



2

Solid Waste
System Planning

Solid Waste System Planning

Policies

- PL-1 Monitor and report the amount, composition, and source of solid waste entering the transfer and disposal system.
- PL-2 Update the solid waste tonnage forecast to support short- and long-term planning and budgeting for facilities and operations.
- PL-3 Monitor and report waste prevention and recycling activity, including the amount of materials recycled, programmatic achievements, and the strength of commodity markets.
- PL-4 Work with the division's advisory committees, the cities, and the Solid Waste Interlocal Forum on solid waste management planning and decisions.
- PL-5 Incorporate principles of equity and social justice into solid waste system planning.
- PL-6 Consider climate change impacts and sustainability when planning for facilities, operations, and programs.

SOLID WASTE SYSTEM PLANNING

The solid waste management system has evolved from a relatively basic system of garbage collection and disposal to a much more complex network of collection, sorting, salvage, reuse, recycling, composting, and disposal managed by the county, area cities, and private-sector collection and processing companies. Initial improvements to solid waste facilities and operations have developed further to incorporate waste prevention and recycling programs that strive to balance resource use and conservation with production and consumption.

One of the early influences in the evolution of the system was the sweeping environmental legislation of the 1960s and 1970s, beginning in 1965 with the federal Solid Waste Management Act, which established strict regulatory standards for landfills and other solid waste facilities. Washington State subsequently passed its own waste management act, codified in Revised Code of Washington (RCW) 70.95, and established Minimum Functional Standards for Solid Waste Handling in the Washington Administrative Code (WAC 173-304). In 1976, the federal Resource Conservation and Recovery Act set even more stringent standards for environmental protection, including requirements for the use of impermeable bottom liners and daily cover at landfills. In response to the more stringent regulations, the county began closing the unlined community landfills across the region, replacing many of them with the more environmentally protective and geographically dispersed transfer facilities that are still in operation today. With the development of the transfer network and technological advances at the Cedar Hills Regional Landfill (Cedar Hills), division facilities and operations were brought into compliance with the new environmental standards, and a safe, efficient, and sustainable system of solid waste management was created. The standards have continued to evolve over time, and transfer facilities and landfills now operate in accordance with the Solid Waste Handling Standards (WAC 173-350) and Criteria for Municipal Solid Waste Landfills (WAC 173-351).

In addition to regulating solid waste handling and disposal, state law also established a framework for planning, authorizing counties to prepare coordinated comprehensive solid waste management plans in cooperation with the cities within their borders. While cities can choose to prepare their own plans, all of the incorporated cities within King County, except for Seattle and Milton, have chosen to participate in the development of a single, coordinated regional plan for the incorporated and unincorporated areas of King County. Since the late 1980s, cities have entered into



The county's service area comprises 37 cities and extensive unincorporated areas.

interlocal agreements (ILAs) with the county that establish the Solid Waste Division as the lead planning agency. By the time the first comprehensive solid waste management plan was adopted by the Metropolitan King County Council in 1990, there were 29 incorporated cities participating in this coordinated effort. Since then, 8 new cities have incorporated and joined the King County system – for a total of 37 cities.

Twenty years after publication of the division's first comprehensive solid waste management plan, the King County solid waste system began a transition to prepare for the next phase of solid waste handling in the region. Planning for this change is a multi-faceted effort – combining a wide array of data collection and analysis with extensive discussions among the division, its advisory committees, the cities, and other stakeholders. This combination provides the foundation for system planning that incorporates the varied perspectives, needs, and roles of the division and its regional participants.

To make sound planning decisions, it is important to understand how the solid waste system operates today and to identify changes that might affect it in the future. This information is critical to ensuring that plans for facilities, services, and programs meet the needs of the region in the years to come. With the sweeping changes on the horizon discussed in Chapter 1, working with stakeholders in the early stages of system planning has been essential. In addition to working with local jurisdictions and the private-sector collection companies, the division worked closely with its two advisory committees – the Solid Waste Advisory Committee (SWAC) and the Metropolitan Solid Waste Management Advisory Committee (MSWMAC). For the preparation of this plan, the division collaborated with the advisory committees in a process of discussion, analysis, and reporting that began in 2005. Through this iterative process of plan development, the ideas, goals, and strategies set forth in the plan have also been shared with the Regional Policy Committee acting as the Solid Waste Interlocal Forum (SWIF) and the County Council. This approach is described in detail in this chapter.

The chapter begins with a brief description of the fundamentals of solid waste system planning, outlining state, county, and city responsibilities. The next section identifies the participants in the planning process and describes the stakeholder process that guided the development of this plan. The final section describes the various planning tools and the forecasting process used to inform solid waste planning and decision-making.

