Draft 2009 Comprehensive Solid Waste Management Plan

October 2009

King County
Department of Natural Resources and Parks
Solid Waste Division

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ACRONYMS, ABBREVIATIONS, AND COMMON TERMS

Acronyms and Abbreviations

2001 Solid Waste Plan	*Final 2001 Comprehensive Solid Waste Management Plan*
ARRA	American Recovery and Reinvestment Act
C&D	construction and demolition debris
CAC	Citizens Advisory Committee
CERP	Capital Equipment Recovery Program
Conversion Technology Report	*Comparative Evaluation of Waste Export and Conversion Technologies Disposal Options*
CRT	cathode ray tube
dBA	decibel
DNRP	Department of Natural Resources and Parks
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EECBG	Energy Efficiency and Conservation Block Grant Program
FEMA	Federal Emergency Management Agency
GBB	Gershman, Brickner & Bratton, Inc.
GHG	greenhouse gas
HDPE plastic	high-density polyethylene plastic
Health Department	Public Health – Seattle and King County
HHW	household hazardous waste
ILA	Interlocal Agreement
ITSG	Interjurisdictional Technical Staff Group
KCBOHC	King County Board of Health Code
KCC	King County Code
LDPE plastic	low-density polyethylene plastic
LEED	Leadership in Energy and Environmental Design
LHWMP	Local Hazardous Waste Management Program
LRF	Landfill Reserve Fund
MFS	Minimum Functional Standards for Solid Waste Handling
MRF	material recovery facility
MSWMAC	Metropolitan Solid Waste Management Advisory Committee
NWPSC	Northwest Product Stewardship Council
PET plastic	polyethylene terephthalate plastic
PSCAA	Puget Sound Clean Air Agency
PSRC	Puget Sound Regional Council
PVC plastic	polyvinyl chloride plastic
RCW	Revised Code of Washington
SEPA	State Environmental Protection Act

Site Development Plan	Cedar Hills Regional Landfill Site Development Plan
SWAC	Solid Waste Advisory Committee
SWIF	Solid Waste Interlocal Forum
Transfer Plan	2006 *Solid Waste Transfer and Waste Management Plan*
UAC	Unincorporated Area Council
UASI	Urban Area Security Initiative
WAC	Washington Administrative Code
WPR	waste prevention and recycling
WUTC	Washington Utilities and Transportation Commission

Common Terms

basic fee – the per-ton fee charged to customers disposing of municipal solid waste at transfer facilities.

beneficial use – the use of solid waste as an ingredient in a manufacturing process, or as an effective substitute for natural or commercial products, in a manner that does not pose a threat to human health or the environment (WAC 173-350).

clean wood –unpainted and untreated wood that can be recycled or salvaged for reuse.

commercial collection company – a private-sector company that collects garbage, recyclables, and organics from residents and businesses.

compost – the product resulting from the controlled biological decomposition of organic waste, which is beneficial to plant growth when used as a soil amendment.

construction and demolition debris (C&D) – debris from the construction, remodeling, repair, or demolition of buildings, other structures, and roads, including clean wood, painted and treated wood, gypsum wallboard, roofing, siding, structural metal, wire, insulation, packaging materials, and concrete, asphalt, and other aggregates.

conversion technology – a process which converts solid waste from a waste product to a useful form of energy and/or useable byproduct, generally with some residual, unusable component that must be sent for disposal (R.W. Beck 2007).

climate change – changes in the long-term trends in average weather patterns of a region, including the frequency, duration, and intensity of wind and snow storms, cold weather and heat waves, drought, and flooding; climate change is attributed primarily to the emission of greenhouse gases, including such compounds as carbon dioxide and methane.

debris management site – temporary site where debris can be taken after a major emergency, such as flood, windstorm, or earthquake, until it can be sorted for recycling or proper disposal.

diversion –any practice or program that diverts solid waste from disposal in the landfill.

drop box – scaled-down facilities, designed to provide cost-effective, convenient drop-off services for garbage and recycling primarily for self-haulers in the rural areas of the county.

equity – 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; they are not random, as they are caused by our past and current decisions, systems of power and privilege, policies, and the implementation of those policies.

garbage –municipal solid waste that is disposed of in the landfill.

green building – the practice of creating and using healthier and more resource-efficient methods of construction, renovation, operation, maintenance, and demolition of buildings and other structures.

greenhouse gas – any gas that contributes to the "greenhouse effect" such as carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, chlorodifluoromethane, perfluoroethane, and sulfur hexafluoride.

Interlocal Agreement – an agreement between a city and the county for use of the King County transfer and disposal system for solid waste generated or collected within that city (KCC 10.04.020).

landfill gas – gas generated through the decomposition of waste buried in the landfill, which consists of about 50 to 60 percent methane and about 40 to 50 percent carbon dioxide, with less than 1 percent hydrogen, oxygen, nitrogen, and other trace gases.

leachate – water that percolates through garbage at the landfill and requires collection and treatment before being set to a wastewater treatment plant.

Leadership in Energy and Environmental Design (LEED) – the recognized standard for measuring building sustainability: the rating system evaluates buildings in six areas: sustainable site development, water savings, energy efficiency, materials and resources selection, indoor environmental quality, and innovation and design.

non-residential generator – businesses, institutions, and government entities that generate solid waste.

organics – yard waste, food scraps, and food-soiled paper.

product stewardship – a management strategy used to encourage the environmentally friendly design of products and to shift the responsibility for managing a product at its end of life from government to product manufacturers.

regional direct fee – the fee charge to commercial collection companies that haul solid waste directly to the Cedar Hills Regional Landfill for disposal instead of to a transfer facility.

self-hauler – both residential and non-residential customers that bring garbage, recyclables, and/or yard waste to division transfer facilities.

social justice – encompasses all aspects of justice, including legal, political, and economic; it demands fair distribution of public goods, institutional resources, and life opportunities.

solid waste – all materials discarded including garbage, recyclables, and organics.

special waste – wastes that require special handling and waste clearance before disposal because of legal, environmental, public health, or operational concerns, such as industrial wastes, asbestos-containing materials, contaminated soil, treated biomedical wastes, treatment plant grit and vactor wastes, and other miscellaneous materials.

standard curbside recyclables – glass and plastic containers, tin and aluminum cans, mixed waste paper, newspaper, and cardboard.

tipping fee – the per-ton fee charged to the commercial collection companies that collect garbage curbside and to residential and non-residential self-haulers who bring wastes to the transfer facilities themselves.

waste generation – waste disposed + materials recycled.

waste prevention – the practice of creating less waste, which saves the resources needed to recycle or dispose of it.

waste-to-energy technology – a thermal technology, also known as incineration, that uses a high-temperature combustion system to convert refuse to energy in a controlled environment, such as mass burn waste-to-energy, refuse derived fuel, and advanced thermal recycling.

Zero Waste of Resources – a principle designed to eliminate the disposal of materials with economic value. Zero waste does not mean that no waste will be disposed; it proposes that maximum feasible and cost-effective efforts be made to prevent, reuse, and reduce waste.

FORWARD

This preliminary *Draft 2009 Comprehensive Solid Waste Management Plan* (the plan) presents proposed strategies for managing King County's solid waste over the next 6 years, with consideration of the next 20 years. The plan was prepared by the Solid Waste Division (the division) of the Department of Natural Resources and Parks in accordance with Washington state law Revised Code of Washington (RCW) 70.95.

The division is seeking comments on this preliminary draft. Copies of the plan have been provided to King County cities, Unincorporated Area Councils, and the King County Council and will be available for public review at all King County libraries. The plan is also available on the division's Web site at *www.kingcounty.gov/SWDCompPlan* for review by the public and other stakeholders. Beginning October 8, 2009, the division will be taking comments on the plan via e-mail, letter, or a comment form available at libraries and on the Web site. The comment period extends through February 4, 2010. Comments by e-mail can be sent to *CSWMP.Comments@kingcounty.gov*. Letters should be addressed to:

2009 Draft Solid Waste Plan Comments
King County Solid Waste Division
201 S. Jackson St., Suite 701
Seattle, WA 98104-3855

State law delegates authority to the county to prepare a comprehensive solid waste management plan in cooperation with the cities within its boundaries. An Interlocal Agreement (ILA) is required for any city participating in a joint city-county plan (RCW 70.95.080(2)). This plan was prepared in cooperation with 37 King County cities with which the county has ILAs (all cities in the county except for Seattle and Milton). Participants in development of the plan included the division's two advisory committees – the Solid Waste Advisory Committee and the Metropolitan Solid Waste Management Advisory Committee. The planning process is discussed in more detail in Chapter 2, *Solid Waste System Planning*.

