



SECTION 2

■ SERVICE INVESTMENT PRIORITIES

This section identifies where investments are needed to provide high-quality service and to meet target service levels. When Metro has resources available to invest, or reallocates existing service hours, these findings and the priorities defined in the guidelines will be the basis for investments.

The investment needs identified in this analysis of spring 2013 data are shown in Table 8 below. They are substantially higher than the previous year's analysis.

TABLE 8
2013 Investment Needs
 (Based on Spring 2013 Data)

Priority	Investment Area	Estimated Annual Hours Needed
1	Reduce passenger crowding	15,400
2	Improve schedule reliability	27,800
3	Increase service to meet target service levels in All-Day and Peak Network*	467,500
Total investment need		510,700
4	Increase service on high-productivity routes	See discussion on page 2

* Referred to in the service guidelines as "corridors below target service levels"

Annual service hours needed to reduce passenger crowding increased from 5,500 to 15,400; hours needed to improve schedule reliability increased from 19,000 to 27,800; and hours needed to meet target service levels in the All Day and Peak Network rose from 309,800 to 467,500. The investment needs grew for several reasons:

- **Passenger crowding.** Growth in ridership resulted in more passenger crowding.
- **Schedule reliability declined** as a result of more crowded buses, more roadway construction, and traffic congestion that has worsened as the economy has improved. The number of unreliable routes in 2013 also continues to reflect the impact of scheduling efficiencies Metro adopted in 2010 and 2011. An additional factor affecting the reliability need is that, due to the timing of the last report, the reliability needs of the services that were to be restructured in fall 2012 could not be assessed.
- **Target service levels increased** for many routes on the All-Day and Peak Network as a result of the August 2013 update of the service guidelines methodology that made it more sensitive to job and household levels (see Section 1). These revisions resulted in more routes being identified as underserved, and did not cause any corridor to drop off the list of routes needing investment. Changes in land use and ridership also contributed to higher target service levels. The total investment needs

based on the analysis of spring 2013 data are shown in Table 8, followed by detailed findings about the investment needs.

Priority 1 – Passenger crowding investments

Investment in the most crowded routes is the highest priority in the service guidelines. When service is chronically very crowded, it is poor quality and has a negative impact on riders. The passenger load thresholds are set so that we accept standing passengers on many of our services, but take action where crowding is at an unacceptable level and where it occurs regularly.

The table below and Figure 7 identify routes that need additional trips to reduce crowding.

TABLE 9
Routes Needing Investment to Reduce Passenger Crowding

Route	Description	Day	Annual Hours Needed
8	Seattle Center - Capitol Hill - Rainier Beach	Weekday and Sunday	700
9EX	Rainier Beach - Capitol Hill	Weekday	500
11	Madison Park - Seattle CBD	Weekday	500
15EX	Blue Ridge - Ballard - Seattle CBD	Weekday	600
17EX	Sunset Hill - Ballard - Seattle CBD	Weekday	800
26	East Green Lake - Wallingford - Seattle CBD	Weekday	400
28EX	Broadview - Ballard - Seattle CBD via Leary Av NW	Weekday	500
40	Northgate TC - Ballard - Seattle CBD via Leary Av NW	Weekday	700
66EX	Northgate TC - Eastlake - Seattle CBD	Weekday	900
67	Northgate TC - University District	Weekday	200
68	Northgate TC - Ravenna - University District	Weekday	300
71	Wedgwood - University District - Seattle CBD	Saturday	500
73	Jackson Park - University District - Seattle CBD	Saturday	400
74EX	Sand Point - Seattle CBD	Weekday	600
75	Northgate TC - Lake City - Seattle CBD	Weekday	400
101	Renton TC - Seattle CBD	Weekday	300
128	Southcenter - Westwood Village - Admiral District	Weekday	800
131	Burien TC - Highland Park - Seattle CBD	Weekday	400
132	Burien TC - South Park - Seattle CBD	Weekday	500
143EX	Black Diamond - Renton TC - Seattle CBD	Weekday	1,800
164	Green River CC - Kent Station	Weekday	300
179	Twin Lakes - Seattle CBD	Weekday	600
240	Bellevue - Newcastle - Renton	Weekday	1,100
303EX	Shoreline - First Hill	Weekday	700
346	Aurora Village - Northgate	Weekday	200
372EX	Woodinville - Lake City - University District	Weekday	300
D Line	Ballard - Seattle Center - Seattle CBD	Weekday	400
Total hours needed			15,400

Some of the routes that were found in last year's analysis to have the most severe crowding have been improved since fall 2012. Route 4 received service investments in fall 2013. Route 16 received larger coaches to better handle passenger loads.

