spine. This street is the primary organizing element of the system, and the street most people will go to when they need to catch a bus or a train to somewhere else. It builds off of the existing bus/light rail tunnel and most of the city's existing bus service.

Third Avenue is within a quarter mile walk of almost all of downtown and it is roughly at downtown's median elevation. As a result, it is the perfect alignment for most of downtown Seattle's all-day north-south routes. For passengers needing to go north or south within downtown, 3rd Avenue is where they'll always see the next bus coming, with headways less than a minute apart most of the day.

Just as importantly, 3rd Avenue will be converted for primarily transit-only use during the tunnel retrofit. Once the retrofit is complete, the street is intended to revert back to its existing configuration. According to Seattle's growth projections, however, 3rd Avenue's transit-only configuration will soon be necessary – even with Monorail and light rail – just to accommodate the projected travel needs. The city should consider studying the operations of the street during the tunnel retrofit very carefully, and consider keeping the plan in place after the retrofit is complete.

- **Second and Fourth Avenue Regional Express and Peak Service.** Even with four transit-only lanes on 3rd, there will not be enough capacity on that street for all the projected travel demand during the peak periods. As a result, peak-hour transit only lanes will be needed on 2nd and 4th Avenues in order to provide "spillover" capacity from 3rd. Because they will remain one-way with synchronized traffic lights, 2nd and 4th will also be useful for express buses that have limited stops downtown.
- **First Avenue.** Because of its lower elevation and intense retail nature, and its role in linking many major tourist and recreational destinations, 1st Avenue will need to retain transit service. Given the nature of the street, discussed further in Chapter 3, this service will be slower and less frequent than service on 3rd. Trolley buses appear to be the best means of providing this service given technologies that can be visualized today, though this would require adding trolley wire on 1st between Lenora and Broad. *One Streetcar scenario, discussed in the next section, could eliminate the need for a First Avenue service by providing a continuous streetcar line along either First or Western, connecting to Seattle Center in the north and International District station in the south.*

Figure 2-4: Transit Framework at Citywide Scale



The proposed Transit Framework works at the citywide scale as well as the downtown scale.

Figure 2-5: Frequent Transit Network and Facilities, 2010-15



Aurora Bus Rapid Transit

Aurora BRT would feed directly into the Transit Spine. Aurora BRT is presumed to make few if any stops between Denny and the Ship Canal, with upgraded Dexter Avenue and East Queen Anne lines providing the main local service for this segment.

Radial Routes: 10 Key "Fingers"

- **Ballard/Magnolia** local lines would come together on Western Avenue then feed into the Transit Spine. Transit prioritization treatments would be applied as appropriate, particularly at Denny. Service on this specific finger will be looked at through bus service restructuring associated with the monorail.
- **West Queen Anne** lines would come together at Denny and feed into the Transit Spine. Transit prioritization treatments would be applied as appropriate, particularly at Denny.
- **East Queen Anne** lines would come together on 5th Avenue and feed into the Transit Spine. Transit prioritization treatments would be applied as appropriate, particularly at Denny.
- **Dexter** local bus service frequencies would be improved, and this line would feed into the transit spine. Transit priority would be needed at Denny.
- **Virginia/Stewart, continuing as Fairview** is a radial corridor that crosses the Transit Spine, turning around at 1st Avenue. This corridor continues to the U District. Transit-only lanes would be provided between John Street and 1st Avenue. The current trolley route 70 would be shifted to this east-west alignment only when express service between the downtown transit tunnel and the University is available at all hours, as it needs to be. This route would also serve the 5th & Stewart monorail station. This east-west routing allows the Transit Spine to be used to its fullest possible extent, with no buses turning on or off anywhere between Blanchard and James.
- **Pike/Pine.** This radial route pulls together frequent routes serving Capitol Hill, the U District via 23rd Avenue, and Pine Street/15th Avenue out to Volunteer Park. If Madison Park continues to be served with diesel buses, they would also go this way. Transit-only lanes would be completed on this corridor between 1st Avenue and I-5. All service would turn back at 1st Avenue and layover no further east than 2nd Avenue
- **Madison/Marion** runs from Colman Dock's pedestrian bridge via Madison/Marion and Madison to First Hill and Madrona. The Madison corridor is one of Seattle's fast growing corridors for both multi-family and commercial development. (If trolley bus service can be restored to Madison Park, it would permit the creation of a simple line running all the way across the city on Madison; this is the kind of simplicity that makes a system easy to use and to remember.) Trolley wires would be extended to Western so that buses could turn around by operating west on Madison past 1st, south on Western, east on 2nd. Colman Dock stops would be westbound Madison far side of 1st for arriving buses, and eastbound Marion nearside of 1st for arriving buses, each stop connecting with a pedestrian bridge into the dock's passenger level. Transit-only lanes would be provided between Broadway and Western Ave.
- **James-Jefferson** ties into the Transit Spine and serves Judkins Park and Madrona via Jefferson. King County Metro should also study the possibility of changing this routing between 3rd and 9th Avenues to use Yesler Way instead of James. While this would require moving trolley wire, and would be a longer route, it would

be much easier to operate reliably, since buses would not be tangling with freeway traffic at the James Street ramps.