The plan builds upon the 2006 *Solid Waste Transfer and Waste Management Plan* that was approved by the King County Council in December 2007. The plan presents draft policies, recommendations, and goals in the following areas: solid waste system planning, waste prevention and recycling, collection and processing, the transfer system, solid waste disposal and landfill management, and system financing. A cost assessment, as required by the Washington Utilities and Transportation Commission (WUTC), is provided in Appendix A.

A final draft plan will be released after consideration of comments, preliminary review by the Washington State Department of Ecology (Ecology), review by the WUTC, and completion of an environmental review under the State Environmental Policy Act (SEPA) requirements. The final draft plan must be adopted by:

- Cities representing three-quarters of the total population of the cities that act on the plan during the 120-day adoption period
- The Regional Policy Committee acting as the Solid Waste Interlocal Forum
- The King County Council

After adoption and completion of SEPA review, the final draft plan will be submitted to Ecology. The draft plan becomes final upon approval by Ecology.

Draft schedule for plan completion

October 8, 2009	Release preliminary draft plan
October 8, 2009 – February 4, 2010	Preliminary draft review and comment period
Dates to be determined (tbd)	Revise preliminary draft to incorporate comments
Dates tbd – up to 120 days	Ecology review of preliminary draft
Dates tbd	Revise preliminary draft to incorporate Ecology's comments
Date tbd	Release final draft
Dates tbd – 120-day period	City adoption process
Dates tbd	Regional Policy Committee adoption process
Dates tbd	King County Council adoption process
Date tbd	Submit final draft to Ecology
Dates tbd – up to 45 days after final draft submittal	Ecology approval period

1

Introduction

INTRODUCTION

The last few decades have brought about significant developments in the management of solid waste – stemming not only from advances in technology and the changing marketplace, but from a widespread recognition of the pivotal role of waste prevention, resource conservation, and environmental protection.

Since its inception in the 1960s, the core mission of the King County Solid Waste Division (the division) has been to ensure that citizens in the county have access to safe, reliable, efficient, and affordable solid waste handling and disposal services. Over the last 20 years, that mission has expanded to integrate the principles of environmental stewardship and sustainable development into every aspect of solid waste management.

The county's Cedar Hills Regional Landfill is a state-of-the-art facility that meets the highest standards for protection of human health and the environment.

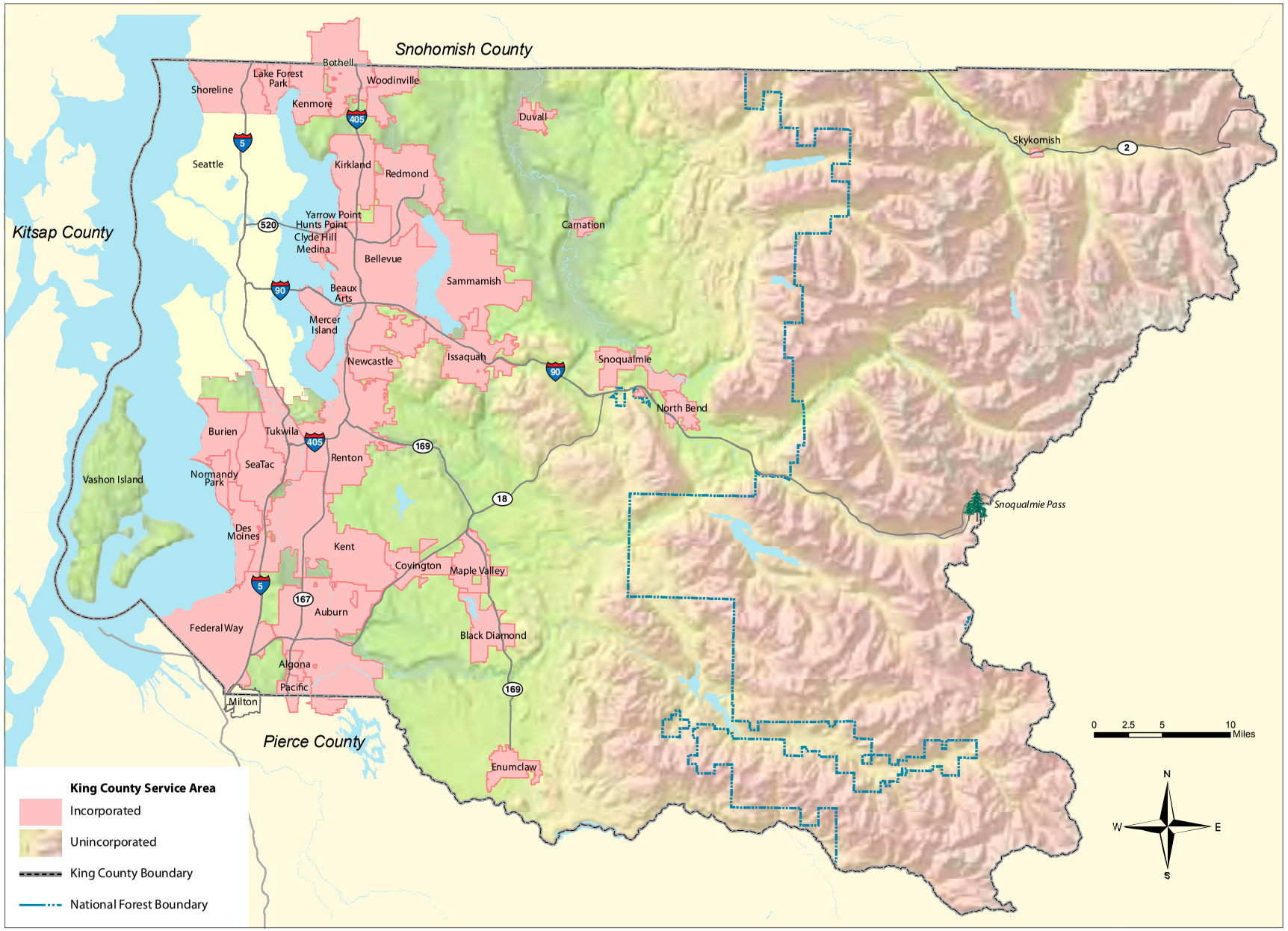
This preliminary *Draft 2009 Comprehensive Solid Waste Management Plan* builds upon those principles in our facility designs, operations, and programs for the future. This is also the first King County solid waste plan to look at ways to address climate change – one of the nation's leading environmental concerns (see page 1-5).

The King County solid waste system comprises 37 of the 39 cities in the county (including all but the cities of Seattle and Milton) and the unincorporated areas of King County. In all, the county's service area, shown in Figure 1-1, covers approximately 2,050 square miles. There are about 1.3 million residents and 690,000 people employed in the service area.

Over time, the management of solid waste has evolved from a relatively simple system of garbage collection and disposal to a much more complex network of collection, transportation, and processing for garbage, recyclables, organics (yard wastes and food scraps), and construction and demolition debris (C&D). This integrated network combines the infrastructure and services of both the public and private sectors to provide long-term capacity for solid waste management in the region.

Through this system, in 2007 about 1 million tons of garbage was disposed at the county-owned Cedar Hills Regional Landfill. In addition, more than 900,000 tons of materials was recycled or composted, and about 132,000 tons of C&D was recycled or reused. Studies show that even more can be done to reduce disposal through waste prevention, reuse, and recycling.