A REGIONAL APPROACH TO SOLID WASTE PLANNING AND MANAGEMENT

As partners in a regional system, cities share in the costs and benefits of King County's transfer and disposal system. The regional solid waste system was formally established in King County when the county and cities entered into ILAs. ILAs have been signed between the county and the following cities:

Algona	Des Moines	Maple Valley	Sea Tac
Auburn	Duvall	Medina	Shoreline
Beaux Arts	Enumclaw	Mercer Island	Skykomish
Bellevue	Federal Way	Newcastle	Snoqualmie
Black Diamond	Hunts Point	Normandy Park	Tukwila
Bothell	Issaquah	North Bend	Woodinville
Burien	Kenmore	Pacific	Yarrow Point
Carnation	Kent	Redmond	
Clyde Hill	Kirkland	Renton	
Covington	Lake Forest Park	Sammamish	

In 2013, the county anticipates amending the *Solid Waste Interlocal Agreement of 1988* (original ILA), which the 37 cities listed above signed. The *Amended and Restated Solid Waste Interlocal Agreement* (new ILA) extends the original ILA by 12.5 years, from June 2028 through December 2040. The longer term will keep rates lower by allowing for longer-term bonding for capital projects.

The new ILA includes several other significant enhancements over the original ILA, including provisions for insurance and a reserve for environmental liabilities. Other changes include:

- Commitment to the continued involvement of the cities advisory group (to be renamed the Metropolitan Solid Waste Advisory Committee or MSWAC)
- An expanded role for cities in system planning, including long-term disposal alternatives and in establishing financial policies
- A dispute resolution process, which includes non-binding mediation
- Mitigation provisions for host cities and neighboring cities

Both the original and the new ILA assign responsibility for different aspects of solid waste management to the county and the cities. The county is assigned operating authority for transfer and disposal services, is tasked with providing support and assistance to the cities for the establishment of waste prevention and recycling programs, and is the planning authority for solid waste. Each city is the designated authority for collection services within their corporate boundaries and agrees to direct solid waste generated and/or collected within those boundaries to the King County transfer and disposal system.

Cooperation between the county and the 37 cities in a regional system of solid waste management has allowed us to achieve economies of scale that translate into lower fees for system ratepayers. A significant benefit is the savings realized by using an in-county landfill for solid waste disposal. Economies of scale will continue to be beneficial once the Cedar Hills landfill reaches capacity and closes, and the region transitions to a new method of solid waste disposal. The benefits also extend to the network of

recycling and transfer stations that provide convenient, geographically dispersed transfer points around the county. A regional system can operate with fewer transfer facilities than an aggregation of separate, smaller systems.

The county's implementation of the *Solid Waste Transfer and Waste Management Plan* (Transfer Plan) to renovate the aging transfer system to better serve its customers is well underway. This investment in the transfer system will help the division meet demands created by the growth in population over the last five decades, technological changes in the industry, and ongoing advances in the recycling and salvage of materials from the waste disposal stream.



The division hosts an informational tour of the Enumclaw Transfer Station for interested stakeholders.

Regional Authorities and Roles

As defined in RCW 70.95.030, solid waste handling includes management, storage, collection, transportation, treatment, utilization, processing, and final disposal. Responsibility for solid waste handling in Washington is divided among the state, counties, jurisdictional health departments, and the cities, as delineated in various legislation, regulations, and agreements. Table 2-1 lists the responsibilities for each entity, its role, and the guiding legislation.

As shown in the table, the state establishes authorities, minimum standards, and planning requirements, and delegates responsibility for implementation to the counties and cities.

Table 2-1. Roles in regional planning and administration

Entity	Role	Guiding Legislation, Regulation, or Agreement
Washington State Department of Ecology	Establish solid waste regulations for management, storage, collection, transportation, treatment, utilization, processing, and final disposal	Revised Code of Washington (RCW) 70.95
	Delegate authority to the counties to prepare joint comprehensive solid waste management plans with the cities in their boundaries, and review and approve those plans	RCW 70.95
	Set Minimum Functional Standards (MFS) for implementing solid waste regulations and establishing planning authorities and roles	Washington Administrative Code (WAC) 173-304, 173-350, and 173-351
Washington Utilities and Transportation Commission	Review the cost assessment prepared with the comprehensive solid waste management plan	RCW 70.95.096
	Regulate solid waste collection services and rates in unincorporated areas and in cities that choose not to contract for solid waste collection services	RCW 81.77
Public Health - Seattle & King County (as authorized by the King County Board of Health)	Permit solid waste handling facilities, including permit issuance, renewal, and, if necessary, suspension (handling facilities include landfills, transfer stations, and drop boxes)	Code of the King County Board of Health, Title 10
	Make and enforce rules and regulations regarding methods of waste storage, collection, and disposal to implement the state's MFS	Code of the King County Board of Health, Title 10
	Perform routine facility inspections	Code of the King County Board of Health, Title 10