- **Yesler Way** ties into the Transit Spine and connects to Colman Park. This street is particularly underserved today, given its convenient crossing of the freeway far from an interchange.
- **Jackson** service to Mt. Baker could operate crosstown from Terminal 46, but would initially operate out of the Transit Spine. Currently, Jackson is a street with frequent service (two ten-minute routes in addition to Route 14 to Mt. Baker. About 80% are trolley buses.

All-Day Frequent Express Routes

All-day frequent express routes provide the main connections between Seattle and the region, and also to areas of northeast Seattle that will not have rapid transit by 2010. Designed to serve all types of trips, not just commuter, these routes combine with rail transit to form the backbone of the regional transit network.

Seattle should support King County Metro's current intention that the buses operating in the transit tunnel, in joint operation with light rail, should be high-frequency express services, *not* peak-only services. This strategy maximizes the use of the tunnel all day and evening, thus making the most of this major capital facility. It also retains, in the tunnel, the services most likely to be replaced by future light rail expansions.

The following services would run into the tunnel. All others would feed into the Transit Spine.

- **I-5 North** expresses to the U-District and to Northgate, with some services continuing locally to serve NE Seattle.
- **SR 520** express lines to South Kirkland, with branches serving Kirkland, Juanita, Overlake, and Redmond.
- **I-90** express lines to Bellevue and to Issaquah, both with Mercer Island flyer stops.
- **I-5 South** expresses from SeaTac and Renton (these would share the E-3 transitway with LRT)

New or Improved Local Routes

Finally, three major intra-neighborhood routes are proposed so that trips among Seattle's core neighborhoods do not have to go via downtown. These include:

- **Denny**, connecting Seattle Center and Capitol Hill. This is the current Route 8, but at a much-improved frequency. Current service is too infrequent to be useful for the short trips in this corridor. Current services continues as the ML King crosstown.
- **Broadway**, connecting the U-District, Capitol Hill, First Hill, and an LRT connection in Rainier Valley. This is the existing Route 9, which we strongly recommend retaining at high frequency at least between the U-District and McClellan.
- **Mercer**, connecting Queen Anne, South Lake Union and Capitol Hill. This new route would strengthen the developing South Lake Union area by providing more direct east-west access using the most direct available arterial streets. *Mercer Street must continue to connect through to Eastlake to make this movement possible.* Because of the grades climbing Capitol Hill on this route, this will need to be a trolley bus. It is certainly a lower priority than the two existing connections above, but will become more important as South Lake Union redevelops.

Streetcars

Overview

Streetcars are on-street rail services operating either in mixed traffic or sometimes in separate rights of way. Unlike "rapid transit" services such as light rail or the Monorail, streetcars are not intended to be much faster than local buses. When in mixed traffic, in fact, they can be slower and less reliable than a bus operating the same route with the same preferential treatments, because they cannot maneuver around obstacles, such as vehicles double-parked or making parallel-parking movements, in the way that a bus can.

Nevertheless, streetcars are attractive in redeveloping areas because of their value as permanent physical amenities, and also because their "look and feel," including the quality of the ride, is superior to that of buses. Streetcars will continue to have a role in Seattle's transportation picture, both as redevelopment tools (as in South Lake Union) and as amenities that support tourism and recreation (as on the Waterfront)

Historic vs. Modern Streetcars

Seattle's historic waterfront streetcar, while a valuable tourist attraction, is currently of limited utility for meeting downtown's major transportation needs. Short trips require frequent service if transit is to be faster than driving, and the 20 minute frequency of the waterfront line, which is fixed by the limited passing tracks, does not meet this need. The historic vehicles are also operated in the historic manner, with two employees on each car, which makes them exceptionally expensive for each hour of service.

The planned South Lake Union streetcar will be a modern vehicle similar to what now operates in Portland, Oregon. It will have double-track for most of the route; one section may be built initially as single track, with the ability to add a second track as needed for frequency or expansion. It will operate in mixed traffic, which may affect travel time and reliability. *Policies are needed on the minimum operating speed of streetcars, just as they are for buses, in order to identify the point at which actions would need to be taken to protect streetcars from congestion.*

Streetcar Issues

In addition to policies on operating speed, several interrelated issues must be addressed by a streetcar plan. Figure 2-6 on the next page summarizes these issues.