Figure 1-1. King County service area



With this plan, the division is building upon past and current efforts to increase waste prevention and recycling (WPR) and advance green building practices in the region's communities and within our own operations. We continue to refine operational practices and facility designs in ways that further reduce our carbon footprint and promote the greening of our natural and built environments. All of the participants in the countywide solid waste management system – from the 37 cities within the county's borders to the private-sector collection and processing companies to the individual businesses and residents – are contributing to these vital efforts in their own operations and practices.

A number of milestones have been achieved since the county published its last comprehensive solid waste management plan in 2001. These achievements are exemplified in current programs, facility designs, and operational practices and reflect the broader mission of solid waste management in the region. The following sections briefly summarize key accomplishments and the future direction of solid waste management within each aspect of our operations.

TAKING A REGIONAL APPROACH TO SYSTEM PLANNING

In 2004, the King County Council adopted Ordinance 14971 to establish a process for the 37 cities in the county's service area to collaborate with the division in the early stages of long-term planning and policy development. It set the stage for creation of the Metropolitan Solid Waste Management Advisory Committee (MSWMAC), which consists of elected officials and staff from participating cities.

MSWMAC and the long-standing Solid Waste Advisory Committee (SWAC) have been instrumental in the development of policies, goals, and recommendations presented in this plan. SWAC has been an advisory group to the division since 1985, with a membership that includes King County citizens and representatives from public interest groups, labor, recycling businesses, the marketing sector, manufacturing, the waste management industry, and local elected office.

Beginning as early as 2005, both SWAC and MSWMAC have been meeting with the division to create the building blocks that would form the basis for this plan. Collaborative efforts that have helped shape the plan include:

- Establishing progressive goals for WPR that will further reduce solid waste disposal over the next 10 years
- Conducting in-depth analyses and evaluations of the solid waste transfer system that resulted in the development and adoption of a major renovation plan for the transfer system network
- Evaluating strategies for extending the life of the Cedar Hills Regional Landfill and beginning to explore viable options for future waste disposal once the landfill closes

Joint planning with SWAC and MSWMAC has proven to be a highly effective tool for achieving regional consensus on solutions to the challenges facing the region's solid waste system in the future.

LEADING THE WAY IN WASTE PREVENTION, RECYCLING, AND PRODUCT STEWARDSHIP

King County continues to gain distinction as a leader in WPR. Together, the division and the cities work with the area collection and processing companies and local, state, and national businesses and organizations to develop the innovative programs and services that give the county its leading edge. Some key program developments include:

- The addition of new recyclable materials for collection at the curb and at division transfer stations
- Growing markets for a wider array of materials for recycling and reuse
- Successful promotions that encourage waste prevention
- An increase in product stewardship, whereby manufacturers and retailers are assuming responsibility for recycling the products they produce or sell through take-back programs at selected collection sites across the region
- Advancements in the green building industry, including a focus on creating sustainable housing in affordable communities

With technical and financial assistance from the division's green building program, the City of Sammamish built a new city hall that showcases environmentally sustainable building and construction.

County Climate Teams Tackle Climate Change

Climate change refers to changes in the long-term trends in average weather patterns of a region, including the frequency, duration, and intensity of wind and snow storms, cold weather and heat waves, drought, and flooding. Climate change is attributed primarily to the emission of greenhouse gases, including such compounds as carbon dioxide and methane.

Proper solid waste management plays a significant role in reducing greenhouse gas emissions. That role has been recognized by both state and local governments in Washington. In 2004, the Washington State Department of Ecology (Ecology) issued its Beyond Waste plan (Ecology 2004), which presents a long-term strategy for systematically eliminating wastes and the use of toxic substances. It includes initiatives that focus on expanding the recycling of organic materials and advancing green building practices. In turn King County issued a 2006 Executive Order and subsequent *2007 King County Climate Plan* (King County 2007) that looks at the role of county government at its many levels of operation. The county's climate plan sets a target of reducing overall greenhouse gas emissions in county operations by 80 percent below 2007 levels by the year 2050. Goals in the plan include the development and use of waste-to-energy technologies, waste prevention, and the use of climate-friendly materials.

To develop comprehensive strategies and goals for addressing climate change, climate teams are forming at all levels of county government from the Executive's office to individual departments and divisions. The Solid Waste Division Climate Team has been formed to coordinate efforts that have already begun throughout the division and to establish goals and strategies for future efforts. The division is also tracking and reporting its progress to the Department of Natural Resources and Parks Climate Team to support department and countywide goals.

Throughout this plan, we have noted current or planned changes in facility designs, operations, and programs that take into account how we might reduce our effects on the climate and adapt to changes that do occur. There are three primary methods for reducing those effects:

- **Mitigation** – directly or indirectly reducing emissions. Examples include reducing energy use at division facilities, reducing fuel use, using hybrid vehicles and alternative fuels (such as biodiesel), and promoting WPR to reduce the mining of virgin resources and emissions from manufacturing and processing activities. Another example is the conversion of gas collected at the county's Cedar Hills Regional Landfill into pipeline-quality natural gas for use in the region's power grid – which replaces the use of natural gas from a non-renewable source.
- **Adaptation** – modifying facilities and operations to address the effects of climate change. Examples include modifying facility designs to adapt to more severe weather systems (e.g., constructing roof structures designed to handle greater snow loads), 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.
- **Sequestration** – removing carbon dioxide from the atmosphere and depositing it back into natural "sinks," such as plants and soils. Examples include planting more trees around facilities to remove carbon dioxide through photosynthesis and using compost to replenish depleted soils and promote plant growth.

Powered by solar panels, weather stations provide data to support environmental monitoring and maintenance at several division facilities.

- An increase in organizations that accept materials for reuse, such as clothing and textiles, usable food supplies, and reusable building materials

With this plan, the division and its advisory committees have set goals to step up regional efforts to reduce, reuse, and recycle by focusing on specific waste generators and particular materials or products that remain prevalent in the waste stream.

The new process for recycling electronic wastes exemplifies the results that can be achieved when area manufacturers, retailers, and local governments work together on a major initiative. State legislation was passed in 2006 that requires manufacturers of computers, monitors, and televisions – referred to as e-waste – to provide for the recycling of these products beginning in January 2009. As a member of the Northwest Product Stewardship Council, the division helped draft the model legislation that led to formation of the E-Cycle Washington program, which implements this recycling service at no cost for Washington residents, small businesses, local governments, nonprofit organizations, and school districts. The division assisted businesses throughout the county in becoming authorized e-waste collection sites. Between January and May 2009, nearly 15 million pounds of e-waste was received at 35 collection locations in King County and more than 220 locations statewide.

EXPANDING THE COLLECTION OF RECYCLABLE AND COMPOSTABLE MATERIALS

An advancement in the collection of curbside recyclables has been the transition to commingled (or single-stream) collection. With this system, all recyclables can be placed in a single, wheeled cart rather than the smaller, separate bins often used in the past. The single cart system not only makes recycling easier and more convenient for the customer, it is more efficient for the companies that provide collection service.

The division and the cities have worked with the collection companies to phase in curbside collection of food scraps and food-soiled paper in the yard waste container. In the past, food scraps and food-soiled paper made up about one-third of the total waste stream for disposal. Currently, nearly all single-family curbside collection customers have access to food scrap collection, and the number of households using the service is increasing. The combined food scraps and yard waste (organics) are taken to processing facilities that turn the materials into nutrient-rich compost used to enrich soils.

Processed organics make it back to consumers as finished compost to enrich soils in local yards and gardens.

BUILDING A NEW GENERATION OF TRANSFER STATIONS

With the approval by King County Council of the 2006 *Solid Waste Transfer and Waste Management Plan*, the division has been moving forward on the renovation of the division's urban transfer system to update station technology and incorporate green building features, increased recycling services, and operational

efficiencies. Because many of the urban stations are operating beyond capacity due to steady increases in the region's population over the years, stations are also being expanded to add capacity for both garbage and recyclables. Renovations planned for each station include design features that reduce water and energy use, designated areas for the collection of a wider array of recyclables, and the installation of solid waste compactors. By compacting the garbage prior to transport to the landfill, fewer trucks are required to haul the same amount of garbage and truck trips are reduced.