Entity	Role	Guiding Legislation, Regulation, or Agreement
Solid Waste Interlocal Forum (SWIF)	The Regional Policy Committee convenes as the SWIF to advise the King County Council, King County Executive, and other jurisdictions, as appropriate, on all policy aspects of solid waste management and planning, and to review and comment on alternatives and recommendations for the comprehensive solid waste management plan and other planning documents	King County Code (KCC) 10.24.020C, and Interlocal Agreements
King County Solid Waste Division	Prepare the comprehensive solid waste management plan and associated cost assessment	RCW 70.95.080, KCC Title 10, and Interlocal Agreements
	Establish disposal fees at the landfill, transfer stations, and drop boxes to generate necessary revenue to cover solid waste management costs, including: <ul style="list-style-type: none"> • Facility operation • Capital improvements • Waste prevention and recycling • Grants to cities for recycling programs and special collection events • Self-haul and rural service • Administration and overhead 	RCW 36.58.040, KCC Title 10, and Interlocal Agreements
	Establish level of service and hours of operation for all King County transfer and disposal facilities	KCC Title 10.10
	Amend hours at transfer facilities, as necessary, to maintain safe and efficient operations	KCC 10.10.020
	Designate minimum service levels for recyclables collection in urban and rural areas	RCW 70.95.092, KCC Title 10.18
	Review impacts of the comprehensive solid waste management plan on solid waste and recycling rates	RCW 70.95
Cities	Participate in the planning process and jointly implement the plan with the county	RCW 70.95.080 and Interlocal Agreements
Solid Waste Advisory Committee	Advise the county in the development of solid waste programs and policies, provide feedback on proposed council actions involving solid waste issues, and comment on proposed solid waste management policies, ordinances, and plans prior to adoption	RCW 70.95.165 and KCC 10.28
Metropolitan Solid Waste Management Advisory Committee	Advise the Executive, SWIF, and County Council in all matters related to solid waste management and participate in the development of the solid waste management system and waste management plan	KCC 10.25.110 and Interlocal Agreements

Stakeholder Involvement in the Planning Process

In the development of the comprehensive solid waste management plan, the division sought participation and input from many sources, including the cities, the division's advisory committees, the Unincorporated Area Councils, commercial collection companies, the County Council, division employees, labor, and the public.

To represent the many perspectives of the residents and businesses in King County, the division has two advisory committees:

- The **Solid Waste Advisory Committee (SWAC)** was established under state law, RCW 70.95.165, and county code, KCC 10.28, and has been operating in an advisory capacity to the division since 1985. Representation on SWAC includes interested citizens, public interest groups, labor, recycling businesses, the marketing sector, manufacturing, the waste management industry, and local elected officials; membership is balanced geographically. SWAC typically meets with the division monthly to discuss solid waste management planning and decisions that affect county residents and businesses and the services they receive.
- The **Metropolitan Solid Waste Management Advisory Committee (MSWMAC)** was formed by county legislation in 2004 to establish a process for collaborative participation with the 37 cities that have signed ILAs with the county (KCC 10.25.110). The group consists of elected officials and staff from the cities. MSWMAC began meeting with the division on a monthly basis in 2005. The committee advises the County Executive, the SWIF, and the County Council on all matters related to solid waste management, and participates in development of the comprehensive solid waste management plan. The legislation that created MSWMAC also created a cities' staff working group – the Interjurisdictional Technical Staff Group (ITSG) – to assist MSWMAC in its work. ITSG comprised staff representatives from the cities, County Council staff, and the division. The group was very active during the initial stages of data gathering and analysis for the planning process, but is no longer meeting.

For the current planning cycle, the division met with SWAC and MSWMAC regularly to discuss their issues and concerns, and hear their perspectives on system planning. The contributions of these committees have been instrumental in developing the comprehensive solid waste management plan. The division's SWAC and MSWMAC websites contain background on the committees as well as minutes from their meetings with the division (KCSWD, updated monthly).

The Planning Process

In 1992, the county adopted a comprehensive solid waste management plan which called for the renovation of its aging urban transfer system. In 1994, the division proposed a rate increase to fund these projects. Without strong regional consensus about the need for improvements, the rate increase was not approved and renovation of the transfer system was put on hold. As a result, for the next 14 years no significant improvements were made to the urban transfer system beyond necessary safety improvements.

Since 1992, continuing growth in the county and technological changes in the industry have intensified the need for significant improvements and updates to the division's infrastructure. Given the scope of changes anticipated, both the cities and the county recognized the need for a more coordinated approach to the planning and decision-making process. In 2004, the County Council adopted Ordinance 14971, which prioritized evaluation of the urban transfer station network as an integral part of the waste management plan and established a process for collaborative participation by the cities in solid waste planning. This process led to the formation of MSWMAC and ITSG to work with the division to, among other things:

- Evaluate the division's current transfer stations
- Plan a future transfer station system
- Investigate disposal options outside of King County
- Evaluate rail, barge, and truck hauling options for waste export
- Review public/private ownership options
- Analyze financing, staffing, and rate impacts
- Define the facility siting process
- Establish a means of involving interested parties in the planning process
- Develop a waste export system plan to document the planning process and explain recommendations for a future system

Codified in KCC 10.25.110, Ordinance 14971 outlined an iterative process of analysis and reporting that would culminate in a package of recommendations for the system and established a forum, through the advisory committees, for the cities, the division and County Council staff to collaborate on solid waste planning. Much of the initial work was to evaluate the system as a whole and develop recommendations that would help inform and guide the direction of this plan.

