

Section Five:

Building the System - Capital

Overview

The transit capital program is integrated with the operating program, providing funds to maintain or expand the system. The level of capital investment is based on projected service levels and the age and maintenance requirements of existing equipment and infrastructure. The strategies outlined in this section provide for the maintenance, expansion and modernization of the transit system and are consistent with the six-year plan objectives outlined in Section Three. The capital improvement program for 2002-2007 provides for many of the service improvements proposed under the service strategies of the Six-Year Plan and illustrated in the sample network in Appendix A.

As adopted in November, 2001 the 2002-2007 Capital Improvement Program (CIP) totals \$900.1 million. More than 50% of this total is devoted to the replacement and/or maintenance of existing equipment and infrastructure. The primary component of this is for vehicle replacements. As the system grows there is a need to provide additional vehicles and operational facilities. During this time, roughly 25% of the CIP is earmarked for these purposes, largely due to identified base expansion at Central-Atlantic and South King County. Passenger facilities and speed and reliability projects that have been identified as part of this plan account for an additional 12% of the CIP. Partnership projects including transit oriented development and regional fare coordination total 8% of the program. The remaining 2% of the program is associated with projects that improve efficiency, increase security and/or enhance the functionality of the system. Table 5-1 shows a categorical breakdown of the adopted 2002-2007 CIP.

As mentioned earlier, the majority of the improvements identified in this plan are specifically included in the adopted 2002-CIP. Other improvements discussed in this plan were not discretely identified in the adopted CIP. Within the adopted CIP, funds were included for generic activities such as speed and reliability and passenger facilities. The number of items that can be funded is dependent on the cost and the prioritization of the individual improvements.

The Transit Capital Program relies heavily on grant assistance. The adopted program assumes that more than 40% of the program expense is grant funded. State grant projections have diminished substantially as a result of I-695. On the other hand, Federal grant projections have been increasing, although this may change as competition increases and/or the amount of federal funding declines. The volatility of federal grants increases the uncertainty that funding is available for the adopted program.

Program Category	2002 - 2007 Financial Plan for Adopted 2002 Budget (millions \$)
Asset Maintenance	67.2
Electric Trolley Bus Infrastructure	12.9
Bus Fleet Procurement	354.0
Operating Facilities	190.7
Paratransit program	20.2
Passenger Facilities	78.1
Transit Speed, Safety, and Reliability	28.8
Transit systems	57.3
Vanpool Program	29.2
Miscellaneous	52.3
Other	9.4
TOTAL 2001-2007 Target Capital Investment	900.1

Table 5-1 – Six-Year Plan Target Capital Investments

Since the time the budget was adopted, the financial conditions in the region have worsened. The current financial forecast projects a loss of revenue that will result in the ability to add only 65,000 annual bus hours from 2002-2007. As a consequence, the capital program is reduced by \$75 million. This decrease is the result of reducing fleet expansion and delaying operating facility capacity in South King County.

Capital Strategies

Maintenance, Replacement and Upgrade of Transit Facilities, Equipment and Systems

Strategy C-1

Maintain, replace, and upgrade current facilities, equipment and systems based on customary and reasonable public transportation and engineering practices and the anticipated use of such facilities, equipment and systems.

Maintaining and upgrading existing capital facilities and infrastructure minimizes total program costs and maintains efficient, safe and reliable operations. Maintenance and upgrades of transit infrastructure are consistent with six-year plan objectives to design and modify services and infrastructure to be more efficient and effective. To this end, specific program elements include:

- Maintenance, replacement and upgrades of aging and outdated transit systems including integration of on-board systems on transit coaches and their supporting communications and maintenance systems and other equipment
- Maintenance of the electric trolley bus system including replacement of electrical substations
- Continued investment in the transit assets maintenance program (TAMP), which provides for routine, scheduled replacement of equipment and facility infrastructure such as roofs and HVAC systems

In addition to the items listed above, the 2002–2007 period will see a continued emphasis on coordinating existing and planned service investments with the maintenance, replacement and upgrade of passenger facilities, speed and reliability projects, and other capital projects as well as an effort to match such investments with the level of cooperation from local jurisdictions.

Improvements to Passenger Facilities and Transit Speed and Reliability

Strategy C-2

Improve transit passenger facility access, shelter, lighting, bus stop locations, and other amenities to enhance the waiting environment. In addition to general improvements throughout the system, focus a portion of resources on the target corridors identified in Figure 5-1, through cooperation and coordination with local jurisdictions.

Strategy C-3

Partner with state and local governments to improve transit operating efficiency and route facilities, and to create speed, safety, and reliability improvements on important transit corridors. In cooperation with local jurisdictions, focus on the target corridors identified in Figure 5-1.