A ribbon-cutting ceremony marks the opening of the new Shoreline Recycling and Transfer Station.

In 2008, the division opened the first of five new state-of-the-art transfer stations – the Shoreline Recycling and Transfer Station. The station has exceeded all expectations for environmental excellence with its innovative design and green building features. It received the highest possible honor from the U.S. Green Building Council with a Leadership in Energy and Environmental Design (LEED) platinum certification. The station has also been the recipient of nearly 10 recognition awards from national, regional, and local organizations, including the Solid Waste Association of North America, the American Institute of Architects, the American Public Works Association, and the Northwest Construction Consumer Council.

Public involvement was a crucial component of the successful design and construction of the Shoreline station. Throughout the process, the division worked closely with the City of Shoreline, neighboring communities, environmental groups, and local businesses and citizens to obtain their input on the project. A Citizens Advisory Committee began meeting with the division in 2002 to review the master plan for the facility prior to final design and construction. The division was also awarded a certificate of appreciation by the Thornton Creek Alliance for working with local residents and alliance members to ensure that improvements at the site would help restore and enhance Thornton Creek, which runs across the property.

The facility design and public process for the Shoreline station have set the bar for the four other stations approved for construction during this planning period, reflecting –

- How we approach the planning process – incorporating early community involvement
- How we build them – using the greenest elements possible
- How we operate them – pursuing operational efficiencies that reduce fuel, energy, and water use and increasing recycling opportunities

MANAGING SOLID WASTE DISPOSAL WITH AN EYE TOWARD THE FUTURE

The Cedar Hills Regional Landfill is the only landfill still operating in King County. Because use of the county landfill is currently the most economical method for disposal of the region's wastes, the division is exploring all viable options for extending its useful life as long as feasible. This strategy, recommended in the division's 2006 *Solid Waste Transfer and Waste Management Plan*, was approved by the King County Council in 2007. In-depth alternatives for extending the life of the landfill beyond the current projection of 2018 are being explored in the update of the Cedar Hills Regional Landfill Site Development Plan, which is being developed concurrently with this plan.

The landfill has been developed in sequential stages (or refuse areas), with construction of Area 7 currently in progress.

The 2001 comprehensive solid waste management plan directed the division to "contract for long-term disposal at an out-of-county landfill" once Cedar Hills reaches capacity and closes. With this plan, the division has proposed eliminating this policy in favor of exploring a range of options for future disposal, such as waste-to-energy and other conversion technologies, in addition to waste export to an out-of-county landfill. Currently emerging technologies for converting solid waste to energy or other reusable resources, such as liquid fuels or compost, are in various stages of development and testing in U.S. and international markets. Some of the technologies are capable of processing the entire solid waste stream, while others target specific components, such as plastics or organics. As the timeframe for landfill closure approaches, the division will continue to monitor both landfill capacity and advancements in waste conversion technologies.

Continued use of the landfill will delay the transition to a new disposal method, thereby delaying the rate increase needed to make this significant transition. Consistent with this strategy, the division also plans to evaluate the feasibility of diverting a portion of the waste stream from Cedar Hills to another disposal option before the landfill reaches capacity and closes. Partial early waste diversion would further extend the life of the landfill and provide an opportunity to assess disposal options, such as waste conversion technologies, before it is necessary to select a new disposal method.

FINANCING SOLID WASTE OPERATION FOR THE LONG-TERM

Solid waste fees in King County remain among the lowest in the region. Even as the division embarks on a major facility renovation plan, keeping fees low and stable are fundamental objectives.

Since late 2007, the division has seen unanticipated reductions in garbage tons received and corresponding revenues due to the effects of the global economic downturn. The division is responding to this economic trend by adjusting expenditures as necessary.

While division revenues rely primarily on fees for garbage disposal, the current priorities are to increase recycling and prevent waste generation. Reductions in tonnage due to WPR have been gradual, and the system has adjusted accordingly. Further reductions will continue to affect the revenues of King County and solid waste operations in other jurisdictions throughout the state. The division is participating in discussions at the state level to explore funding structures for financing solid waste disposal that "reinforce rather that work against" WPR efforts. To help offset reductions in solid waste tonnage, the division has begun to identify new revenue sources, such as the sale of landfill gas from the Cedar Hills landfill (discussed below) and greenhouse gas offsets from this and other potential sources.

PROTECTING NATURAL RESOURCES THROUGH ENVIRONMENTAL STEWARDSHIP

Environmental stewardship incorporates a long-term mission to manage our natural resources so they are available for future generations. It also involves taking responsibility – as individuals, employees, business owners, manufacturers, and governments – for the protection of public health and the environment.

Building an environmentally sustainable solid waste management system in King County takes a coordinated, regionwide effort. The division, the cities, and the collection and processing companies in the region are making concerted efforts to help make this happen.

WPR is just one of the ways in which the division and others are working to reduce wastes, conserve resources, and protect the environment. Other well-established programs and innovations that support environmental stewardship are discussed in the following sections.

Open fields of green at the Cedar Hills Regional Landfill attract many species of wildlife.

Turning Landfill Gas Into Green Energy

In 2009, a new gas-to-energy facility began operating at the Cedar Hills Regional Landfill to turn landfill gas generated through the decomposition of garbage into pipeline-quality natural gas for the energy market. The gas is delivered via pipeline to Puget Sound Energy's gas-fired power plants. The facility is

expected to generate enough natural gas to supply about 24,000 homes with "green energy." The sale of gas from the landfill is expected to earn the division more than $1 million in annual revenues.

Landfill gas, composed primarily of methane, has historically been captured and burned in flares at the landfill site. The new facility, one of the largest of its kind in the world, will run the landfill gas through a series of processors to remove and destroy harmful emissions and route the remaining pipeline-quality gas through a nearby gas line and into the Puget Sound Energy grid. Bio Energy Washington, which owns and operates the facility, determined that the annual reduction in carbon dioxide from converting the landfill gas to natural gas is roughly equal to the annual carbon dioxide emissions from 22,000 average passenger cars.

Managing Illegal Dumping and Litter

Illegal dumping and litter can cause environmental contamination and pose a safety hazard. Addressing the issue of illegal dumping requires several coordinated programs and the participation of many county departments, the cities, and other agencies. The division manages or participates in programs that strive not only to reduce littering and illegal dumping on public and private property, but also to assist its victims.

The county continues to strengthen its role in enforcing laws that prohibit illegal dumping on public and private lands.

Illegal dumping

Illegal dumping is a continuing problem for agencies, businesses, and the general public who find yard waste, appliances, car bodies, and other wastes dumped on their personal property, on public property, and on road rights of way. The division continues to lead the implementation of recommendations made in 2004 by a county task force charged with strengthening and coordinating the county's response to illegal dumping reports. In 2008 the King County Council adopted an ordinance to refine the county's role in enforcing laws that prohibit illegal dumping on public and private lands.

The new ordinance enhances the county's authority to cite and prosecute illegal dumpers. For example, it allows the county to charge a restitution fee to illegal dumpers and, in turn, provide monetary relief to victims of the illegal dumping. The fee can be waived if the illegal dumper cleans up and properly disposes of the waste.

The county also developed a new program called the Community Cleanup Assistance Program, which enables environmental site inspectors from the county, cities, and other agencies to issue free disposal vouchers to the property owners who are victims of illegal dumping.

The division also expanded illegal dumping prevention efforts through continued advertising and public outreach, such as advertisements on buses and the radio, and community meetings. The division continues to promote the reporting of violations through its Illegal Dumping Hotline number (206-296-SITE).

Community Litter Cleanup

The division's Community Litter Cleanup Program, funded in part by a grant from Ecology, supports the cleanup of litter and illegal dumpsites on public lands and waterways in King County. The program also supports prevention and education, through school programs, advertising, signage, and other measures.

In 2008, litter crews cleaned up approximately 136 tons of debris from 104 sites. About 11 percent of the debris – including items such as tires, appliances, and junk vehicles – was recycled.