Along with division staff, the committees first analyzed aspects of the solid waste system through four iterative milestone reports. These reports presented the following information:

- **Milestone Reports 1 and 2** (KCSWD and ITSG 2004; KCSWD 2005a) identified the need to renovate the county's urban transfer facilities by evaluating the current conditions of each facility. In the first milestone report, the division and advisory committees developed 17 criteria for evaluating the stations, which fall into three general categories of information: 1) level of service to users, 2) station capacity to handle solid waste and recyclable materials, and 3) the local and regional effects of each facility. Division staff presented detailed information on the existing conditions of individual facilities and worked with the advisory committees to apply the evaluation criteria. Results of these evaluations are presented in Milestone Report 2.

As described in Milestone Report 2 and discussed in more detail in Chapter 5, *Solid Waste Transfer System*, five of the six urban transfer stations – Algona, Bow Lake, Factoria, Houghton, and Renton – were evaluated using the 17 criteria. Each of the five transfer stations failed to meet between seven and 12 of the evaluation criteria. As a result of these detailed evaluations, the need for major transfer station renovations was established.

- Milestone Report 3** (KCSWD 2005b) discussed options for public and private ownership and operation of solid waste and recycling facilities in King County. Recommendations based on the options presented in Milestone Report 3 were reported in Milestone Report 4. In summary, the recommendation was to retain the current mix of public-private operations. Under this scenario, the private sector would continue to be the primary provider of curbside collection of garbage, recyclables, organics (yard waste, food scraps, and food-soiled paper), and construction and demolition debris (C&D); the division would remain the primary provider of solid waste transfer facilities; the private sector would continue to process recyclable materials and C&D; and the division would maintain the Cedar Hills landfill for disposal until it reaches capacity and closes. Once the landfill closes, disposal would be contracted to a private- or public-sector operation. The decision on the need for, number of, and type of intermodal facilities would be deferred until no more than five years before the implementation of waste export or other disposal technology.



The Algona Transfer Station is one of five urban stations evaluated in the Transfer Plan.

- Milestone Report 4** (KCSWD 2006a) identified packaged alternatives for the future configuration of the transfer station network, and decisions required to determine the capacity (or lifespan) of Cedar Hills; potential disposal locations once the landfill closes; the most feasible type of longhaul transport; the need for an intermodal facility or facilities; and the timing of waste export or other method of final disposal. A preferred alternative for the transfer system was identified.

These four milestone reports culminated in the *Solid Waste Transfer and Waste Management Plan* (Transfer Plan; KCSWD 2006b), which provides recommendations for upgrading the transfer station system and services; methods for extending the lifespan of Cedar Hills; and options for preparing the landfill for eventual closure. Through the process of analysis and reporting, the division's stakeholders had a significant role in shaping the recommendations in the Transfer Plan. At the conclusion of the process, they communicated their support of the plan to the King County Executive and the County Council.

Before final approval of the Transfer Plan, the County Council requested an independent third-party review of the Transfer Plan, which was conducted by the firm Gershman, Brickner & Bratton, Inc. (GBB). GBB fully supported the primary objectives of the plan to modernize the transfer station system and maximize the lifespan of the Cedar Hills landfill. Based on GBB's review and the support of both SWAC and MSWMAC, the County Council unanimously approved the Transfer Plan in December 2007. In addition, the County Council appropriated funds in the 2007 budget for the division to begin evaluating the feasibility of waste-to-energy technologies as an option for future waste disposal.

Because the collaborative planning process with SWAC and MSWMAC has been so successful, that planning

model was used for the preparation of this comprehensive solid waste management plan. Both SWAC and MSWMAC were involved in the development of policies and recommendations presented in each chapter of the plan. Because the cities and the county have a closely shared role in the development and implementation of waste prevention and recycling programs and services, the planning meetings have provided a forum for deciding what goals would be attainable by the region and how to go about meeting them (discussed in detail in Chapter 3, *Waste Prevention and Recycling*).



MSWMAC worked closely with the division throughout the development of the plan.

PLANNING TOOLS AND FORECASTING

The monitoring of solid waste disposal, recycling, and waste prevention, and the forecasting of future trends are fundamental to system planning. The division routinely collects data about the amount and composition of waste and recyclable materials in the system, tracks demographic and economic trends that will affect the amount of solid waste generated in the future, and conducts focused studies to address specific topics, such as markets for recyclable materials, industry trends, and new technologies.

Forecasts are used to estimate the amount of material expected to be disposed and recycled in the coming years, incorporating expected growth in population and other demographic and economic trends. This information can be used to estimate the necessary capacity of division transfer facilities and associated private-sector recycling facilities and markets.