The plan identifies targeted corridors where efforts to improve passenger facility and transit speed and reliability will be concentrated. Individual or spot improvements will continue in both program elements as well. Portions of core routes serving several corridors are slated for both passenger facility improvements and transit signal priority or other speed and reliability improvements. Most core services operate along key freeway and Regional Arterial Network (RAN) corridors. Improvements to the service operating environment, including passenger facilities and speed and reliability improvements, enable services on these corridors to support increased growth by enhancing the person carrying capacity of these key arterial corridors.

Significant support from local jurisdictions will be necessary for successful implementation of these and other projects that rely on modifications to existing city-owned infrastructure such as sidewalks, streets, and curbs. The targeted corridors are served by high-ridership core routes with frequent service, and reflect a continued emphasis on coordinating passenger facilities, speed and reliability, and service investments to provide an improved transit operating environment. The synergistic nature of coordinated improvements will produce greater overall improvements in comfort, speed, reliability, and convenience along core routes and throughout the system.

Transit Route Facilities. Between 1995 and 2001, the transit route facilities program focused on improving passenger and transit coach facilities at transfer points and at transit “hubs”—locations where multiple routes converge and provide transfer opportunities. Forty-four hubs and 138 transfer points—virtually all of those that were identified in the 1995-2001 Six-Year Plan—have been completed.

The 2002–2007 program includes regular bus stop improvements at locations throughout the system, a systematic approach to improving bus stops and facilities along core route corridors, and ongoing improvements to support service changes. In addition to improving bus stop comfort and safety, the program establishes bus staging and layover facilities critical to service reliability and expansion. Design considerations that must be incorporated into transit route facilities include pedestrian and bicycle access, efficient bus ingress and egress, and consistency with neighborhood planning efforts.

Bus Stop Improvements. Improvements to bus stops are designed to help provide transit customers with a comfortable, safe trip as well as to address the needs of transit vehicle operations. Locations are determined by community needs, operational requirements, ridership patterns, available budget, and service patterns.

Bus stop improvements include a mix of the following and other components that improve the physical location where passengers wait and may affect stop location or related coach needs.

- **Pedestrian and bicycle access.** Pedestrian access to bus stops will continue to be upgraded to meet or exceed ADA standards, particularly as local jurisdictions make sidewalk improvements. Access will be improved by constructing curb ramps, providing paved waiting areas, and improving sidewalk and pathway connections. Pedestrian safety issues and provision of bike racks will be addressed in coordination with local jurisdictions’ programs.
- **Shelters and benches.** New passenger shelters and benches will be provided at some bus stops as warranted by ridership. Translucent roofs will be installed on existing shelters when they are upgraded and on new shelters to increase customer and operator security.
- **Lighting.** New, improved or re-directed lighting will be installed at selected locations where agreements are reached for maintenance by the local jurisdiction and utilities.

- **Signage and customer information.** Transit service routing and levels of usage at bus stops are used to determine where customer information or signage will be upgraded. Regularly maintained and updated information about which routes serve the bus stop, bus departure times, maps and connections to other routes is a critical aspect of operations and customer service.
- **Curb lane transit improvements.** This category generally requires a higher level of investment and also greater cooperation with local jurisdictions. Parking restrictions, extended bus stops, curb changes or bus bulbs, turning improvements and street reconfigurations are designed to improve operations at bus stops. Providing in-lane stops, for example, can help eliminate delays buses encounter when leaving and entering moving traffic.
- **Bus stop spacing.** Stop spacing—the distance between bus stops - has a direct impact on transit operations and rider comfort. Bus stops can be re-spaced, relocated or consolidated to provide smoother, faster, and more comfortable operation and can concentrate ridership to provide for bus stop improvements in a more cost-effective manner. They are pursued when the benefit to a large majority of riders can be demonstrated.
- **Minor park-and-ride lot modifications.** Adjustments to signage, bus layovers, and other minor improvements are often required to accommodate changes in service and park-and-ride utilization.
- **Other improvements.** A variety of other additions may be made at bus stops and shelters, particularly in funding partnership with local jurisdictions and others. Detailed bus schedule information, art, community information, litter receptacles, special benches or other resting and seating structures, railings, and the use of buildings or awnings for weather protection can be included.

Layovers. At or near bus zones at the end of each route, layover space (parking space for buses waiting to begin a trip, located near the end of a route) is critical to efficient system operation and is increasingly difficult to establish. Urban development, changes in service, and local jurisdiction decisions to prioritize non-transit traffic can trigger the need to site new or improved existing layover locations. The participation of local jurisdictions in providing layover space enables more efficient operation of service and is often necessary to enable increases in service levels.

Corridor-based Route Facility Improvements. The Six-Year Plan Section Four “Improving the System–Service” identifies core network connections on corridors with demonstrated and growing ridership. The existing transit, pedestrian, and passenger facility infrastructure along core network corridors varies significantly. The potential corridor facility improvement projects highlighted in Figure 5-1 will help match the level of infrastructure with existing and targeted levels of transit service. Corridor facility improvements will be coordinated with corresponding speed and reliability projects in order to maximize combined benefits.