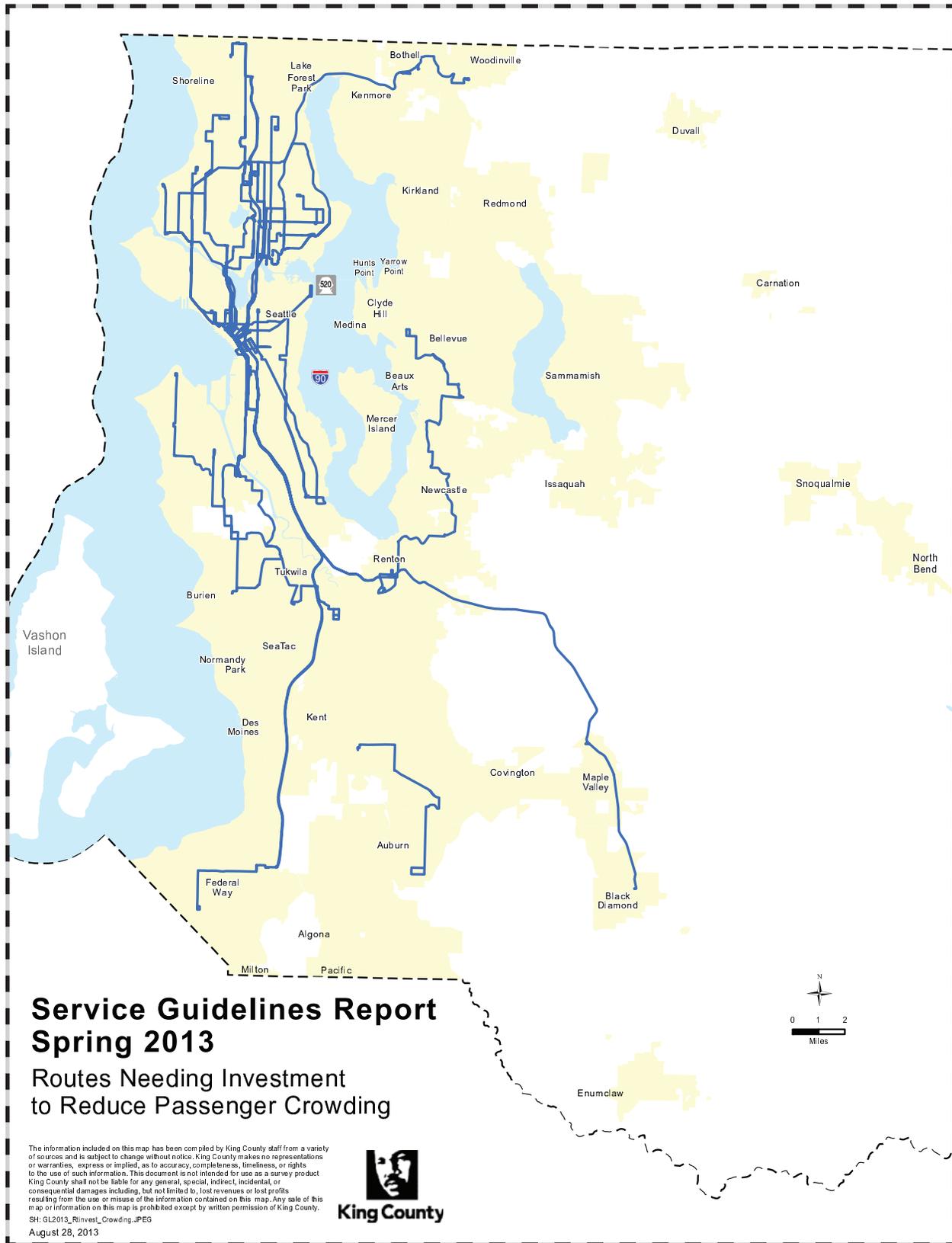
The need for investment to reduce passenger crowding has grown because

- ridership has grown and because
- the last report excluded routes that were part of the fall 2012 restructure.

Some additional routes were identified as overcrowded but were determined to not need immediate investment either because surrounding trips had capacity or because passenger crowding could be accommodated by assigning a larger bus. A list of all routes identified as overcrowded is in Appendix D.