Existing data and forecasts form the basis for discussions with cities and other stakeholders about options for the future, answering questions such as:

- How much waste are system users currently generating and expected to generate in the future?
- How can we reduce waste generation?
- What materials can be separated from the disposal stream and turned into a resource through reuse and recycling?
- Who uses the solid waste facilities and curbside services, how do they choose those services, how often are services used, and what influences their choices?
- How can these services best be provided?
- What changes in markets and technologies need to be incorporated into our analysis of options for the future?

Planning data, studies, and forecasts used in the development of this plan are discussed in the following sections.

Data Gathering and Reporting

The division collects information on the amount of garbage and recyclable materials generated in the region. This section describes the primary data sources used by the division.

Tonnage and Transaction Data

An automated cashiering system is used to track data on the tons of garbage received and number of customer visits at division transfer facilities. In-bound and out-bound scales weigh loads for all vehicles



Division transfer trucks weigh in at Cedar Hills to provide an accounting of the tons of waste disposed at the landfill each year.

except sedans, which are assigned an average weight of 320 pounds. These data are used to track overall garbage tonnage and transactions at individual stations. Data for recyclables accepted for a fee, such as yard waste, are also tracked by the cashiering system. For recyclables collected at no charge, data are provided to the division by the processing facility that receives them. Data on the amount and types of C&D recycled or disposed in the county are provided monthly to the division by some of the private-sector C&D facilities in the region. Other facilities report similar data to the Washington State Department of Ecology (Ecology), which are forwarded to the division annually.

Reports from Curbside Collection Companies and State Survey Data

The commercial collection companies that pick up curbside garbage and recyclables within the county provide monthly tonnage reports to the division. These reports provide information such as tons of garbage disposed, tons of materials recycled by material type, tons of organics recycled, and number of subscribers to garbage, recycling, and organics collection. In addition, Ecology requires recycling companies to report annually on the amount of recyclables they receive at their facilities; this information is also provided to the division.

Waste Monitoring Program and Telephone Surveys

Since the 1990s, the division has conducted a Waste Monitoring Program to understand who uses solid waste system facilities, what materials they bring to the stations, how and why they use our facilities, and how satisfied they are with the services provided. To answer these questions, the division conducts both waste characterization studies and customer surveys, as follows:

- Waste characterization studies are performed to analyze the waste stream and its components (Cascadia 2012a). At the transfer stations and drop boxes, random customer loads are sorted to identify what materials are being disposed by what category of customer – single-family residents, residents of multi-family units, and non-residential customers (businesses, institutions, and government entities). Studies of the C&D and organics streams have also been conducted. The studies help identify materials that are being thrown away that could have been recycled or reused. This information helps guide programs that will reduce the disposal of materials in the landfill. More detail about these studies is presented in Chapter 3, *Waste Prevention and Recycling*.
- In-person surveys are administered to customers bringing materials to transfer facilities (Cascadia 2009b). Customers are asked about the types of wastes they are bringing, the origin of those wastes, reasons for self-hauling (rather than using curbside collection services), how often waste is self-hauled, and willingness to separate out various recyclable materials. These surveys help us better understand the customers who visit the stations and, in turn, provide the proper levels of service. The surveys are also useful in informing programmatic decisions.
- Customer satisfaction surveys are also conducted at the stations to evaluate the level of satisfaction with customer service and the disposal and recycling services provided at division facilities (Cascadia 2008c). The division uses this information to monitor its performance and identify areas where improvements can be made.
- With the addition of curbside collection service for food scraps and food-soiled paper with yard waste, the division conducts periodic studies of organics collected at the curb (Cascadia 2012b). The information will be used to track the progress of organics collection and to focus education campaigns.
- In 2001, the division began characterization studies of C&D debris disposed at select private facilities by commercial and self-haulers, as well as small quantities delivered to division transfer stations by self-haulers. The study measures the composition of C&D materials that continue to be disposed instead of recycled. Two studies have been conducted to date, with the last study completed in 2008 (Cascadia 2009a).
- A periodic telephone survey of county residents explores behaviors and attitudes about household waste disposal, recycling, and waste prevention (Cascadia 2008b). The primary focus of the survey is to find out how familiar residents are with various waste prevention and recycling programs and services available in the region.

These studies and surveys are used to shape system planning, particularly waste prevention and recycling programs. With a better understanding of our customers and their waste management behaviors, the division can identify areas where enhanced promotion, education, or technical assistance may be needed.

Focused Planning Studies

To support overall system planning and determine appropriate rates, the division conducts focused studies to evaluate elements of the solid waste system and its operations, emerging technologies

and industry challenges, and private-sector markets for recycling and reuse. The division will conduct additional planning studies as needed to explore a variety of topics including best practices in solid waste management, alternative disposal technologies, and sustainable financing.

Major studies used in development of the plan are listed below.