Corridor facility improvement projects affect the condition and location of bus stops along an arterial. Along each corridor, the initial focus will be on bus stop location. Many corridors are candidates for bus stop consolidations that improve transit speed and reliability. Bus stop locations that are moved, those that have the highest number of users along the corridor, and those where route operating efficiencies could result will be evaluated for the kinds of bus stop improvements described above.

The following factors will be considered in evaluating and advancing corridors for systematic facility improvements.

- Frequent current or planned service
- Active transit signal priority or other speed and reliability project
- Amount of ridership and projected growth
- Local jurisdiction support
- Local funding partnerships
- Potential to reduce delays and improve passenger comfort through bus stop spacing
- Degree to which passenger access, safety, comfort and information needs are being met

Transit Speed, Safety, and Reliability Improvements. Traffic congestion on arterials and freeways will continue to pose a major challenge to the efficiency and effectiveness of public transportation services over the next six years. The main focus of the Transit Speed, Safety, and Reliability Program is the implementation of relatively low-cost improvements along arterial corridors with high bus volumes and high ridership.

High traffic volumes slow buses down and lengthen travel times. Variations in daily traffic flows decrease the reliability of bus schedules and cause missed connections. The ability to serve multiple destinations with convenient connections between routes relies on timed transfers and schedule coordination. This reliance increases the importance of on-time performance, particularly where very frequent service is not provided. Where frequent service is provided, improvements that enhance the speed and reliability of bus operations help maintain even intervals between buses thereby reducing overcrowding and schedule adherence problems.

Two general types of speed and reliability improvements included in this program are:

- Corridor-based projects improving high transit volume streets used by bus routes primarily providing core connections and operating frequently. Corridor-based speed and reliability projects support and reinforce the development of a regional system of transit signal priority. These projects are designed to be coordinated with the improvement of passenger facilities along the same corridors, with the intent to provide more pronounced benefits to riders and increases in service efficiency.
- Spot improvement projects addressing problems with bus operations at specific locations, such as flow and circulation within or near activity centers and transit hubs. Spot improvements can include queue jumps, transit or HOV lanes, bus bulbs, curb radius modifications, and other forms of rechannelization of the street right-of-way. A series of spot improvements can also improve bus operations along significant route segments.

There are speed and reliability projects currently underway in eleven key transit corridors. All of these projects have a transit signal priority element. Some also include other transit-related improvements such as business access and transit lanes (also known as BAT lanes) and queue jumps. Additional transit corridors and spot improvement locations have been targeted for potential new speed and reliability projects. These would be broken down into segments, then screened and prioritized using the criteria in Table 5-2.

Active and potential speed and reliability corridors and locations serve high-ridership core routes. The potential new projects specifically complement planned corridor-based passenger facilities improvements. Existing and potential projects are shown in Figure 5-1 and are overlaid on planned corridor-based passenger facilities improvements.

Criteria	Measures
Bus volumes	Total number of weekday bus trips in the corridor
Passenger volumes	Total number of weekday transit passenger trips in the corridor
Congestion/delay	Transit speeds, schedule variability, and on-time performance
Cost	Availability of low-cost, effective solutions
Schedule	Implementation practical within 2-5 years
Operations and Maintenance support	Local jurisdiction willing to execute standard operations and maintenance agreement for TSP infrastructure investment
Feasibility	Support from local jurisdiction; willingness to prioritize arterial capacity to support improved transit operations
Planning	Supports Metro's Six-Year Plan

Table 5-2 – Criteria to Screen and Prioritize Potential Transit Speed, Safety, and Reliability Investments