FIG. 7

Routes Needing Investment to Reduce Passenger Crowding



Priority 2 – Improve schedule reliability

Schedule reliability is measured as a percent of trips that arrive between 1 minute early and 5 minutes late. To evaluate the system, our reliability threshold is 80 percent for weekday and weekend averages, indicating that our buses should arrive on time 80% of the time, which allows for variations in travel time, congestion, and ridership. Weekday PM peak average (3:15 p.m. – 6:15 p.m.) has a lower reliability threshold of 65 percent because this is the period with the most delays. Routes that are on-time less than 80 percent of the time (65 percent for weekday PM peak) are candidates for investment of service hours.

Metro continually strives to improve schedule reliability and has continued to make improvements since 2011. The table below shows the schedule reliability for calendar years 2011 and 2012 and for the service guidelines period from October 2012 to May 2013. Schedule reliability varies by time of year and tends to be best each year in the early spring. We use a longer time period for this analysis to ensure that schedule reliability needs are not understated by using data from just the four-month spring period. As shown in the table below, reliability has improved for each time period since 2012.

TABLE 10
Percent On-Time, 2011-2013

	2011	2012	October 2012 – May 2013
6:00 a.m. – 9:00 a.m.	81.3%	81.9%	81.9%
9:00 a.m. – 3:15 p.m.	74.9%	75.8%	78.7%
3:15 p.m. – 6:15 p.m.	69.0%	68.5%	70.6%
Weekday average	75.7%	76.3%	78.3%
Saturday	75.7%	75.7%	78.6%
Sunday	78.6%	77.9%	81.4%
Total system average	76.0%	76.4%	78.6%

The table below lists the 69 routes identified as needing service-hour investments to improve their reliability using data from October 2012 to May 2013; a map of those routes is shown in Figure 8. The total need of 27,800 annual hours was calculated based on how far above the lateness threshold the routes were during the different time period. While this calculation provides a reasonable estimate of total needs, individual routes may receive more or less investment than estimated depending on the scheduling techniques available to improve reliability.

TABLE 11
Routes Needing Investment to Improve Schedule Reliability

Route	Area	Day	Estimated Hours Needed
1	Kinnear - Seattle CBD	Saturday, Sunday	100
4	East Queen Anne - Seattle CBD - Judkins Park	Saturday	100
7	Rainier Beach - Seattle CBD	Saturday	50
8	Seattle Center - Capitol Hill - Rainier Beach	Weekday, Saturday, Sunday	2,050
10	Capitol Hill - Seattle CBD	Saturday	50
11	Madison Park - Seattle CBD	Weekday, Saturday, Sunday	350
14	Mount Baker - Seattle CBD	Weekday, Sunday	350
16	Northgate TC - Wallingford - Seattle CBD	Weekday, Saturday, Sunday	1,300
17EX	Sunset Hill - Ballard - Seattle CBD	Weekday	250
18EX	North Beach - Ballard - Seattle CBD	Weekday	250