Planning Studies

- *Solid Waste Transfer and Waste Management Plan (KCSWD 2006b)* – Provides recommendations to guide the future of solid waste management, including the renovation of the urban transfer system and options for extending the life of the Cedar Hills Regional Landfill. The plan was approved by the County Council in December 2007.
- *Final Environmental Impact Statement for the Cedar Hills Regional Landfill 2010 Site Development Plan (KCSWD 2010a)* – Identifies development alternatives for the landfill, outlines the environmental impacts of each alternative, and identifies potential mitigation measures, and recommends a preferred alternative.
- *Project Program Plan: Cedar Hills Regional Landfill 2010 Site Development Plan (KCSWD 2010b)* – Summarizes the preferred alternative for development of the landfill based on environmental review, operational feasibility, cost, stakeholder interest, and flexibility to further expand landfill capacity if future circumstances warrant. The plan was approved by the County Council in December 2010.
- *Executive Proposed Solid Waste Disposal Fees 2013-2014 (KCSWD 2012)* – Rate study that examines five key inputs – financial assumptions, tonnage forecast, revenue and expenditures projections, and required target fund balance – that determine solid waste disposal fees. Fees are calculated to ensure that revenues are sufficient to cover the costs of operations and services; funds are available for landfill closure and maintenance and capital investment projects for the transfer and disposal system; and a reserve Operating Fund balance is maintained.

Evaluation of Technologies

- *Comparative Evaluation of Waste Export and Conversion Technologies Disposal Options (R.W. Beck 2007)* – Provides a planning-level assessment and comparison of various solid waste conversion technologies and waste export. The division is continuing to monitor potential technologies and will make a recommendation in the next update of the comprehensive solid waste management plan.
- *2006 Material Recovery Facility (MRF) Assessment (Cascadia 2006a)* – Provides an assessment of four MRFs where commingled recyclables collected at the curb are sorted and processed. The purpose was to quantify and characterize materials processed at the MRFs. MRF activity and capacity will continue to be tracked as necessary to monitor the need for improvements and to ensure there is processing capability for additional materials diverted from disposal in the future.

Waste Prevention and Recycling Studies

- *Sustainable Curbside Collection Pilot* (KCSWD et al. 2008b) – Presents results of a pilot study to test the feasibility and public acceptance of every-other-week curbside garbage collection. Conducted in the City of Renton, the pilot study was performed in conjunction with Public Health – Seattle & King County and Waste Management, Inc.
- *Curbside Recycling in King County: Valuation of Environmental Benefits* (Morris 2008) – Examines the environmental costs and benefits of curbside recycling and composting in King County.
- *Estimated Market Value for Recyclables Remaining in King County's Disposal Stream* (Sound Resource Management 2006) – Evaluates the end-user market value of recyclable materials still prevalent in the waste stream, such as metals, organics, paper, and plastic.
- *Waste Monitoring Program: Market Assessment for Recyclable Materials in King County* (Cascadia 2006b) – Helps identify opportunities and establish priorities for market development and increased diversion of recyclable materials from the waste stream. Data from the market assessment are used to guide the direction of future recycling programs and services recommended in this plan.



Commercial collection companies provide the division with essential data on the amounts of garbage, recyclables, and organics collected curbside throughout the region.

Other Plans Considered

The comprehensive solid waste management plan is just one component of regional planning for land use, development, and environmental protection in King County. The division considers plans developed by the state, the county, and the City of Seattle in its own planning process to ensure consistency with other planning efforts in the region. The following list was used in the development of this plan; in future planning efforts, the division will refer to the newest version of these plans.

- *Washington State's Beyond Waste Project: Summary of The Washington State Hazardous Waste Management Plan and Solid Waste Management Plan, 2009 Update* (Ecology 2009a) – Presents the state's long-term strategy for systematically eliminating wastes and the use of toxic substances, including initiatives that focus on expanding the recycling of organic materials and advancing green building practices.

- *Strategic Climate Action Plan* (King County 2012) – Synthesizes King County’s most critical goals, objectives, strategies and priority actions to reduce greenhouse gas emissions and prepare for the effects of climate change. It provides a single resource for information about King County’s climate efforts.
- *2008 King County Comprehensive Plan with 2010 Update* (King County 2010a) – The guiding policy document for all land use and development regulations in unincorporated King County, the establishment of Urban Growth Area boundaries and regional services throughout the county, including transit, sewers, parks, trails, and open space. Updates to the 2008 plan were adopted by the County Council in October, 2010.
- *King County Strategic Plan* (King County 2010b) – Presents countywide goals for setting high standards of customer service and performance, building regional partnerships, stabilizing the long-term budget, and working together as one county to create a growing economy and sustainable communities. This comprehensive solid waste management plan supports each of the primary goals of the King County Strategic Plan, with particular emphasis on environmental sustainability and service excellence.
- *On the Path to Sustainability and 2004 Plan Amendment* (City of Seattle 1998/2004) – The City of Seattle’s solid waste management plan, including goals for recycling and waste prevention. A draft update to this plan was released in 2012, but has not been finalized at this time.
- *2010 Local Hazardous Waste Management Plan Update* (Watson et al. 2010) – Presents plans for managing hazardous wastes produced in small quantities by households and businesses and for preventing these wastes from entering the solid waste stream.