- Whenever the Alaskan Way Viaduct project goes into construction, it will almost certainly shut down the Waterfront streetcar, possibly for years. Is this long shutdown acceptable, or should the streetcar be redesigned in a way that could continue to operate during the Viaduct work? Due to the capital costs involved, this would only be the case if a revised alignment continues to make sense after the Viaduct replacement is done. One alternative alignment south of Union would be to use Western, Yesler, and Occidental to Main, with continuous double-track in mixed traffic, and on a special right-of-way through the pedestrian precinct along Occidental.
- If the streetcar remains on the waterfront, what will it look like when the Viaduct project is complete? At least south of Union, the Viaduct project will have to rebuild the streetcar line in any case. For the streetcar to operate frequently enough to be useful, this segment must be double-tracked and protected from traffic. The latter is especially important at and south of Colman Dock, where any intersection with ferry traffic would hopelessly disrupt streetcar reliability.

- For what frequencies should the streetcar network be designed? We recommend designing for headways as close as five minutes, and planning for 7.5 minute headways on the trunk segment between Union and International District Station, which requires continuous double-track. There are several options for branches at both the north and south ends of this segment, each of which would operate at 15 minute headways – possible on single track with sidings.
- Is it desirable to connect the South Lake Union and Waterfront alignments, and if so, is it physically possible? The benefits could include shared maintenance facilities and fleet, reducing the need for spares and generally achieving economies of scale.
- What extensions and branches should be considered? Popular ideas include:
 - East via King or Jackson through the International District to Rainier Avenue. This would be a logical extension of the Waterfront line.
 - Into Terminal 46 redevelopment. This could be a branch of the Waterfront line, but Terminal 46 is likely to generate higher ridership via a direct connection to International District station, rather than continuous along the waterfront.
 - Into the stadium areas. This could be useful for event-specific high-volume service between the stadiums and Colman Dock ferries, timed to the ferries and the events. This would need to be studied more closely to look if capacity is available to handle this type of service.
 - North along Alaskan Way beyond Broad Street into Interbay.
 - North along Fairview and Eastlake from the currently planned terminus of the South Lake Union line, possibly ultimately to the U-District.



The Waterfront Streetcar Line

Figure 2-6: Streetcar Options, 2010-2015



Some Possible Configurations

As noted above, the trunk waterfront streetcar segment between Union and International District station could operate either:

- Via the current alignment, or
- Via Western, Yesler, Occidental, Main, and the current alignment.

In either case, the route could branch at Union, with 7.5 minute frequencies on the trunk and 15-minute service on each branch. One branch would continue north along Alaskan Way to Broad St. or beyond. The other would climb the hill via Western Avenue, shifting over to 1st between Blanchard and Battery. From there, numerous options exist for a routing that would continue northeast and connect with the South Lake Union line at some point, providing continuous service between the Center City's "two waterfronts." The routing shown on our map uses Battery, but this requires detailed study in relationship to the Aurora and Viaduct projects as well as other Belltown and South Lake Union development issues.

Finally, one permutation of streetcar options has the potential to eliminate the need for 1st Avenue local bus service. This would require that the trunkline be on Western, not Alaskan, between Union and Yesler. The Western Avenue branch north of Union would still shift into 1st at Blanchard/Bell but then continue north on 1st into Lower Queen Anne, then turn east and reach South Lake Union via Mercer or Roy. This option is not consistent with current plans for Mercer Street or Aurora crossings, but it does have the value of eliminating the need for local bus service on 1st Avenue, since Western is close to 1st while also being close enough to Alaskan to replace the Waterfront service south of Union. A branch could still serve Alaskan north of Union, and any number of branching options are possible at the south end.

The primary recommendation regarding streetcars is that the city conduct a comprehensive study of potential streetcar corridors, including an integrated streetcar system. Such a study would consider:

- An overarching vision for the streetcar system that identifies its mission and its relationship to other transit modes.
- Policies determining what makes a good streetcar alignment, as opposed to bus service alignment, and what minimum operating speeds must be achievable for a streetcar to be workable.
- A study of all of the alignment issues outlined above.

Bicycles

Bicycles are key components of any urban transportation system, though they are often given the "leftover" space once cars and transit have been accommodated. The needs of bicyclists in Seattle are discussed conceptually below, with specific street recommendations in the subsequent section of this report.