Continued

Route	Area	Day	Estimated Hours Needed
21EX	Arbor Heights - Westwood Village - Seattle CBD	Weekday	400
21	Arbor Heights - Westwood Village - Seattle CBD	Saturday	50
24	Magnolia - Seattle CBD	Weekday, Saturday	700
25	Laurelhurst - University District - Seattle CBD	Weekday	250
26	East Green Lake - Wallingford - Seattle CBD	Weekday, Saturday	350
27	Colman Park - Leschi Park - Seattle CBD	Weekday, Saturday, Sunday	450
28EX	Broadview - Ballard - Seattle CBD via Leary Av NW	Weekday	250
28	Whittier Heights - Ballard - Seattle CBD via Leary Av NW	Weekday, Saturday	600
29	Ballard - Queen Anne - Seattle CBD	Weekday	500
31	University District - Fremont - Magnolia	Weekday	300
32	University District - Fremont - Seattle Center	Weekday	250
33	Discovery Park - Seattle CBD	Weekday, Saturday, Sunday	400
40	Northgate TC - Ballard - Seattle CBD via Leary Av NW	Saturday, Sunday	500
41	Lake City - Seattle CBD via Northgate	Weekday	1,400
48	Mt Baker - University District - Loyal Heights	Saturday, Sunday	300
55	Admiral District - Alaska Junction - Seattle CBD	Weekday	400
56EX	Alki - Seattle CBD	Weekday	400
57	Alaska Junction - Seattle CBD	Weekday	300
60	Westwood Village - Georgetown - Capitol Hill	Saturday	100
71	Wedgwood - University District - Seattle CBD	Weekday	850
72	Lake City - University District - Seattle CBD	Saturday	550
73	Jackson Park - University District - Seattle CBD	Weekday, Saturday	650
74EX	Sand Point - Seattle CBD	Weekday	600
76	Wedgwood - Seattle CBD	Weekday	250
77	North City - Seattle CBD	Weekday	300
101	Renton TC - Seattle CBD	Saturday, Sunday	150
114	Renton Highlands - Seattle CBD	Weekday	250
119EX	Dockton - Seattle CBD via ferry	Weekday	250
120	Burien TC - Westwood Village - Seattle CBD	Saturday, Sunday	150
124	Tukwila - Georgetown - Seattle CBD	Weekday, Saturday, Sunday	1,450
128	Southcenter - Westwood Village - Admiral District	Weekday	500
131	Burien TC - Highland Park - Seattle CBD	Weekday, Saturday	1,300
132	Burien TC - South Park - Seattle CBD	Weekday, Saturday	350
143EX	Black Diamond - Renton TC - Seattle CBD	Weekday	250
157	Lake Meridian - Seattle CBD	Weekday	250
166	Kent Station - Burien TC	Weekday	250
169	Kent Station - East Hill - Renton TC	Weekday	400
173	Federal Way TC - Federal Center South	Weekday	250
177	Federal Way - Seattle CBD	Weekday	250
178	South Federal Way - Seattle CBD	Weekday	700
179	Twin Lakes - Seattle CBD	Weekday	250
182	NE Tacoma - Federal Way TC	Saturday	50
190	Redondo Heights - Seattle CBD	Weekday	250
202	South Mercer Island - Seattle CBD	Weekday	300
221	Education Hill - Overlake - Eastgate	Weekday, Saturday	650

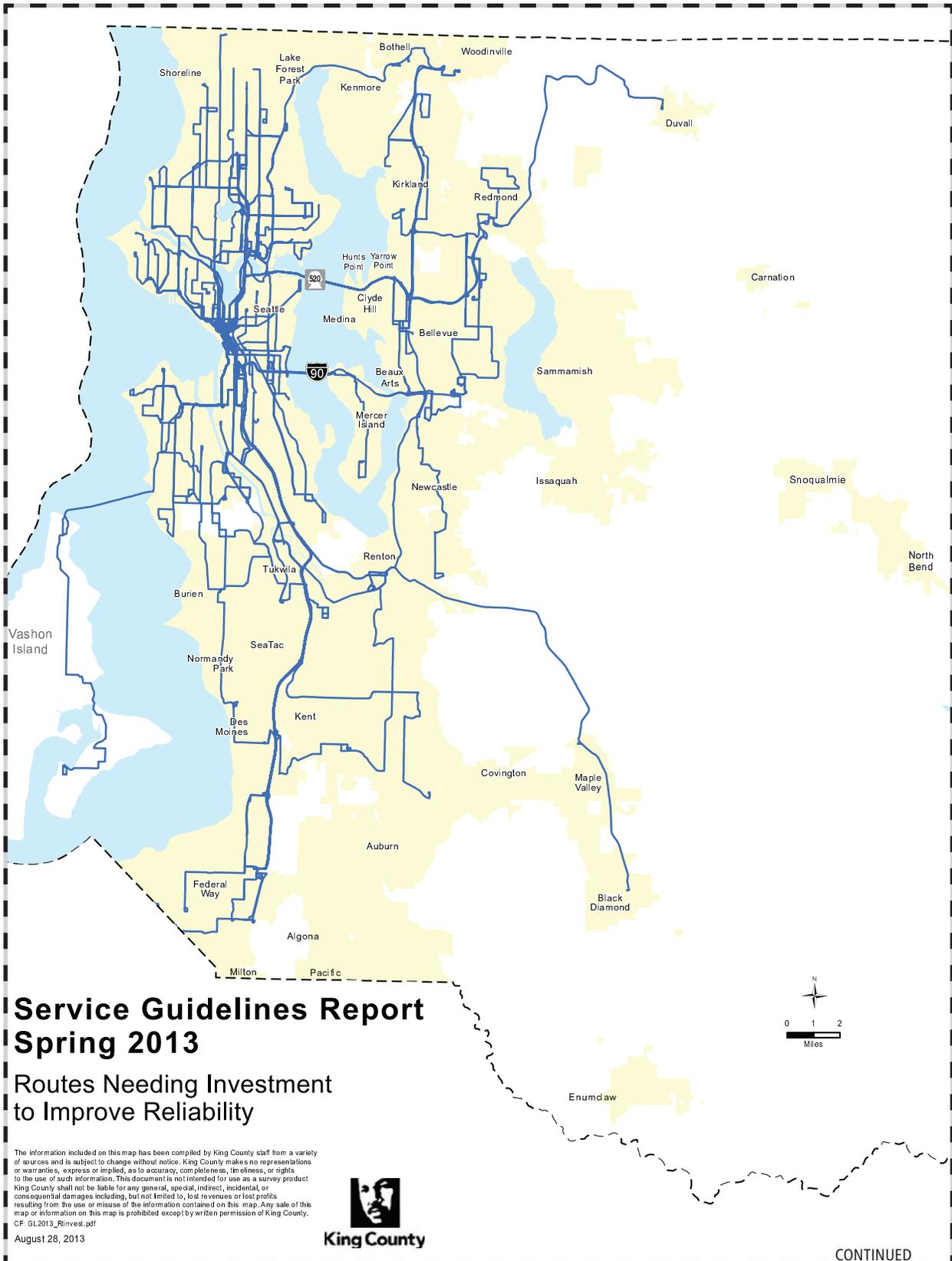
Route	Area	Day	Estimated Hours Needed
232	Duvall - Bellevue	Weekday	250
237	Woodinville - Bellevue	Weekday	250
241	Eastgate - Factoria - Bellevue	Weekday	300
242	North City - Overlake	Weekday	250
243	Jackson Park - Bellevue	Weekday	250
245	Kirkland - Overlake - Factoria	Saturday	50
257	Brickyard - Seattle CBD	Weekday	250
277	Juanita - University District	Weekday	250
280	Seattle CBD - Bellevue - Renton	Saturday	50
316	Meridian Park - Seattle CBD	Weekday	250
355EX	Shoreline CC - University District - Seattle CBD	Weekday	500
358EX	Aurora Village - Seattle CBD	Sunday	100
372EX	Woodinville - Lake City - University District	Weekday	600
601EX	Seattle CBD - Group Health (Tukwila)	Weekday	250
Total hours needed			27,800