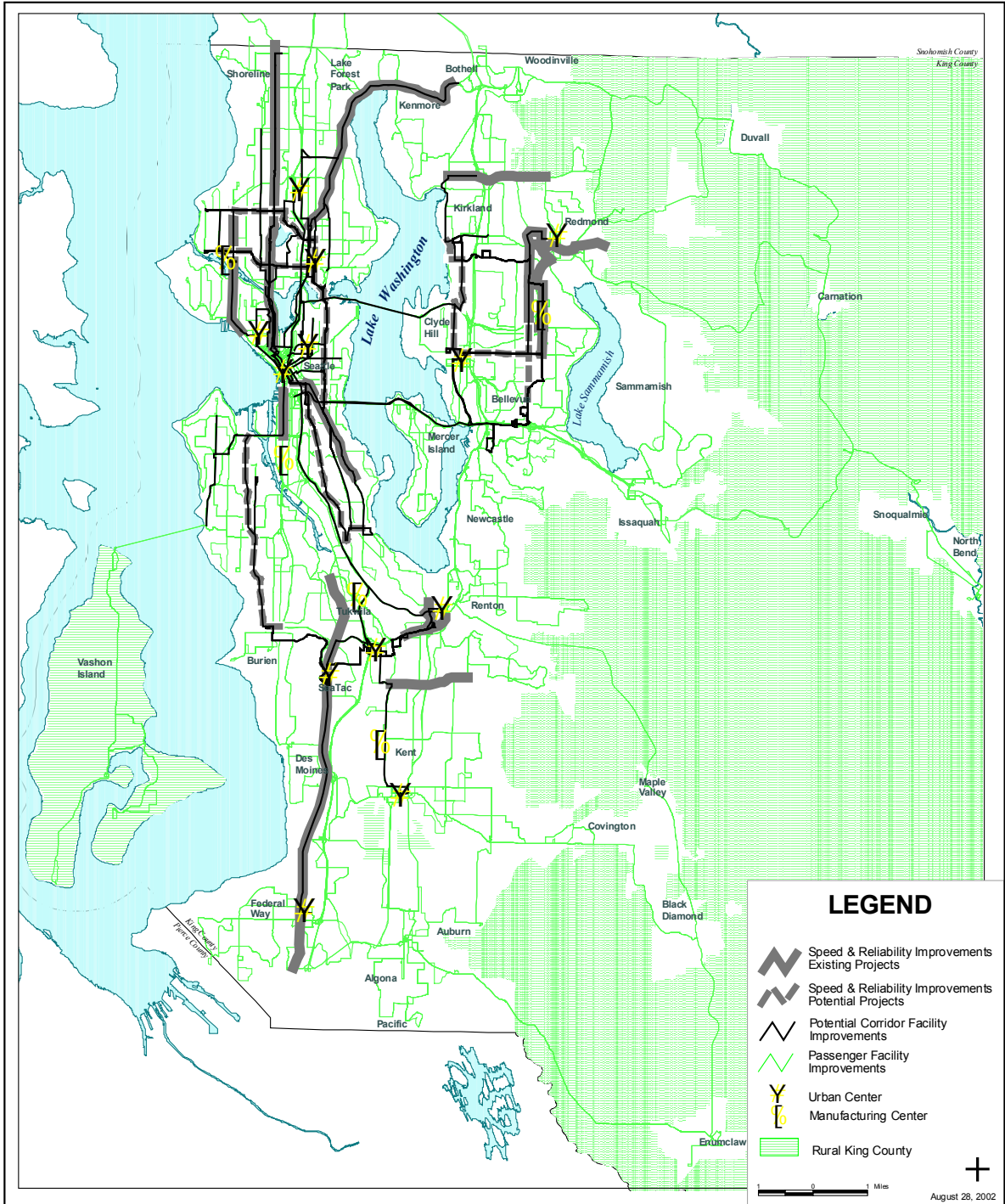


Figure 5-1: Route and Passenger Facility Improvements - Target Corridors

Location-Specific Facility Improvements. A number of service improvements identified in this plan may require corresponding improvements to hubs or layover terminals to resolve operating or safety issues and provide increased capacity. These potential projects vary in scale and complexity. On-street improvements are typically lower cost and can be accommodated within the Transit Route Facilities program. Off-street layover improvements are often more capital intensive and may be linked to larger projects or are funded separately. Projects currently under consideration or in progress include:

- Factoria–Secure on-street facilities to provide terminals for two new frequent-service core routes.
- Kirkland–Secure on-street facilities in downtown Kirkland to provide terminal capacity for two new frequent-service core routes.
- Northgate–Replace layover on N.E. 100th Street with expanded capacity at Northgate Transit Center.
- Redmond/Bear Creek–Construct on-street facilities in downtown Redmond or Bear Creek to provide terminal capacity for additional Redmond-Bellevue core service.
- SeaTac/Des Moines–Site and construct a new off-street hub with terminal capacity for restructured express service between SeaTac and Downtown Seattle as well as other routes serving Highway 99 and the Des Moines area.
- Seattle/Convention Place Station–Replace current layover capacity at Denny Regrade and Convention Place Station, depending on space needed to accommodate the Sound Transit Link Light Rail line.
- Seattle/International District Station - Replace layover capacity in Pioneer Square and the International District depending on space needed to accommodate the Sound Transit Link Light Rail line.
- White Center–Locate additional on-street curb space to provide increased capacity to accommodate increased service on routes terminating in White Center.

Park-and-Ride Expansion

Strategy C-4

Expand park-and-ride capacity in congested corridors with full or overcrowded park-and-ride facilities as identified in Figure 5-2. Support development of a series of small owned or leased park and ride lots along low density suburban routes in order to create artificially higher densities to enhance the ridership base. Use the Transit-oriented Development (TOD) program to further expand park-and-ride opportunities through joint use of new parking capacity and financing partnerships. Where these lots have unused capacity, encourage their use by vanpools and park-and-pools.