Adding cycling facilities in downtown will increase bicycle commuting

Bicycle Network

Despite its rainy weather and challenging topography, Seattle is well situated to be one of the best bicycling cities in the country. Seattle, like Vancouver, Portland and San Francisco, developed along its streetcar lines. Streetcars tend to be limited to gentle grades and so do bicycles. While many of its streets are too steep for casual cyclists to ride, nearly every neighborhood in the city is accessible by an easily bikeable route that follows the old streetcar network, abandoned railroad rights-of ways, and other through streets.

Most of these streetcar routes are identifiable as the downtown and neighborhood commercial streets, such as Pine Street and Broadway. As a result, they are often the streets most in demand for transit service, auto traffic and auto parking. The challenge in Seattle is how to create space for bikes while balancing the needs for the other modes.

With the exception of some college towns such as Eugene, OR, and Davis and Palo Alto, CA, bicycling is often overlooked as a means of everyday transportation and congestion relief in the United States. European cities with tighter roadway capacity constraints (and worse weather), such as Amsterdam and Copenhagen, have had no choice but to invest in bicycle infrastructure as a primary means of moving people through the city. The experience of all of these cities offers valuable lessons for Seattle:

- The "design cyclist" should not be seen as a young and athletic person. In order for cycling to generate significant mode share, facilities must be designed with all potential users in mind. Some Dutch cities consider a middle-aged person with two sacks of groceries to be their "design cyclist."
- Potential cyclists who do not bike for everyday transportation are overwhelmingly clear on what it takes to get them to bike to work: First, and most importantly, a connected network of bike lanes and paths. A distant second is a secure place to store their bike on the trip end. Lastly is a place to shower and change clothes at the workplace.

² Discussed throughout the Federal Highway Administration's *National Bicycling and Walking Study*, particularly: Federal Highway Administration (Stewart A. Goldsmith). *Case Study No. 1: Reasons Why Bicycling and Walking Are Not Being Used More Extensively as Travel Modes*. National Bicycling and Walking Study, U.S. Department of Transportation (FHWA), Publication No. FHWA-PD-92-041.

- Significant mode shift occurs only when there is a reasonably complete **network** of bike lanes and paths connecting key neighborhoods and destinations throughout the city² This means that the benefits of individual bike lane projects may not be measurable until several projects are connected together. Seattle's Comprehensive Plan policies recognize this by emphasizing direct and continuous bicycle routes and prioritizing bike facilities in urban centers and other growth areas.
- In addition to bike lanes and paths, cities such as Palo Alto have experienced great success with their "bicycle boulevards," a network of narrow residential streets that have been traffic calmed. These streets have been designed so that motor vehicles travel at bike speeds, allowing bikes to use the full width of the roadway. Such designs would be especially valuable in Seattle neighborhoods such as Capitol Hill.

It is estimated that approximately half of Seattle residents own bicycles. However, an estimated 5-10% of the cyclists do 80% of the cycling. A focus should be placed on enhancing the bicycling network so that the next tier of bicycle owners become regular bicycle users.

In considering how to accommodate Seattle's downtown growth through its transit system, Seattle's potential bicycle network was also taken into account. The proposed network begins with Seattle's existing bike facilities, ties them together and adds new connections to major destinations downtown as well as all its surrounding neighborhoods. Appropriate wayfinding for bicycles should also be included in downtown bicycle planning. The complete network is shown in Figure 2-7. The following is a brief summary.

- **Maintain the 2nd Avenue bike lane and create a northbound pair on 4th Avenue.** The 2nd Avenue bike lanes work well and can be maintained even with the Monorail construction, unless the center alignment is chosen. On 2nd and 4th, we recommend a bus-only lane on the west-side curb and a bike lane on the east-side curb. If the Monorail goes on the east side of 2nd, parking can be maintained on the left curb, and this parking could be allowed 24 hours a day. If the Monorail goes on the west side, then the westerly sidewalk should be widened and no parking should be provided on 2nd. 4th Avenue would be the mirror image of 2nd, but it has more flexibility since it would not be the route of the Monorail.
- **Extend the Pine Street bike lanes to 1st.** Pine Street is extremely important for bicyclists, being the most level connection between downtown and all its eastern neighborhoods, including Capitol Hill and First Hill. The existing bike lanes should be extended, with a contra-flow bike lane where Pine becomes one-way.



Dexter Avenue's popular bike lane gets cyclists to the edge of the Center City

Figure 2-7: Bicycle & Pedestrian Framework



Completing this link will require more than striping, since some curbs will need to be moved to address the traffic needs at the freeway overpass and the varying curb-to-curb width between 1st and 8th Avenues.