Additional Planning Considerations

Climate Change

Climate impacts are considered by the division when planning for future programs, facilities, and operations, in accordance with the state’s Beyond Waste project and the county’s climate plan. Climate change is manifest in the long-term trends in average weather patterns, including the frequency, duration, and intensity of wind and snow storms, cold weather and heat waves, drought, and

Cities in King County Support Climate Protection

As of this writing, 16 cities in King County’s service area have signed the U.S. Conference of Mayors Climate Protection Agreement. Former Seattle Mayor Greg Nickels launched the initiative to promote the participation of U.S. cities in the goals of the Kyoto Protocol. Among the more than 900 cities that have signed on nationwide, local cities have committed to meeting or exceeding targets of the Kyoto Protocol in their own communities and advocating for the reduction of GHG emissions at all levels of government.

Participating cities within the King County service area include:

Auburn	Pacific
Bellevue	Redmond
Burien	Renton
Carnation	Sammamish
Clyde Hill	Shoreline
Issaquah	Snoqualmie
Kirkland	Tukwila
Lake Forest Park	Yarrow Point

flooding. Planning for climate change means taking into account both how we might reduce our effects on the climate, today and in the future, and how changes in climate might affect our facilities and operations.

At a regional level, the division and its planning participants continue to strengthen and broaden waste prevention and recycling programs to continually improve our long-term, positive effects on the environment (discussed in detail in Chapter 3, *Waste Prevention and Recycling*). As discussed in Chapter 3, the benefits are tangible in terms of reductions in greenhouse gas (GHG) emissions, resource conservation, and energy savings.

Considerations of how division activities and operations might affect climate change involve both positive and negative impacts on GHG emissions. If areas where GHG emissions can be expected to occur are identified, strategies to mitigate those emissions can be developed, for example:

- The division is building facilities (such as the Shoreline and Bow Lake Recycling and Transfer Stations) that are more energy efficient and use green power, including solar power, to meet Leadership in Energy and Environmental Design standards and protocols.
- Garbage compactors are being installed at all new stations, which will decrease truck trips, saving fuel and decreasing emissions.
- In day-to-day operations, the division looks for ways to reduce resource use and increase the use of environmentally friendly products.
- The division contracts with Bio Energy (Washington) LLC to turn landfill gas into pipeline-quality natural gas for the energy market.

We also look at the potential impacts of climate change on division facilities and operations and determine strategies for adapting to those impacts. For example, the division is using more drought-tolerant plants in facility landscapes and identifying alternate transportation routes to avoid areas where there may be an increase in seasonal flooding.

Equity and Social Justice

King County is committed to ensuring that equity and social justice are considered in the development and implementation of policies, programs, and funding decisions. **Equity** is achieved when all people have an equal opportunity to attain their full potential. Inequity occurs when there are differences in well-being between and within communities that are systematic, patterned, unfair, and can be changed. These differences are not random; they are caused by our past and current decisions, systems of power and privilege, policies, and the implementation of those policies. **Social justice** encompasses all aspects of justice, including legal, political, and economic; it demands fair distribution of public goods, institutional resources, and life opportunities.

In solid waste system planning, the division examines ways that we may affect equity and social justice through our programs and services.

- Fair distribution of transfer facilities and division resources, such as the community litter cleanup, school education, and green building programs, helps ensure that everyone has access to services that create safer and healthier communities.
- The division provided technical assistance to ensure that the benefits of green building strategies, such as lower energy costs and improved indoor air quality, are available to residents of affordable housing developments. These efforts are discussed in more detail in Chapter 3, *Waste Prevention and Recycling*.
- In siting new transfer facilities, the division engages communities to ensure equal opportunity for involvement in the siting process. The division utilizes demographic data to ensure that these essential public facilities are distributed equitably throughout the county and that any negative impacts of the facilities do not unfairly burden any community.
- In addition to translating materials into multiple languages, the division has added a Spanish-language component to its comprehensive outreach programs. Rather than simply translate existing materials, the division has worked directly with the local Spanish-speaking community to create new programs and materials in Spanish that respond to the questions and needs of the community.

Forecasting

The division uses a planning forecast model to predict future waste generation over a 20-year period. Waste generation is defined as waste disposed plus materials recycled. The forecast is used to guide system planning, budgeting, rate setting, and operations. The primary objectives of the model are to 1) estimate future waste disposal and 2) provide estimates of the amount of materials expected to be diverted from the waste stream through division and city waste prevention and recycling programs. The planning forecast

model relies on established statistical relationships between waste generation and various economic and demographic variables that affect it, such as population, employment, and income.