Included in this program is the continued design and implementation by King County Metro of approximately 3,000 new parking spaces at park-and-ride lots and continued coordination with local jurisdictions and other agencies to identify park-and-ride needs beyond 2007. Additional 3,000 spaces are to be built by other governments, including Sound Transit and suburban cities. Additional park-and-ride expansion may be accomplished during the 2002 to 2007 period through various Transit Oriented Development projects as partnership opportunities and funds are identified to do so.

Park-and-ride facilities often function as transit centers, incorporating bus layover areas, route terminals, bicycle and pedestrian amenities and other transit operating infrastructure. Expansion projects will include infrastructure to support increased levels of use by pedestrians and bicyclists. King County Metro will also work with local jurisdictions to improve the access to park-and-ride facilities along the pathways to and from the facility. New park-and-ride lots should be readily and safely accessible to pedestrians and bicyclists as well as by motor vehicles. Increased accessibility to non-motorized modes can stimulate greater use of park-and-ride lots without the addition of more parking spaces.

New park-and-ride spaces are planned to be added at the following locations:

King County projects

- Eastgate—Construct a parking garage to expand the capacity of the existing Eastgate park-and-ride lot by approximately 1,000 new spaces. Completion is scheduled for 2003.
- Issaquah Highlands—Construct a new park-and-ride lot with approximately 500 spaces included in the first phase. Completion is scheduled for 2004.
- I-90 East—Identify a location east of Issaquah Highlands in the I-90 corridor and develop a project scope and cost to construct a new park-and-ride lot with approximately 150 spaces
- Northgate—Add approximately 500 spaces to Northgate Transit Center, currently served by three separate park-and-ride lots. Completion of the interim expansion is scheduled for 2002.
- Redondo Heights (Pacific Highway S. & S. 272nd St.)—Construct a new park-and-ride lot with approximately 700 spaces. Completion is scheduled for 2003.
- Skyway—Begin planning and land acquisition for development of a new park-and-ride lot.

Projects Jointly or Solely Funded by Sound Transit and Others

Park-and-ride capacity improvements often lend themselves to partnerships and joint financing with other agencies and local jurisdictions. King County Metro is participating in the following projects.

- Auburn Commuter Rail park-and-ride—Construct approximately 530 surface and structured parking spaces at the Auburn train station to serve both rail and bus passengers. Completion is scheduled for 2002.
- Mercer Island—Construct approximately 235 new parking spaces. Completion is scheduled for 2003.
- Kent Commuter Rail park-and-ride: Construct approximately 1000 surface and structured parking spaces at the Kent train station to serve both rail and bus passengers. Completion is scheduled for 2002.
- Overlake Transit Center at N.E. 40th—Add 220 new spaces. Completion is scheduled for 2002.

- Tukwila Commuter Rail park-and-ride—Construct approximately 300 spaces at the Tukwila train station to serve both rail and bus passengers. Completion is scheduled for 2005.

The sample route network described in Appendix A is designed to serve new park-and-ride facilities and expansion projects and to attract new customers to existing park-and-ride facilities with unused space. Many park-and-ride lots serve as hubs where connections can be made between regional, intercommunity, and local transit services.

Transit-Oriented Development. Transit-Oriented Development projects bring increased residential and commercial density and activity together to improve urban areas that already support high levels of transit service. TOD staff has been working on bus-related joint-development projects since 1998. The mix of uses in King County's TOD projects includes transit centers, park-and-ride lots, off-street bus-layover spaces, residences, institutions, and commercial enterprises. Recently completed projects included these elements at Northgate, Renton Transit Center and at the Village at Overlake Station. Figure 5-3 identifies projects in various stages of planning or study, as well as the Kent Sound Transit parking garage, which is scheduled to open in July 2002.