- **Connect the Dexter lanes to 2nd and 4th,** using Blanchard and Bell - streets that have some additional traffic capacity. Based on a fall, 2000 count, almost 1,000 cyclists use the Dexter bike lanes on a daily basis.
- **Complete the Alaskan Way Trail.** There are several possibilities for creating a continuous waterfront bike-way, several of which are being studied by the Viaduct replacement project.
- **Consider a northbound bike lane on 1st.** The 1st Avenue right of way allows for a continuation of the landscaped median found on its Pioneer Square stretch, along with left-turn pockets to accommodate heavy left turn movements. With the median, enough right of way is left for a northbound bike lane that would provide a pair to the southbound bike lanes on 2nd. Given the grade difference between 2nd and 4th, a northbound lane on 1st would be highly valuable. The median would help 1st Avenue's role as the downtown "main street."
- **Create a southbound lane on 5th.** This would act as a pair to 4th, but it may be challenging to create given the freeway-access function of 5th.
- **Create uphill bike lanes on Spring and Cherry** to connect downtown and First Hill. These lanes can be accomplished within the existing right of way or by converting diagonal parking to parallel. No downhill lanes are appropriate given the high speeds cyclists reach in descent. The steep grades are likely to discourage all but the most dedicated bicyclists. For this reason, other segments should be prioritized over these lanes.
- **Use Thomas and Roy** to connect South Lake Union, Queen Anne Hill, Seattle Center and Belltown. Ensuring good bicycle and pedestrian connections across Aurora at Thomas and Roy will be important. Care must be taken on Thomas at the Seattle Center, which desires excellent bicycle access to its facilities, but does not want to be a major bicycle through-route. Another option to explore is Mercer. These recommendations should be further studied through the South Lake Union transportation study.
- **Add bike lanes to Melrose Avenue** from Roy Street to Pine Street. This route is already a popular and low traffic connection for bicyclists going from the U-District to downtown.
- **Complete the network south of Center City** by completing the I-90 Trail to the waterfront and to the 2nd and 4th Avenue lanes. This area will require more study, but Jackson Street could provide an excellent east-west route that would tie together many of the other good bike streets.



A waterfront bikeway would expand the reach of cycling and allow cyclists to take in the views of downtown

Pedestrian Environment

Almost all travelers -- whether motorists or transit users -- become pedestrians for the last leg of their trip. The pedestrian environment therefore has an powerful impact on the vitality of any downtown.

For the most part, downtown Seattle has an excellent pedestrian network. There are, however, some notable exceptions that merit attention:

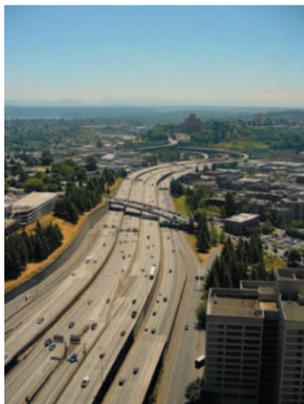
Crossing I-5

- **On- and off-ramps** between I-5 and downtown streets all suffer from tensions between the freeway-oriented *Highway Design Manual* and standards more applicable on complex, low-speed downtown streets. The city and WashDOT should work collaboratively to re-design this challenging transition zone, where motorists must change driving behaviors between urban and freeway. For example, where the ramps meet downtown streets, most of them still have design speeds well in excess of downtown speed limits. While the ramps likely meet all applicable standards, where there is a tension between pedestrian safety and a motorist striking a fixed object due to excessive speed, life-safety of pedestrians on downtown streets should take higher priority.
- **Pine** is one of the most important I-5 crossings, as it is the most level connection between Center City and most of Capital Hill and First Hill, along with Pike. Between Melrose and Terry, however, most of its right of way is given over to cars, with a narrow, unprotected sidewalk on the south side only. Pine should be prioritized for urban design treatments to make it more like parallel Pike.
- **Pike**, while better than Pine, still faces pedestrian barriers associated with the freeway ramps. A specific problem with the freeway ramp intersection on Pike Street is the high speed design of the ramps and the presence of pedestrian crossing pushbuttons at all legs of the crossing.



Long-term visions for Denny Way are more pedestrian and transit oriented

- **Denny**, like Pine, has no sidewalks on its north side. The sidewalks should be completed and the intersection at Stewart should be made more pedestrian friendly.
- **Olive** has a two-lane, high-speed HOV ramp with an uncontrolled pedestrian crossing. A push-button controlled pedestrian signal should be considered here also well as other pedestrian treatments.
- **Spring, Cherry and James** all have adequate right of way for pedestrians,



I-5 Limits the connectivity between City Center districts

but the walk across the freeway is unpleasant. It may be possible to add a cap over the freeway on either side of Spring, partially funded by joint development on the cap. At Cherry and James, continuous storefront development under the freeway would greatly enhance perceived personal safety.