In 2007, garbage tons received at Cedar Hills surpassed the 1 million mark, due primarily to steady economic growth and population increases in the region over the previous few decades. In late 2007, a nationwide financial crisis upended the division's ability to forecast short-term trends in the economy using the forecasting model. Between December 2007 and December 2012, however, garbage tons disposed at



Demographic trends in the region, such as growth in employment, are used to forecast the generation of garbage and recyclables.

Cedar Hills declined 20 percent overall. Garbage tons dropped 8 percent in 2008 alone. The City of Seattle, surrounding counties, and jurisdictions in Oregon and California reported similar or greater declines in tonnage, as did regional recycling firms.

The recession created a great deal of unpredictability in variables used in the division's forecasting model to predict the short-term (1- to 5-year) trends in solid waste generation. To respond to this uncertainty, the division has adjusted its approach to forecasting, using a more flexible system of ongoing monitoring. This interim forecasting method involves:

- Monitoring solid waste tons delivered to division transfer stations and the Cedar Hills landfill on a daily basis
- Regularly checking regional and state-wide economic forecasting activities (local economic forecasting firm Dick Conway and Associates, King County economic forecast, Washington State Economic and Revenue Forecast Council)
- Monitoring state-wide tax revenue streams, particularly in the home improvement sector, furniture store sales, clothing sector, and other key markets
- Communicating regularly with other jurisdictions about the trends in their service areas

This information has been used to forecast short-term tonnage and subsequent revenues for use in critical budgeting, expenditure control, and management of capital projects over the 3- to 5-year period. The division will continue to use this interim forecasting method until the economy recovers from the recession and some degree of predictability returns. Once that occurs, the forecasting model will need to be adjusted and recalibrated to reflect changes created by the multi-year recession and recovery periods. Economists are indicating that the recession is over, although economic recovery will take some time. In the solid waste industry, garbage tonnage has not returned to 2007 levels, but declines have begun to moderate.

In the meantime, the division routinely updates its long-term, 20-year forecast for use in planning. As mentioned previously, to predict solid waste generation over the long term, the planning forecast model relies on established statistical relationships between waste generation and various economic and demographic variables that affect it, such as:

- Population of the service area
- Employment
- Household size in terms of persons per household
- Per capita income (adjusted for inflation)

Increases in population, employment, and per capita income and decreases in household size typically lead to more consumption and hence more waste generated. Studies indicate that for the long-term planning forecast through 2032, the following trends are expected:

- Population is expected to grow at a steady rate of 1 percent per year. Population growth is directly correlated with the amount of waste generated, i.e., more people equal more waste generated.
- Employment is expected to increase following recovery from the recession at an annual rate of 1.8 percent. Increased employment activity typically leads to an increase in consumption and waste generation.
- Household size is expected to decrease from an average of about 2.6 persons per household to 2.4 persons per household. The trend in household size reflects a nationwide move toward smaller family size and an aging population. Because a "household" implies a certain level of maintenance, mail, purchasing, and so on, a decrease in household size tends to increase waste generation per capita.
- Per capita income is expected to grow by about 2 percent per year through 2032, adjusted for inflation. As with employment activity, increases in income typically lead to an increase in consumption and waste generation.

Data Sources: Projections for population and household size are based on 2006 data developed by the Puget Sound Regional Council (PSRC). Data provided by PSRC are based on U.S. Census and other data sources and developed in close cooperation with the county and the cities. The income and employment data were provided in 2010 by the local economic forecasting firm of Dick Conway and Associates.

Developing the tonnage forecast is a two-step process, in which waste disposal and waste diversion are calculated separately. In the first step, an econometric model is used to relate historical data for waste disposal and recycling to past demographic and economic trends in the region. Once these relationships are established, the model can be used to project future waste generation based on expected trends over the planning period, in this case to 2032. This first step produces a baseline disposal forecast, which assumes that the percentage of waste recycled remains constant.

In the second step, the future goals for waste prevention and recycling, incorporating additional programs and strategies for increasing waste diversion (discussed in Chapters 3 and 4), are used to calculate how much additional material we expect to be diverted from disposal given the same demographic and economic trends. This information is used to adjust the baseline forecast. Data on tons of materials recycled are provided by the curbside collection companies, division data from transfer facilities, and survey data collected annually by Ecology.

Figure 2-1 shows the projection of waste generation from 2012 through 2032.

The projections shown in Figure 2-1 are based on a forecast developed in the first quarter of 2013. The 1- to 5-year projections have been adjusted to reflect current data on the state of the recession. The chart also incorporates the goals established for waste prevention and recycling presented in Chapter 3, assuming we will reach the goal of 55 percent recycling in 2015 and 70 percent in 2020. The tonnage forecast will be routinely adjusted to reflect factors that affect waste generation, such as the success of waste prevention and recycling programs and future events that affect economic development.

Figure 2-1. Projection of solid waste generated, recycled, and disposed 2012 - 2032