Some other routes had reliability problems but were determined not to need immediate investment, either because they have received reliability investments since spring 2013 or were deleted or have had major changes since spring 2013.

A list of all routes that exceeded the thresholds for reliability during the period analyzed for this report is in Appendix E.

FIG. 8

Routes Needing Investment to Improve Schedule Reliability



Priority 3 – Corridors below target service levels

Our analysis found that 58 corridors in the All-Day and Peak Network were below target service levels in one or more time periods in spring 2013. Nineteen corridors are new to this list in 2013 and three corridors from the 2012 list have dropped off. To bring service up to the target levels, an estimated 467,500 annual hours of investment would be needed—substantially higher than the 2012 need of 309,800 annual hours.

Table 12 lists the corridors that were below target service levels as of spring 2013; they are shown in Figure 9 (page 38). Priority among these corridors was established according to the service guidelines by ordering the corridors in descending order of points, first by the geographic value score, then by the productivity score, and finally by the social equity score. This priority order helps ensure that service enhancements are equitably distributed and productive.

TABLE 12
2013 Corridors Below Target Service Levels and Estimated Hours to Meet Service Level Targets, Ordered by Investment Priority

Shading indicates corridor is new to list of routes below target service level

* Indicates route received investment in 2012

Corridor number	Between	And	Major route	Estimated hours to meet target
105	U. District	Seattle CBD	49	4,700
12	Ballard	Seattle CBD	40	4,400
25	U. District	Seattle CBD	73	4,700
69	Northgate	Seattle CBD	16*	8,900
55	Lake City	Seattle CBD	41	14,600
99	Tukwila	Seattle CBD	124	9,300
9	Ballard	Northgate	40	4,400
68	Northgate	U. District	66 EX/67*	3,300
19	Burien	Seattle CBD	132	15,000
20	Capitol Hill	Westwood Village	60*	9,800
51	Kent	Seattle CBD	150*	7,500
84	Renton	Seattle CBD	101	7,300
32	Federal Way	Tukwila Intl Blvd Station	A Line	7,000
81	Redmond	Totem Lake	930 DART	11,000
33	Federal Way	Kent	183	12,400
50	Kent	Renton	169	5,400
52	Kent	Renton	153	13,100
83	Renton	Burien	140 ¹	18,000
3	Auburn	Burien	180	21,700
100	Tukwila	Highline CC	156	9,700
59	Madison Park	Seattle CBD	11	4,600
38	Greenwood	Seattle CBD	5	2,700
35	Fremont	U. District	32	5,900
5	Aurora Village TC	Seattle CBD	358 EX* ²	18,800
111	Westwood Village	Seattle CBD	C Line*	6,200

¹ Route 140 is slated to be deleted and replaced by RapidRide F Line in June 2014.