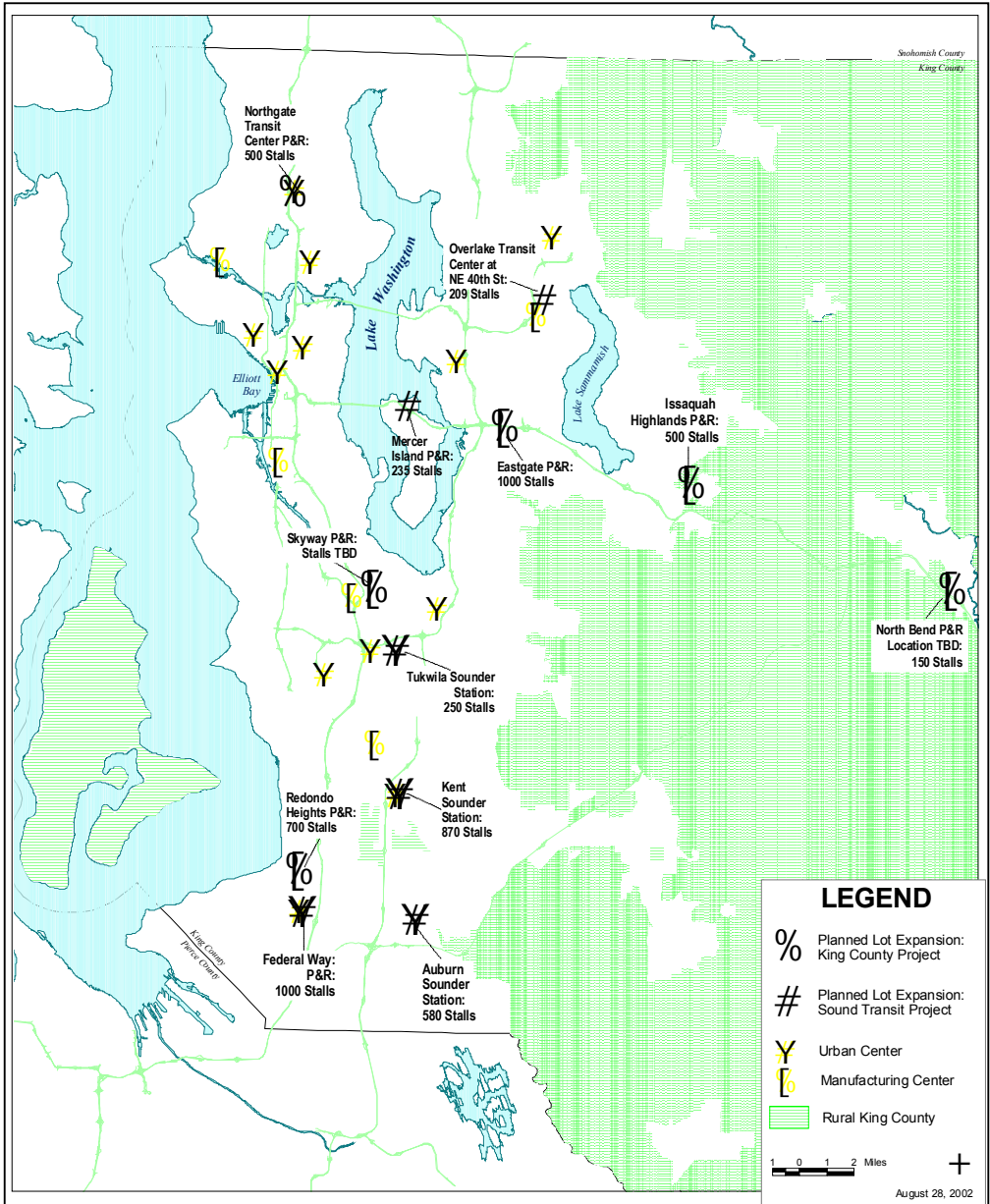


Figure 5-2: Park-and-Ride Lot Expansion

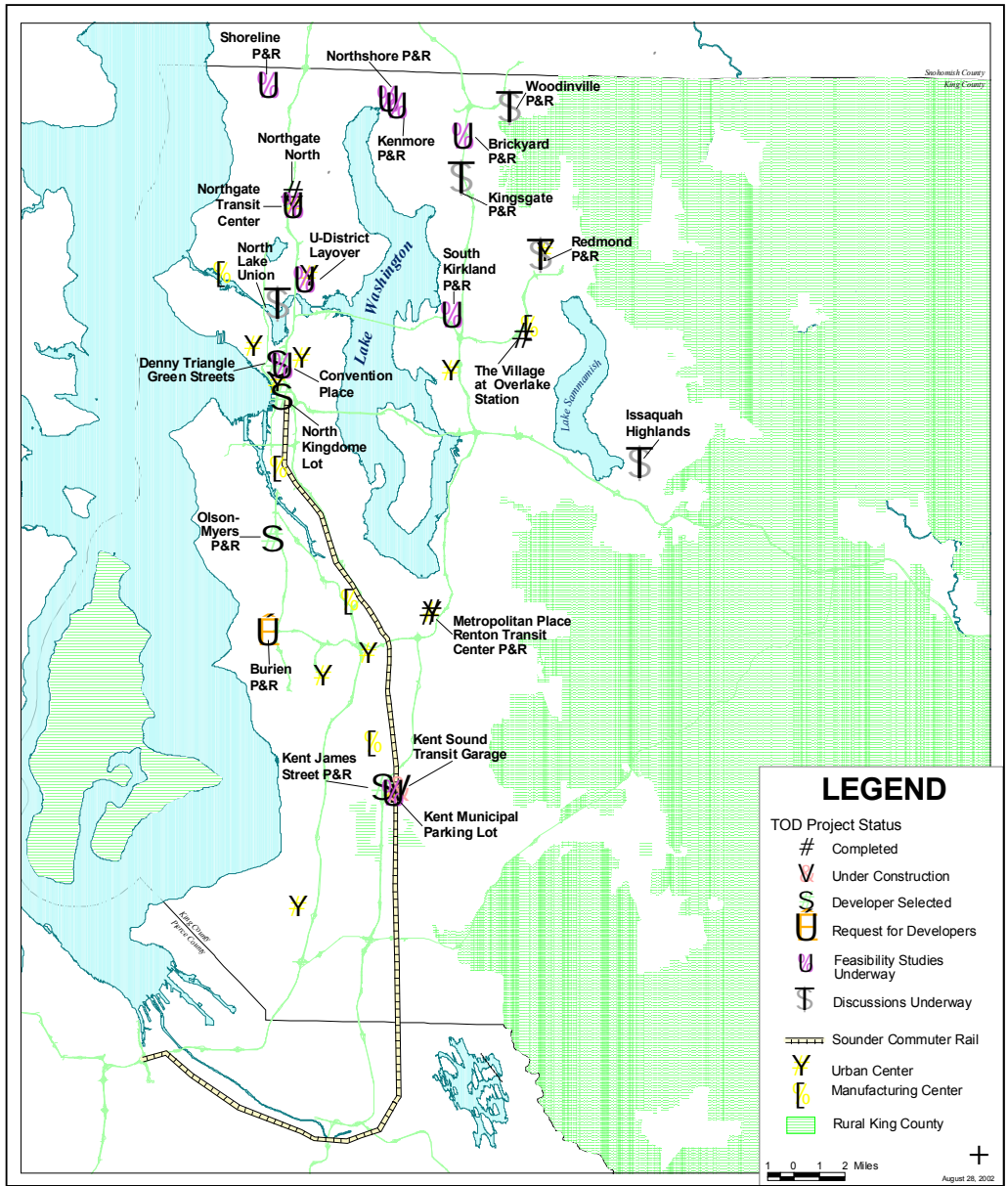


Figure 5-3: Current King County TOD Sites

Replacement and Expansion of the Transit Fleet

Strategy C-5

Replace and expand the transit fleet so that the size, fleet mix, and individual fleet procurements are consistent with service projections and operating characteristics. Achieve more efficient operations using features including efficient propulsion systems, advanced maintenance technologies and integrated on-board systems on transit coaches. Encourage the expansion of the vanpool program.

Fleet Procurement and Operating Facilities. The type and quantity of vehicles purchased and maintained by Metro is based on current and projected levels of service. Service expansion drives the need for fleet expansion, and fleet expansion in turn defines the extent of the need for expanded base capacity.

Projected Transit Fleet Requirements. The sample network described in Appendix A would require approximately a seventeen- percent increase in the total size of the transit fleet over the current fleet requirement, from 1,242 vehicles in 2001 to 1,455 vehicles. These totals reflect the requirements for revenue service, schedule maintenance, and spares and exclude vehicles used by Sound Transit.

The number of units included in each procurement will be calculated using the sample network and the most current service projections available. A comparison of the 2001 fleet requirement with the projected sample network fleet requirement for 2007 shows the following changes.

- **Increased use of deadheading coaches.** The sample network highlights several connections that could receive increased service frequency. These improvements include better utilization of deadheading (out of service) coaches traveling back to operating bases after completing their peak direction trips.