The division has expanded its efforts to discourage littering and illegal dumping through advertising and public outreach.

Secure Your Load

Each year in the U.S. nearly 25,000 accidents are caused by litter that is either intentionally dumped by motorists or that falls out of vehicles carrying unsecured loads. About 350 of those accidents occur on Washington state highways.

In 2006, the division launched the Secure Your Load outreach program to raise public awareness of the importance of securing loads when transporting materials in truck beds, in trailers, atop cars, and in open trunks. Title 10 of King County Code defines an unsecured load as "a load of solid waste that has not been securely fastened, covered, or both to prevent the covering or any part of the load from becoming loose, detached or leaving the vehicle while the vehicle is moving."

The Secure Your Load program has promoted enforcement efforts under a state law that requires vehicles carrying loads to prevent it from "dropping, sifting, leaking, or otherwise escaping" (RCW 46.61.655). King County Code (Title 10.12.040) also allows the division to charge an unsecured load fee to vehicles arriving with unsecured loads at King County transfer stations. The division has worked closely with the King County Sheriff's Office to enforce the law. As part of the program, the Sheriff's office has conducted periodic emphasis patrols around solid waste facilities.

Providing Technical Assistance for Contaminated Site Cleanup

Contaminated sites can harm the environment, hinder economic development, and contribute to blight. The division manages two programs that provide assistance to businesses and public agencies, including King County, for site cleanup.

Brownfields Program

The division's Brownfields Program provides assistance to qualified private businesses and landowners, nonprofit organizations, and municipalities within King County to assess and clean up contaminated sites, also known as Brownfields. The division provides the following services:

- **Technical Assistance:** Two types of technical assistance are available to determine the extent of contamination at a site. Private individuals and businesses, municipalities, and nonprofit organizations are eligible for initial assessments that include research of past and present uses, a review of existing environmental studies, and site visits. Public and nonprofit entities are eligible for in-depth assessments that include environmental sampling and analysis. Private entities may also be eligible for this latter assistance if the end use of the site will result in a public benefit.

- **Low-Interest Loans:** In partnership with the State of Washington, the program offers low-interest loans to public, private, and nonprofit entities for cleaning up Brownfields properties.

The Brownfields program team helped clean up a contaminated site and transform the property into a residential and commercial development.

- **Grants:** The program helps public and nonprofit entities access grant funds available from the U.S. Environmental Protection Agency in amounts of up to $200,000 for environmental assessment and cleanup.

The Brownfields Program has had a number of successes. Among them a former chemical manufacturing plant at which the soil and groundwater were contaminated with petroleum, solvents, and metals. The property was cleaned up and converted to a productive business that is generating new jobs and tax revenues. Another successful cleanup effort was at a site where the soil and groundwater were contaminated with polychlorinated biphenyls, petroleum, solvents, and metals; the site has been transformed to a mixed-use housing and commercial development.

Contaminated Sites Program

Through the Contaminated Sites Program, the division provides technical advice and environmental assessment services to other county divisions and departments that own or acquire property that may be contaminated. Established under county ordinance, the program maintains a revolving fund to carry out assessments and cleanups. For example, the division provided environmental assessments for several sites that were being acquired by the Water and Land Resources Division to create green belts and other open spaces from Redmond to Black Diamond.

SUMMARY OF THE PLAN ORGANIZATION

This 2009 plan is organized to guide the reader from system planning through the major elements of solid waste management. Within each chapter are proposed King County policies that provide the overarching mission for each facet of operation from WPR to disposal and system financing. Following the policies, as appropriate, are the proposed recommendations for more specific actions to be carried out during this planning period. Beside each recommendation is a page number to indicate where more detailed discussion can be found in that chapter.

Following the table of contents is a list of acronyms, abbreviations, and common terms used throughout the plan. A list of the documents referenced in the plan is provided in a final chapter. Web site addresses are provided for documents that were prepared by or for the division.

There are two appendices provided with the plan. A cost assessment, as required by the Washington Utilities and Transportation Commission, is provided in Appendix A. The template for the existing solid waste Interlocal Agreements with the cities is provided in Appendix B.

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 when planning for facilities, operations, and programs.

SOLID WASTE SYSTEM PLANNING

Over the years, 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. It began with improvements to solid waste facilities and operations and 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. It began in 1965 with the federal Solid Waste Management Act, which established strict regulatory standards for landfills and other solid waste facilities. Washington State followed by passing its own waste management act, codified in Revised Code of Washington (RCW) 70.95, and establishing Minimum Functional Standards for Solid Waste Handling (WAC 173-351). 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, 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.

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 Interlocal Agreements

The county's service area comprises 37 cities and about 1,735 square miles of unincorporated area.

(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 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 is in the midst of transition that will prepare us for the future 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 has worked closely with its two advisory committees – the Solid Waste Advisory Committee and the Metropolitan Solid Waste Management Advisory Committee. For the preparation of this plan, the division has been collaborating 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 King 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

The regional solid waste system was formally established in King County when the county and cities began entering into ILAs that extend until 2028. ILAs have been signed between the county and the following cities:

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

The ILAs assign responsibility for different aspects of solid waste management to the county and the cities. The template for the existing solid waste ILA with the cities is provided in Appendix B. As discussed earlier, through the ILAs, 37 of the 39 incorporated cities within King County have chosen to participate with the county in the development of the comprehensive solid waste management plan. The ILAs also give the county operating authority for transfer and disposal services, while indemnifying and holding the cities harmless against any claims related to the county's solid waste operations.

Through the ILAs, the county is tasked with providing support and assistance to the cities for the establishment of waste prevention and recycling programs. The ILAs recognize the cities as the designated authority for collection services within their corporate boundaries and require that cities direct municipal solid waste generated and/or collected within those boundaries to the King County transfer and disposal system. This requirement includes areas annexed by a city in an adjacent county.

As partners in a regional system, cities share in the costs and benefits of King County's transfer and disposal system. If a city were to terminate its ILA and leave the system, that city would be responsible for covering its proportional share of existing solid waste debt and liabilities. The city would also be responsible for taking on the solid waste management functions currently performed by the county, as well as liability for those operations. Responsibilities would include developing a comprehensive solid waste management plan that is coordinated with the county's plan and fully funding the city's waste prevention and recycling programs. The reduction in tipping fee revenues to the division due to the departure of a city could result in higher fees for the remaining ratepayers or a reduction in services.

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

With the implementation of the 2006 *Solid Waste Transfer and Waste Management Plan*, the county is well underway in its plan to renovate the aging transfer system to better serve its customers. The facility renovation plan is designed to 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. This investment in the transfer system will ensure the provision of high-quality services at the lowest possible rates far beyond the current expiration of the ILAs in 2028.

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 management and 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, their 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) 36.58 and 70.95
	Delegate authority to the counties to prepare joint comprehensive solid waste management plans with the cities in its 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 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
King County Board of Health	Permit solid waste handling facilities, including permit issue, renewal, and, if necessary, suspension (handling facilities include landfills, transfer stations, and drop boxes)	King County Board of Health Code (KCBOHC) Title 10
	Make and enforce rules and regulations regarding methods of waste storage, collection, and disposal to implement the state's MFS	KCBOHC Title 10
	Perform routine facility inspections	KCBOHC 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 10.24.020C
King County	Prepare the comprehensive solid waste management plan and associated cost assessment	RCW 70.95.080, King County Code (KCC) Title 10, and Interlocal Agreements with the cities
	Establish disposal fees at the landfill, transfer stations, and drop boxes to generate necessary revenue to cover solid waste management costs, including: • 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 with the cities
	Establish level of service and hours of operation for all King County transfer and disposal facilities	KCC Title 10.10
	Designate minimum service levels for recyclables collection in urban and rural areas	RCW 70.95.092
	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 with the county
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

Stakeholder Involvement in the Planning Process

In the development of the comprehensive solid waste management plan, the division seeks participation and input from many sources, including the cities, the division's advisory committees, the Unincorporated Area Councils (UACs), commercial collection companies, the King 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. SWAC includes interested citizens, as well as representation from public interest groups, labor, recycling businesses, the marketing sector, manufacturing, the waste management industry, and local elected office; 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). MSWMAC, which consists of elected officials and staff from the cities, began meeting with the division on a monthly basis in 2005. The committee advises the County Executive, the SWIF, and the County Council in 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 comprises staff representatives from the cities, central Council staff, and the division.