Other Pedestrian Barriers

- **Aurora** remains a major barrier between South Lake Union, Queen Anne Hill and the Seattle Center. Improved crossings are being considered at Thomas, Mercer and Roy, and pedestrians should be accommodated in the new designs. Thomas in particular should be made an attractive pedestrian route all the way from Lower Queen Anne to South Lake Union.
- **Denny** suffers from its high traffic volumes and exceedingly complex intersections. Denny should be prioritized for improvements to minimize pedestrian crossing distances as well as countdown signals to assist pedestrians with multi-legged crossings.

Recommended Strategies throughout Center City

- **Pedestrian phase pushbuttons** should be removed in the downtown core where pedestrian activity is continuous or at least during active parts of the day.
- **Pedestrian crossing lights should be replaced with countdown signals**, with a focus on wider streets and those with higher pedestrian crash rates.
- **Crosswalks and stoplines should be rigorously maintained** in the Center City. A city program should systematically assess, prioritize and re-stripe pedestrian markings. While these types of programs appear minor on the surface, they work to both improve safety and communicate important messages for potential investors in downtown.
- **Improve accessibility** of the Center City by increasing the deployment of accessible pedestrian signals, upgrading curb ramps to appropriate grades, angles, and textures, and providing curb ramps where they are missing.
- **Provide buffers between pedestrians and traffic.** On-street parking often performs this function, but some of the recommended transit and bicycle improvements may require further elimination of on-street parking. In these cases, bollards or landscaped strips as little as three feet wide, including low shrubs and possibly also street trees, can provide the necessary buffering effect. This buffer would be interrupted at crosswalks and bus stops, but would otherwise have the effect of discouraging jaywalking.



Countdown signals provide useful information to crossing pedestrians



Truncated domes are an important wayfinding tool for visually impaired walkers

Policy Support

In order to accommodate its planned growth, the city must ensure that its transportation and land use plans, policies and performance measures are all compatible with one another, and that they support agreed-upon outcomes. Fortunately, the city's existing Comprehensive Plan, downtown neighborhood plans and Transportation Strategic Plan offer strong, consistent policy guidance in support of all of the recommendations of this document. While all the relevant policy language is in place, however, these plans lack specific implementation language necessary to ensure that policy translates into reality. Five areas needing further refinement include:

- Performance Measures
- Street Typology
- Parking Management and Requirements
- Bicycle and Pedestrian Plan
- Funding and Implementation Strategy

Each of these subjects is discussed in more detail below.

Existing Performance Measures

No matter how good its transportation planning efforts, they will not be successful unless the city measures the important outcomes it seeks. Since the post-War era, most cities have adopted Automobile Level of Service (LOS) as their primary transportation system performance measure. Auto LOS is highly useful since it is easy to measure, and it can effectively estimate a factor of great concern to most cities, auto congestion. At intersections, Auto LOS estimates the average seconds of delay a motor vehicle will experience. Most cities use a letter scale from A (less than 10 seconds of delay) to F (more than 80 seconds of delay), but other cities add additional letters (G, H) to denote further delay.

Similar measures are available for street segments in between intersections, using both a letter scale as well as a numerical volume-to-capacity (v/c) ratio. V/C ratios take the total number of vehicles on a given stretch of roadway and divide by the capacity of that road to handle cars. A v/c ratio of 0.80 or lower represents free-flow conditions, while a ratio of 1.20 represents very congested conditions.

While useful for estimating the effects of congestion on motorists, Auto LOS and v/c ratios do not offer the full picture of a transportation network in a place as complex as downtown Seattle. First, by focusing on spot locations, they say nothing about the ability of the overall transportation network's ability to carry traffic. For example, they do not allow planners to estimate actual average travel time among various destinations – travel time being the factor motorists care most about.

Secondly, and more importantly, these measures estimate delay only to *vehicles*, not *people*. A bus with 50 passengers on board is counted the same as an automobile with one passenger. In order to improve Auto LOS at a given intersection, for example, traffic engineers can remove bike lanes or transit priorities in order to give more accommodation for cars. The result may be that the intersection can handle more vehicles but fewer people. While this result may present short-term benefits for those who drive, it would contradict the city's goals for population and job growth. In the long-term, moreover, as the city grows, managing the transportation system with an exclusive focus on auto congestion paradoxically results in more auto congestion than a more balanced approach.