- **Replacement of the dual-powered tunnel bus fleet.** This fleet, used exclusively on routes using the downtown Seattle transit tunnel, will reach the end of its projected useful life in 2003. Due to the unique nature of tunnel operation and due to the possibility of joint operation with light rail, the choice of propulsion technology for the new tunnel-capable vehicles requires extensive study. A promising alternative is a low-floor coach with new hybrid diesel-electric drive technology.

- **Introduction of low-floor buses.** Low-floor buses are now commonly used worldwide because of their operational, safety, and accessibility advantages over conventional high-floor coaches. While high-floor coaches might remain the best choice for some portions of the system, low-floor coaches will represent a significant portion of the 2002-2007 investment in revenue vehicles. As with other fleet types, vehicle assignments will be based on vehicle characteristics, which for low-floor buses include lower seating capacity and faster boarding than comparably sized high-floor vehicles.
- **Replacement of the articulated electric trolley bus fleet.** This fleet, used exclusively on high-ridership routes 7, 9, 43, and 44, will reach the end of its projected useful life in 2005. Investigate replacement with new low-floor, articulated electric trolley buses, utilizing the slightly used drive trains of the retired dual-powered buses if feasible and cost effective.
- **Introduction of ultra low-sulfur diesel fuel.** King County Metro is currently evaluating the use of diesel fuel with a reduced sulfur content. When used in conjunction with new catalytic converters, this fuel reduces emissions of some pollutants by approximately ninety percent with no expected reduction in fuel efficiency.

Projected Vanpool and ADA Paratransit Fleet Requirements. Both rider demand and the productivity of paratransit service affect fleet requirements for paratransit service. It is projected that the fleet necessary to support the ADA Paratransit Program will decrease somewhat from the present level of 279 vehicles. The decrease is anticipated due to decreased demand as well as increased productivity following technological improvements as described in Strategy S-6. The cost of replacement vehicles and other supporting capital needs is estimated at \$17.8 million through 2007.