² Route 358 is slated to be deleted and replaced by RapidRide E Line in June 2014.

Corridor number	Between	And	Major route	Estimated hours to meet target
18	Burien	Seattle CBD	131	13,000
79	Rainier Beach Station	Capitol Hill	9 EX	17,900
57	Lake City	U. District	65	5,600
86	Renton	Seattle CBD	106	9,400
94	Shoreline CC	Northgate	345	8,600
45	Kenmore	U. District	372 EX	14,200
56	Northgate	U. District	75	4,500
87	Renton	Renton Highlands	105	2,800
112	Westwood Village	Seattle CBD	125	2,800
2	Alki	SODO	50	1,900
95	Shoreline CC	Lake City	330	4,500
16	Bellevue	Renton	240	7,600
37	Green River CC	Kent	164	11,100
49	Kent	Maple Valley	168	7,400
1	Admiral District	Tukwila	128	20,900
41	Issaquah	Overlake	269	11,100
101	Tukwila	Fairwood	155*	5,200
30	Enumclaw	Auburn	186/915 DART	2,600
64	Mount Baker Station	Seattle CBD	14	8,200
24	Colman Park	Seattle CBD	27	4,900
107	U. District	Seattle CBD	25	8,600
26	Discovery Park	Seattle CBD	33	3,100
72	Overlake P&R	Bellevue	226	6,500
92	Sand Point	U. District	30	1,700
70	Northgate	U. District	68	10,600
58	Laurelhurst	U. District	25	3,400
27	Eastgate	Bellevue	241	4,800
28	Eastgate	Bellevue	246	3,500
93	Aurora Village TC	U. District	373 EX	20,800
65	Mountlake Terrace	Northgate	347	2,000
71	Othello Station	SODO	50	1,900
89	Renton	Renton Technical College	908 DART	3,000
74	Pacific	Auburn	917 DART	3,000
Total				467,500

Change from 2012

The list of corridors below target service levels identified in spring 2013 differs from the spring 2012 list because of service investments and changes in corridor scores since the last report. Corridor scores changed because of changes in the thresholds used to set service levels, as described in Section 1, as well as changes in the underlying land use, social equity, and performance data. Table 13 lists the corridors that were below target service levels in 2012 but are no longer targeted for investment. Reasons for change include:

- **Service improvements made in 2012.** Service was improved on several corridors as part of the C and D line launch.
- **Lower ridership and productivity.** The ridership and productivity of major routes changed on several corridors. These corridors were targeted for less service because they needed less to meet existing demand.