The contributions of these committees have been instrumental in the current planning process.

The division also seeks input from the UACs, which represent the many citizens who reside in unincorporated King County. The UACs are defined by geographic area, as follows:

- **Four Creeks Unincorporated Area Council** – representing the area bounded by Renton, Newcastle, Issaquah, and Maple Valley
- **Greater Maple Valley Area Council** – representing the communities of Hobart, Ravensdale, Francis, and River Heights
- **North Highline Unincorporated Area Council** – representing the area bounded by Seattle, Burien, SeaTac, and Tukwila, including White Center
- **Upper Bear Creek Community Council** – representing the area near Woodinville/Cottage Lake
- **Vashon-Maury Island Community Council**
- **West Hill Community Council, Inc.** – representing the area bordered by Seattle, Tukwila, and Renton

These UACs are staffed by the county and typically meet on a monthly basis, with a joint meeting of all the UACs each quarter to discuss issues of common interest. The division periodically attends UAC meetings to present and discuss issues pertaining to the solid waste system. These meetings provide a forum for

the UACs to participate in the planning process during development of the comprehensive solid waste management plan.

The Current 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, except for 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 a forum, through the advisory committees, for the cities, the division, and central Council staff to collaborate on solid waste planning.

For the current planning cycle, the division has met with SWAC and MSWMAC regularly to discuss their issues and concerns, and hear their perspectives on system 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 7 and 12 of the evaluation criteria. As a result of these detailed evaluations, the need for major transfer station renovations was established.

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

- **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 system 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, the selected disposal facility (or multiple facilities) 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.

- **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 the Cedar Hills landfill; potential disposal locations once the landfill closes; the most feasible type of long-haul 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 2006 *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 the Cedar Hills Regional Landfill, 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. In addition, 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.

Along with the Transfer Plan, the division submitted a rate proposal to the County Council for the three-year period from January 1, 2008 through 2010. The proposal requested the adoption of an increase in the solid waste disposal fee from $82.50 to $95.00 per ton to cover the rising costs for fuel, equipment, and maintenance and to help finance the capital improvements to the county's transfer system. It is the first rate increase requested by the division since 1999 and represents an average increase of 1.6 percent per year since the last increase, which is well below the rate of inflation. Both SWAC and MSWMAC sent their endorsement of the rate proposal to the Executive and County Council. In addition, the Suburban Cities Association, a nonprofit corporation representing 35 of the 39 cities in King County, supported the proposal to increase solid waste rates and communicated their support to the Executive and County Council. The rate increase was adopted by the Council in July 2007. The effect of this increase on the average customer with weekly one-can collection service is about $0.73 per month.

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

Because the collaborative planning process with SWAC and MSWMAC has been so successful, the planning model has been used for the preparation of this comprehensive solid waste management plan. Both SWAC and MSWMAC have been 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 we would go about meeting them (discussed in detail in Chapter 3, *Waste Prevention and Recycling*).

PLANNING TOOLS AND FORECASTING FOR THE FUTURE

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 expected to be 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, as well as trends for the future. Data collected include the following.

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 except passenger cars, which are assigned an average weight of 320 pounds. These data are used to track overall garbage tons 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.

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

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 2008a). At the transfer stations and drop boxes, random customer loads are sorted to identify what materials are being disposed of 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 us identify materials that are being thrown away that could have been recycled or reused. This information helps us 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 recent addition of curbside collection service for food scraps and food-soiled paper with the yard waste, the division has begun to gather baseline information for these materials. In 2007, preliminary data were collected on current participation levels in organics recycling by single-family households. A follow-up study is being conducted in 2009.

- In 2001, the division began to conduct 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). The next study is planned for 2012-2013.

- A separate telephone survey is periodically conducted of county residents to explore 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, the division routinely conducts focused studies to evaluate elements of the solid waste system and its operations, emerging technologies and industry changes, and private-sector markets for recycling and reuse. 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 King County Council in December 2007.

- *Draft Environmental Impact Statement for the Cedar Hills Regional Landfill 2009 Site Development Plan* (HDR 2009) – Identifies development alternatives for the landfill, outlines the environmental impacts of each alternative, and identifies potential mitigation measures.

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 will continue 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 and 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, among others.

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

- *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.

Other Plans Considered

This comprehensive solid waste management plan is just one component of regional planning for land use, development, and environmental protection in King County. The following plans developed by the state, the county, and the City of Seattle are also considered to ensure consistency with other planning efforts in the region:

- *Washington State's Beyond Waste Project: Summary of The Washington State Hazardous Waste Management Plan and Solid Waste Management Plan* (Ecology 2004) – 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.

- *2007 King County Climate Plan* (King County 2007) – Presents the county's climate change policies as guided by a 2006 Executive Order. Among the goals are fostering the development and use of waste-to-energy technologies, waste prevention, and the use of climate-friendly materials.

- *King County Comprehensive Plan 2008* and *Proposed 2009 Amendments to the King County Comprehensive Plan 2008* (King County 2008/2009) – The guiding policy documents for all land use and development regulations in unincorporated King County, and for regional services throughout the county, including transit, sewers, parks, trails, and open space. The 2008 plan was adopted by the County Council in October 2008.

- *On the Path to Sustainability* and *2004 Plan Amendment* (City of Seattle 1998/2004) – Presents the City of Seattle's solid waste management plan, including goals for recycling and waste prevention.

- *Local Hazardous Waste Management Plan for King County* (LHWMP 1997) – 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. An update to this plan is in progress and is expected to be released in mid-2010.

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 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.

When considering how division activities and operations might affect climate change, we look at both our positive and negative impacts on GHG emissions. If we identify areas where GHG emissions are expected to occur, we can develop strategies to mitigate those emissions, for example:

- The division is building facilities (such as the Shoreline Recycling and Transfer Station discussed in detail in Chapter 5) that require less energy and use green 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.

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.

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. 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.

Cities within King County that are participating include:

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

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. Whereas, 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, as 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 role of green building is discussed in more detail in Chapter 3.

In siting new transfer facilities, the division engages communities to ensure equal opportunity for involvement in the siting process and endeavors to ensure that these essential public facilities are distributed equitably throughout the county.

Forecasting for the Future

The division uses a planning forecast model to predict future waste generation, which is defined as *waste disposed + 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.