The current capital program for the vanpool fleet is projected to grow at a rate of 40 vans per year and does not include any assumptions for expanded growth due to initiatives identified in this plan or regional actions. During the plan period approximately 240 expansion vans will be purchased to serve over 1,500 new vanpool riders.

Replacement van purchases during the plan period represent a significant investment in the program. Replacement vans are purchased when vans have reached the end of their defined useful economic life and must be retired from active service with vanpool

groups. 818 vans (the current active fleet size in 2001) are scheduled for replacement. In 2000, the replacement cycle for program vehicles was increased from five to six years. Eight, twelve and fifteen-passenger vans are scheduled for replacement.

King County adopted policy requires that Vanpool Program passenger fares and the resale of vans recover: 100 percent of capital costs, 100 percent of direct operating expense and 25 percent of administrative costs. Some adjustment of this target subsidy level can be considered if such a change enables simplification of fares on a regional basis or is used in conjunction with efforts to expand vanpool use.

Operating Base Expansion

Strategy C-6

Expand transit operating base capacity in the areas identified and described in an adopted King County Metro Transit Operating Facilities Strategic Plan to support transit fleet growth projected to occur through the year 2020.

Metro Transit currently houses approximately 1,250 buses in seven facilities—North, East, Bellevue, Central, Atlantic, Ryerson and South operating bases. Expansion of operating bases is required to support planned increases in bus service. Implementation of new service is currently affected and will soon be constrained by limited base capacity.

The *Transit Operating Facilities Strategic Plan* is being updated currently and identifies the need for additional base capacity, as well as where and when it is needed. Because a base may require as many as ten years to site, plan, design and build, this plan has a 25-year horizon that extends through the year 2025. The plan indicates the need for additional base capacity for approximately 500 buses through the year 2025.

Current planning work indicates the need for additional base capacity for approximately 240 buses by 2007, additional 100 buses by 2015 and another 160 buses by 2025. Capacity needed through the year 2025 is projected to accommodate approximately 500 additional buses. See Figure 5-4 below.

**King County Metro & Sound Transit Fleet Size and Capacity
1997 - 2025 with Planned Expansions**

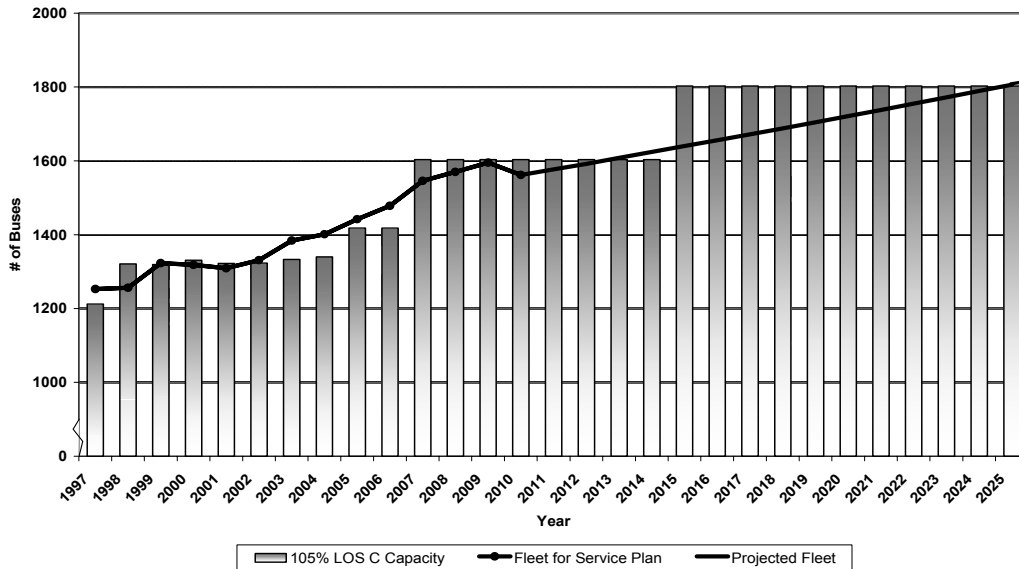


Figure 5-4 Projected Operating Base Capacity Needs

The *Transit Operating Facilities Strategic Plan* included in Appendix C indicates a need for bus base capacity in three areas—east, central and south. East capacity needs were met by re-opening Bellevue Base in 1998. Current and projected capacity constraints in the central and south are expected to be addressed by the following projects:

Central:

- Add bus storage capacity at Ryerson Base while accommodating State Route 519 by 2005.
- Expand the capacities of Atlantic Base and Central Base by 2007.

South:

- Determine the most cost-effective location for an eighth base after evaluating South Base Annex and south King County options.