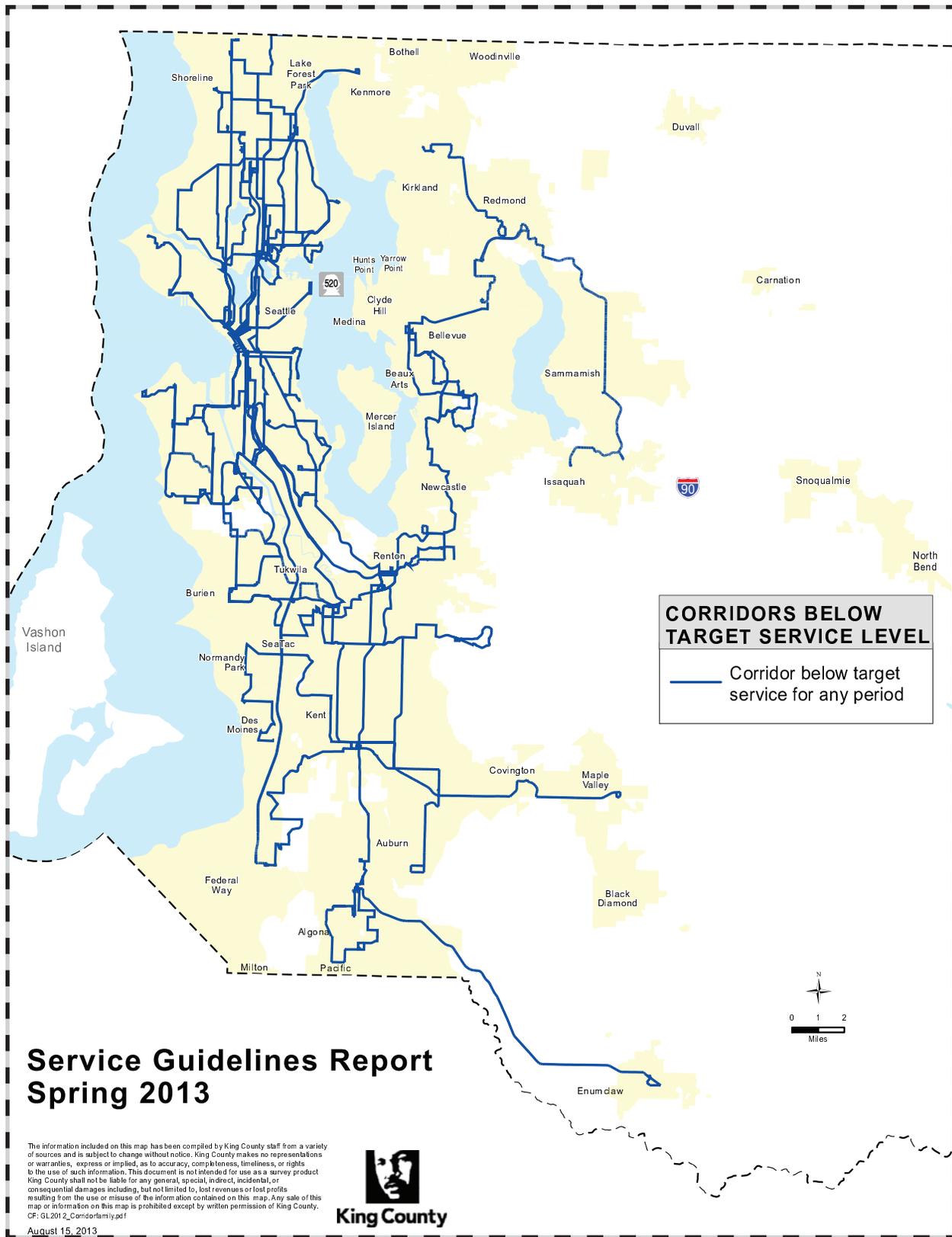
In general, we expect to see changes each year in corridors that are below target service levels as ridership, productivity, and social conditions evolve. Our analysis takes such changes into account as we determine what investments may be needed.

TABLE 13
2012 Corridors Below Target Service Levels that are No Longer Targeted for Investment

Corridor Number	Between	And	Major route	Reason for Change
11	Ballard	U. District	44	Lower off-peak ridership
21	Capitol Hill	Seattle CBD	10	Lower off-peak ridership
48	Kent	Burien	131	Service improvement

FIG. 9

2013 Corridors Below Target Service Levels



Priority 4 – High-productivity routes

Route productivity is assessed using two measures (see page 10). High-productivity routes are defined as those that perform in the top 25 percent of comparable routes on one or both measures in at least one time period.

In the spring 2013 period, of the 212 routes evaluated, 82 were in the top 25 percent on either or both productivity measures: rides per platform hour or passenger miles per platform mile.

Metro must become more productive and carry more riders to help fulfill the public transportation goal set in *Transportation 2040*—one reason why the guidelines define highly productive services as an investment priority. Investing in high-productivity routes in areas where there is latent demand for transit will result in higher ridership. A substantial portion of the growth needed to meet the *Transportation 2040* goals (an additional 2.6 million annual service hours) will be on high-productivity services.

Metro has demonstrated that investments in highly productive service lead to increased ridership. Examples are the RapidRide lines, where investments to improve frequency and quality of service have resulted in ridership growth on all four corridors: 55 percent increase on the A Line since October 2010, 20 percent increase on the B Line since October 2011, 51 percent increase on the C Line since September 2011, and 16 percent increase on the D Line since September 2012. The A and B Lines are among the top 25 percent of routes on both performance measures in all time periods. The C and D Lines are among the top 25 percent of routes on one or both performance measures in all time periods. We will continue to invest in high-productivity services when we restructure service, form service partnerships with local jurisdictions, or have other opportunities.