New Performance Measures

In order to avoid the unintended negative consequences of over-reliance on Auto-LOS and other vehicular measures,

we recommend that the city reexamine its objectives for the Center City and quantify specific outcomes it would like to see. It should then translate those objectives into performance indicators with several aims in mind:

- **Relate indicators to objectives.** The indicators should operationalize the city's Strategic Transportation Plan.
- **Minimize data collection costs.**
- **Retain a high-level focus.** While the indicators should encompass as many of the Strategic Transportation Plan objectives as possible, the number should be kept low to retain a high-level focus.
- **Ensure they are comprehensible to the public and policymakers.**

We recommend that the city adopt the following changes into its Comprehensive Plan and Transportation Strategic Plan, environmental compliance guidelines, congestion management program, and elsewhere as appropriate:

- Level of Service should reflect *person* delay rather than vehicle delay.
- Volume to Capacity ratios should examine *person* capacity rather than vehicle capacity.



Performance measures should assess how well we move people and goods, not vehicles

This simple word swap would have far-reaching consequences and should not be done lightly. First, vehicular performance can be measured with simple automated hose counts. Measuring person-based performance may require hand counts of bikes, transit passengers and/or pedestrians, a more costly and complex undertaking. Secondly, on streets with high transit volumes, transit passenger counts may so dwarf auto passenger counts that tiny reductions in transit delay might justify huge increases in auto delay. The city may wish to set some network-wide or street-specific minimum accommodation for cars in order to ensure an appropriate balance among modes. The city may also want to maintain Auto LOS as a secondary measure, with person-based measures primary. Seattle has established the policy basis for these performance measures in both its Comprehensive Plan Transportation Strategic Plan. For example, Strategy A3 of the Transportation Strategic Plan is to "Optimize the People-Moving Capacity of Existing Streets" (p. 70).

Some cities have adopted primary transportation performance measures that have more to do with quality of life than movement. Palo Alto's primary indicator is to ensure that total vehicles trips do not grow beyond 2000 levels. Trenton, NJ has indicators focused around economic development. London includes "public satisfaction," measured through regular polling, among its measures.

Some cities have also specified different performance measures for different types of streets, identifying primary auto streets where vehicular through traffic is given priority, neighborhood commercial streets, where on-street parking and pedestrian activity is given priority, and other designations. In Seattle, Transit Operating Speed will be a key performance measure that will apply in different ways depending upon street typology. Primary Transit Network streets will have a higher transit operating speed by policy than other streets.

Street Typology

While its street design standards and its CityDesign division are among the best in the United States, Seattle may want to refine its street typologies to better reflect the complex functions of its various streets. With its complete urban grid, Seattle has already moved beyond the simplistic arterial-collector-local typologies that dominate most suburban cities. The Blue Ring Plan envisions "Green Streets," "City Corridors," and "City Connectors." These urban design focused designations would be enhanced by designations centered on transportation and access functions. Creating more specificity around the functions of its streets will allow engineers to make better decisions about allocating street rights of way.

Seattle should consider the following designations, many of which may overlap or be discontinuous on a given street:

- **Neighborhood commercial street.** These streets are lined with continuous storefront retail and include portions of streets such as Pike and Broadway. On such streets, maintaining small businesses is paramount. As a result, the highest priority is creating a high-quality pedestrian environment, followed by high-turnover, short-term parking. 1st Avenue may fall into this category. Transit operating speeds will be an important performance criterion, but secondary to other factors such as retail success. Policy operating speeds may be set relatively low at 7-10 mph.
- **Primary bike network street.** Due to Seattle's topography, there are a few streets in the city, such as Pine, that are a high priority for bicyclists. These streets are identified in the Bike Network section.
- **Primary transit network street.** These streets are described in the Transit Framework section. The primary performance criterion for primary transit network streets is transit average operating speed, and they should be set as high as possible. In the Center City, 9-15 mph is a good target, with higher speeds outside the downtown.

- **Primary auto street.** In addition to traditional arterials, primary auto streets are designed to distribute cars heading to and from the freeway ramps, as well as accommodate through auto traffic at a reasonable speed.

Note that designations proposed in the Blue Ring Plan were consulted in developing the recommendations of this plan.

Parking Management

The City of Seattle already has one of the most thoughtful and well implemented parking programs in the United States, particularly for its downtown. There are no minimum parking requirements for residential uses, retrofits of existing buildings, or for small non-residential uses. In addition, the city allows a maximum of 1 parking space per 1,000 square feet of non-residential uses downtown. Elsewhere in the city, parking requirements vary depending upon the proximity to downtown (reflecting actual ownership rates) and whether parking is shared with complementary uses.