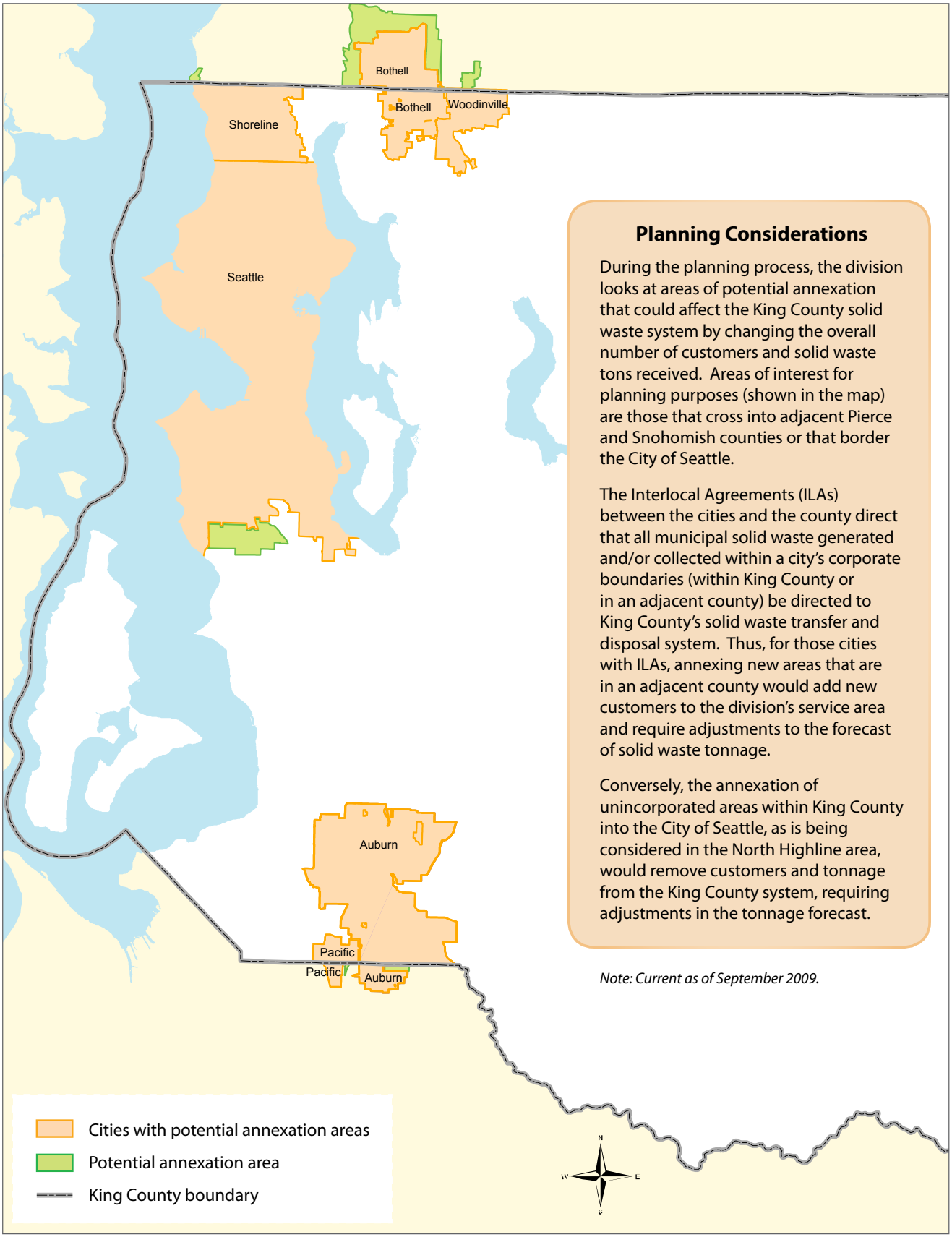
To predict future waste generation, the planning forecast model relies on established statistical relationships between waste generation and various economic and demographic variables that affect it, including:

- Population of the service area, including potential areas for future annexation by cities (Figure 2-1)
- 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.

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

Figure 2-1. Current areas of potential annexation



Planning Considerations

During the planning process, the division looks at areas of potential annexation that could affect the King County solid waste system by changing the overall number of customers and solid waste tons received. Areas of interest for planning purposes (shown in the map) are those that cross into adjacent Pierce and Snohomish counties or that border the City of Seattle.

The Interlocal Agreements (ILAs) between the cities and the county direct that all municipal solid waste generated and/or collected within a city's corporate boundaries (within King County or in an adjacent county) be directed to King County's solid waste transfer and disposal system. Thus, for those cities with ILAs, annexing new areas that are in an adjacent county would add new customers to the division's service area and require adjustments to the forecast of solid waste tonnage.

Conversely, the annexation of unincorporated areas within King County into the City of Seattle, as is being considered in the North Highline area, would remove customers and tonnage from the King County system, requiring adjustments in the tonnage forecast.

Note: Current as of September 2009.

Studies indicate that for the long-term planning forecast, from 2010 through 2030, 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 = more waste generated.
- Employment is expected to increase at an annual rate of 1.3 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 2030, 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, employment, and household size are based on data developed by the Puget Sound Regional Council (PSRC; 2006). 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 data are provided by the local economic forecasting firm of Dick Conway and Associates (July 2007).

Note: These are pre-recession assumptions. New long-term projections have not yet been developed; therefore, growth may be less than expected in some years.

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 2030. 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.

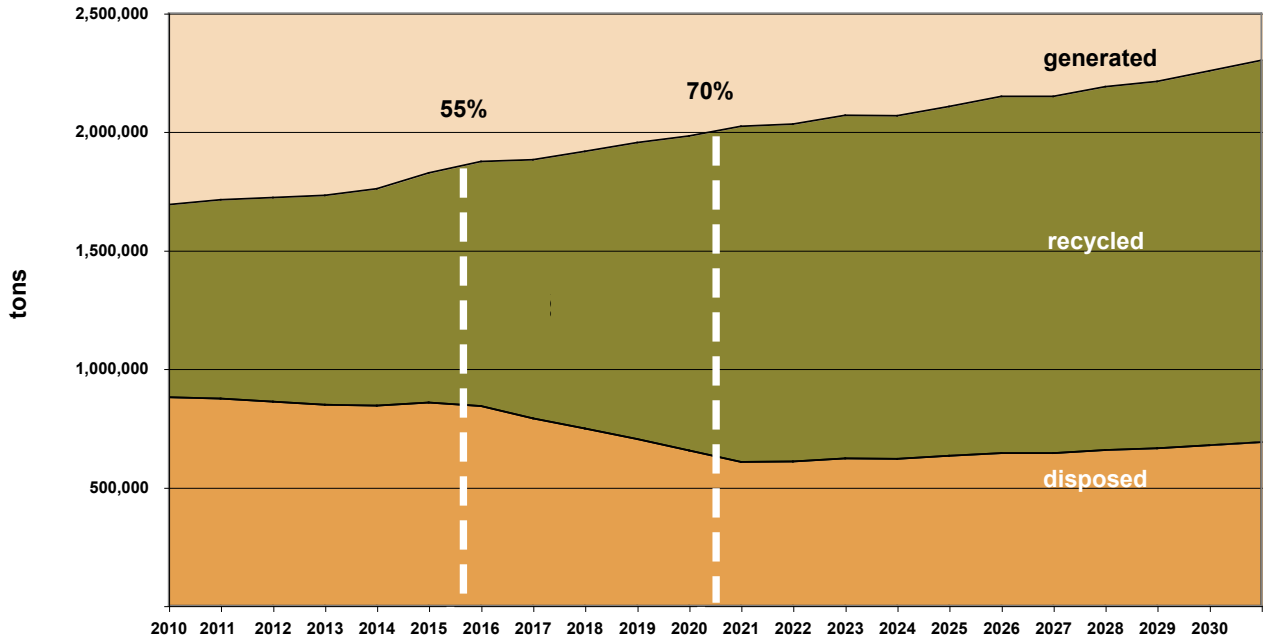
Figure 2-2 shows the projection of waste generation from 2010 through 2030.

The projections shown in Figure 2-2 are based on a forecast developed in the second quarter of 2009. The chart 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 or unexpected events that affect economic development.

In 2007, garbage tons received at the Cedar Hills Regional Landfill surpassed the 1 million mark, attributable primarily to economic growth and population increases in the region. In late 2007, however, tonnage entering the county's system began to drop off significantly due to the nationwide economic downturn that began mid-year. Tonnage in 2008 was down by about 8 percent overall, and the system has continued to experience declines into 2009. The City of Seattle, surrounding counties, and the states of Oregon and California have reported similar or greater declines in tonnage. Regional recyclers have also reported declining tonnage. The division expects tonnage to remain at a lower level for several years. Forecasts have been and will continue to be updated accordingly.

Figure 2-2. Projection of solid waste generated, recycled, and disposed 2010 – 2030



3

Waste Prevention and Recycling

Waste Prevention and Recycling

Policies

WPR-1 Achieve Zero Waste of Resources – to eliminate the disposal of materials with economic value – by 2030 through a combination of efforts in the following order of priority:
a. Waste prevention and reuse
b. Product stewardship, recycling, and composting
c. Beneficial use

WPR-2 Set achievable goals for reducing waste generation and disposal, and increasing recycling and reuse.

WPR-3 Enhance, develop, and implement waste prevention and recycling programs that will increase waste diversion from disposal using a combination of tools:
a. Infrastructure
b. Education and promotion
c. Incentives
d. Mandates

WPR-4 Advocate for stewardship in the design and management of manufactured products and greater responsibility for manufacturers and retailers to divert these products from the waste stream.