Many services that performed highly in 2012 continued to do so in 2013. Some notable groups of high-productivity routes that performed well on both measures include:

- **Current and future RapidRide routes.** In addition to the high performance of current RapidRide lines described above, Route 358 (future E Line), and Route 140 (future F Line) all performed in the top 25 percent on both measures for all time periods. The C and D lines performed in the top 25 percent for at least one of the measures during all time periods.
- **Downtown Seattle to University District routes.** Routes 49, 71, 72, 73, and 74 Express continue to be top performers that connect the largest transit markets in King County.
- **Commuter routes serving north Seattle.** Routes 15 Express, 17 Express, 18 Express, 26 Express, 74 Express, 76 and 316 are the top-performing commuter routes. These highly successful commuter routes operate in areas that have high demand for service, including Ballard, Green Lake, the University District, northeast Seattle, and Shoreline. Several of these routes are new to the group of high-performing routes, reflecting the restructure of service around the C and D lines in fall 2012 that consolidated services in northwest Seattle.
- **Routes connecting regional growth centers in south King County.** The network of routes that connect regional growth centers in south King County—128, 164, 166, 169, 180, and 181—continued to perform well in 2013. Their good performance is indicative of the strong demand for transit between regional growth and activity centers outside the Seattle core.
- **Routes that connect neighborhoods to Northgate.** The network of all-day routes in north King County connects several feeder routes with the high-performing Route 41, which connects Northgate to downtown Seattle. Routes 345, 346, and 347 provide neighborhood circulation as well as connection to Northgate. This group of routes performs well not just on service to downtown Seattle, but also on the neighborhood routes that both circulate and connect to the trunk service.

TABLE 14
2013 Routes in Top 25% on Both Measures in All Time Periods Served

Route	Description	Time Period
A Line	Federal Way - Tukwila	Peak, off peak, night
B Line	Bellevue - Crossroads - Redmond	Peak, off peak, night
15EX	Blue Ridge - Ballard - Seattle CBD	Peak
17EX	Sunset Hill - Ballard - Seattle CBD	Peak
18EX	North Beach - Ballard - Seattle CBD	Peak
26EX	East Green Lake - Wallingford - Seattle CBD	Peak
41	Lake City - Seattle CBD via Northgate	Peak, off peak, night
49	University District - Capitol Hill - Seattle CBD	Peak, off peak, night
71	Wedgwood - University District - Seattle CBD	Peak, off peak, night
72	Lake City - University District - Seattle CBD	Peak, off peak, night
73	Jackson Park - University District - Seattle CBD	Peak, off peak, night
74EX	Sand Point - Seattle CBD	Peak
76	Wedgwood - Seattle CBD	Peak
140 (F Line)	Burien TC - Renton TC	Peak, off peak, night
164	Green River CC - Kent Station	Peak, off peak, night
169	Kent Station - East Hill - Renton TC	Peak, off peak, night
316	Meridian Park - Seattle CBD	Peak
358EX	Aurora Village - Seattle CBD	Peak, off peak, night

TABLE 15
2013 Routes in Top 25% on Both Measures in at Least One Time Period Served

Route	Description	Time Period
D Line	Ballard - Seattle Center - Seattle CBD	Off peak, night
5	Shoreline CC - Seattle CBD	Peak, night
7	Rainier Beach - Seattle CBD	Off peak
66EX	Northgate TC - Eastlake - Seattle CBD	Peak
67	Northgate TC - University District	Off peak
101	Renton TC - Seattle CBD	Off peak, night
105	Renton Highlands - Renton TC	Off peak
120	Burien TC - Westwood Village - Seattle CBD	Night
128	Southcenter - Westwood Village - Admiral District	Peak, off peak
148	Fairwood - Renton TC	Night
166	Kent Station - Burien TC	Peak, off peak
168	Maple Valley - Kent Station	Off peak, night
180	Auburn - SeaTac Airport - Burien TC	Peak, off peak
181	Twin Lakes P&R - Green River CC	Peak, off peak
345	Shoreline CC - Northgate	Peak, off peak
346	Aurora Village - Northgate	Peak, off peak
347	Mountlake Terrace - Northgate	Peak, night

FIG. 10
Route Design and Productivity

The design guidelines in the service guidelines help Metro plan productive service. The diagram below illustrates how longer, direct routes that connect multiple activity centers (denoted by the red hexagons along the routes) tend to have high productivity, while services that circulate through neighborhoods or are too short to connect many destinations tend to perform below the performance thresholds.

Selected all-day routes in the **top** 25% performance thresholds for both measures for at least one period

Selected all-day routes **below** 25% performance thresholds for both measures for at least one period