While other cities still have suburban-level minimum parking requirements in their downtowns, Seattle recognized early that managing its parking supply is a critical tool for managing congestion. Long-term, commuter-oriented parking spaces have the greatest impact on the traffic network, generating one AM peak period trip and one PM peak period trip each day. Seattle wisely maximizes short-term parking aimed at shoppers, generating many off-peak trips that provide the greatest economic benefits to the city.

To carry these successful efforts further, we recommend the city explore the following changes to its parking code:

- **Eliminate downtown minimum parking requirements entirely.** With its high transit access and automobile access constraints, it is counterproductive to ask developers to build more parking than they think they need.
- **Consider residential parking maximums.** According to two analyses in San Francisco, building a parking space for each residential unit increases the cost of each unit by about 25% and reduces the number of units that can be built on a given parcel by about 25%.
- **Consider reducing non-residential parking maximums.** The city's roadway network cannot easily accommodate any additional commuter-oriented parking, and only limited increases in short-term parking. The city may want to consider tighter limits on commercial parking.



Transportation benefits from well managed curb space

- **Continue to limit curb cuts on key transit streets.** Transit travel time and reliability is generally worsened more by cars turning left or right into driveways than it is by cars moving straight ahead. To maintain good service, new driveways should not be allowed on key streets such as 3rd Avenue or Pine Street.
- **Implement new parking pay station technology** in downtown neighborhoods as well as some neighborhood business districts. Pay stations are automated kiosks that replace multiple meters on a block. The new pay stations will benefit the public by providing more ways to pay (cash, credit cards, smart cards, etc.) as well as help the City more efficiently manage parking.⁴
- **Expand downtown parking provisions to adjacent neighborhoods.** Center City neighborhoods are becoming increasingly like the core of downtown, and these areas are subject to the same traffic constraints as downtown. Downtown's parking restrictions, including those listed above, should be expanded into these revitalized neighborhoods.

Additional parking constraints are not easy to adopt, particularly in neighborhoods that are undergoing rapid urbanization. Existing residents and merchants will be rightly concerned about scarce parking becoming scarcer, and that their quality of life and economic well being will be threatened. In order to reduce the impact upon existing merchants, we recommend the city expand the efforts of the successful "Making the Parking System Work" program. To reduce the impact on residents, we recommend the city explore the following changes to the city-wide residential parking permit program:

- **Limit the number of Residential Parking Zone permits sold to the spaces available.**
- **Sell new off-street permits at market rate.** Depending upon the scarcity of parking, this rate may approach the commercial off-street parking rate. Establishing market rates for restricted on-street parking may require the establishment of a parking district, approved by the vote of affected residents.
- **Provide a buy-back program for permits.** This would provide encouragement for existing residents to sell their vehicle or clean out their garage, allowing them a one-time profit for the sale of their permit back to the city. The city would set the buy-back rate at one-half the market rate, or whatever formula is appropriate to match supply with demand.

In addition, the city may want to explore deed-restricting certain types of developments from joining an adjacent Residential Parking Zone program. For example, when a high-density infill project with limited parking is built in an established low-density neighborhood, community acceptance may require that the new building's occupants be restricted from joining the parking program.

Finally, we recommend that the City establish a close relationship with a carsharing organization. Currently, Flexcar has over 100 vehicles in a dozen Seattle neighborhoods. Seattle works to designate on-street parking spaces for carsharing vehicles. In San Francisco, non-profit City CarShare has eliminated more than 500 private vehicles with its fleet of

74 shared vehicles⁵. Providing City CarShare with free access to on- and off-street parking spaces throughout the city has been one of the most cost-effective programs San Francisco has undertaken to improve parking availability for those who need to drive.

Bicycle and Pedestrian Plan

Despite its many advantages for bicyclists and pedestrians, Seattle currently has no bicycling or walking master plans. Such plans should be developed, or their implementation sections should be directly incorporated into the city's overall Transportation Strategic Plan implementation framework.

Funding and Implementation Strategy

Seattle's excellent planning work can only take it so far if funding is not in place to carry out the city's vision. Such a strategy is well beyond the scope of this study. Chapter 4 notes some of the key next steps and the agencies that would need to be involved in taking them.

⁴ There are two main types of this technology from the motorist's standpoint. The system implemented in downtown Portland requires customers to buy a ticket at a kiosk (of which there is typically one per block) then receive a slip and return to their car to place it on the dashboard. A more customer-friendly approach involves numbering the spaces along the block and allowing a customer simply to specify the number of their space and then deposit the money required to rent that space. The latter approach results in slightly fewer parking spaces since all spaces must be marked.

⁵ Robert Cervero calculations, UC Berkeley, unpublished, 2003.