WPR-5 Work with regional partners to find the highest value end uses for recycled materials and support market development.

WPR-6 Strive to ensure that materials diverted from the King County waste stream for recycling or reuse are handled and processed using methods that are protective of human health and the environment.

Waste Prevention and Recycling

Summary of Recommendations

Responsibility		Action	Detailed Discussion
Waste Prevention, Product Stewardship, and Recycling			
1	**Cities, county**	Lead by example by improving waste prevention and recycling in public-sector operations, facilities, and at sponsored events, as well as through the purchase of environmentally preferable products.	Page 3-5
2	**County**	Provide regional education and incentive programs to help consumers improve their waste prevention efforts.	Page 3-5
3	**County**	Provide waste prevention and recycling education programs in schools throughout the county, and help schools and school districts establish, maintain, and improve the programs.	Page 3-5
4	**County, in partnership with the Northwest Product Stewardship Council, local businesses, and other stakeholders**	Pursue product stewardship strategies through a combination of voluntary and mandatory programs for materials that contain toxic materials or are difficult and expensive to manage, including, but not limited to, paint, carpet, fluorescent bulbs and tubes, mercury thermostats, rechargeable batteries, pharmaceuticals, mattresses, junk mail, and telephone books.	Page 3-8
5	**County, in partnership with the Northwest Product Stewardship Council, and other stakeholders**	Draft model legislation that sets up a framework for addressing producer responsibility through efforts such as take-back programs.	Page 3-9
6	**Cities, county**	Monitor the ability to transition away from recycling collection events as enhanced recycling services are provided at renovated transfer stations, as improved bulky item collection becomes available curbside, and as product stewardship programs emerge.	Page 3-13
7	**County, in cooperation with cities**	Work with food producers, grocers, restaurants, and schools to donate surplus meals and staple food items to local food banks.	Page 3-19

	Responsibility	Action	Detailed Discussion
Waste Prevention, Product Stewardship, and Recycling			
8	**County**	Provide technical assistance and promote proper deconstruction, building reuse, and reuse of building materials.	Page 3-10, 3-23
9	**County**	Implement a pilot program to link retailers, warehouses, and other generators of large amounts of plastic wrap with material processors.	Page 3-30
10	**County, in cooperation with cities**	Promote consumer use of reusable bags at grocery and other retail stores.	Page 3-30
11	**County, in cooperation with cities**	Partner with area retailers to establish a wide-scale take-back network for used plastic bags, and encourage reuse and recycling of plastic bags.	Page 3-30
12	**County, in cooperation with cities**	Provide regional and local education and promotion to increase recycling of food scraps and food-soiled paper.	Page 3-31
Green Building			
13	**Cities, county**	Adopt green building policies that support the design of buildings and structures that have less impact on the environment, are energy efficient, and use recycled materials.	Page 3-10
14	**County**	Assist cities in developing green building policies and practices; provide financial incentives to encourage green building through Leadership in Energy and Environmental Design (LEED) and Built Green™; provide technical assistance for projects seeking green certification, such as LEED; and promote residential green building programs, such as Built Green™.	Page 3-10
Use of Grant Resources			
15	**County**	Continue to support the cities' implementation of the plan through the county waste reduction and recycling grant program and allocation of Coordinated Prevention Grant funds from the Washington State Department of Ecology.	Page 3-13
16	**County**	Work collaboratively with cities and other stakeholders to consider a new competitive grant program that would be available to cities and collection companies to support innovative programs that help meet plan goals.	Page 3-13

	Responsibility	Action	Detailed Discussion
Recycling at Transfer Facilities			
17	**County**	Maximize recycling services at the transfer facilities as new stations are constructed and as space allows at existing facilities. Focus on priority materials: organics, clean wood, scrap metal, and cardboard.	Page 3-21
18	**County**	Provide financial and other incentives to encourage recycling instead of disposal.	Page 3-22
Management of Construction and Demolition Debris (C&D)			
19	**Cities, county**	Consider implementing city and county permitting requirements to increase the diversion from disposal of C&D generated at job sites.	Page 3-24
20	**County**	Clarify the definitions of recycling and beneficial use. Endeavor to establish consistent definitions with the Washington State Department of Ecology, the City of Seattle, and other regional governments.	Page 3-23
Market Development			
21	**County**	Support the development of markets for recyclable materials through incentives and programs such as LinkUp.	Page 3-28
Data Reporting and Tracking			
22	**Cities, county, collection companies**	Standardize the sampling methodology and frequency in tonnage reports submitted to the division and the cities by the collection companies.	Page 3-33
23	**County**	Perform solid waste characterization studies on a periodic basis to support goal development and tracking.	Page 3-35
24	**County**	Develop a strategy to report waste disposal information by business type.	Page 3-35
25	**County**	Conduct organics characterization studies on a periodic basis to support goal development and tracking.	Page 3-36
26	**County**	Conduct C&D waste characterization studies on a periodic basis to support goal development and tracking.	Page 3-36

WASTE PREVENTION AND RECYCLING

In the late 1980s, state law and county code (RCW 70.95 and KCC Title10, respectively) established waste prevention and recycling (WPR) as the preferred method of managing solid waste. In 1989, the state adopted the Waste Not Washington Act, making it a priority to provide curbside recycling services to all residents living in urban areas.

Working together over the last 20 years, both the public and private sectors have taken the region well beyond curbside recycling by creating myriad programs and services that foster the recycling and reuse of materials that might otherwise be thrown away – and more importantly, that prevent waste from being created in the first place.

In the 1980s, residents of King County were throwing away on average nearly 35 pounds of garbage per person per week. Projections indicated that with the growing population and economy in the region, this number would continue to climb steeply.

Rather than responding to this trend by building more solid waste facilities to handle increasing amounts of garbage, the division and its many stakeholders embraced a strategy to reduce disposal through progressively rigorous WPR. Through the efforts of the county and area cities, businesses, and individual citizens, the amount of garbage disposed per resident per week dropped from 35 pounds in the 1980s to 16.7 pounds in 2007 – a reduction of more than half.

This reduction in disposal has extended the life of the Cedar Hills Regional Landfill by more than 10 years – a result that can be attributed solely to the region's WPR efforts.

Division Helps Consumers Lose Weight in Their Garbage Cans

In June 2008, six Renton families took the Recycle More Neighborhood Challenge to see who could make the biggest reduction in the weight of their garbage. In the first week, each family was visited by the division's resident Garbologist, Program Manager Tom Watson. First, he weighed each household's garbage to establish their starting point. Watson then examined the contents of the garbage and gave each family tips on what was present that could have been recycled. Most of the errant waste was food scraps and food-soiled paper, which could be recycled with the yard waste.

For four consecutive weeks Watson visited each family to conduct a garbage weigh-in and monitor each family's progress. The average weekly weight loss ranged from 42 to 82 percent. In total, the six families reduced their garbage weight by 290 pounds over the course of the challenge.

As can be seen with this small-scale project, a little bit of effort on the part of a lot of people could make a big difference. The participants reported simple changes that led to their successes – such as setting up several convenient recycling locations in the home and involving the entire family in making recycling a household priority.

Yet even with the increased recycling and waste prevention we've seen over the years, recent waste characterization studies conducted by the division indicate that about 60 percent of all materials disposed in the landfill are resources that could have been recycled or reused. As discussed in this chapter, identifying what these materials are and who generates them can help us determine where future efforts should be focused to achieve ongoing improvements.

The division advertises its Recycle More. It's Easy to Do. campaign to reinvigorate recycling in the region.

Concentrating efforts on a particular class of waste generator (e.g., residential or business) or commodity type can yield measurable results. Four categories of information, discussed in detail herein, can be used to evaluate the current status of our WPR efforts and help us develop strategies that will lead to future improvements:

1. Waste prevention programs achieving results in the region
2. Recycling and disposal rates, as well as waste prevention efforts, by type of waste generator, including:
    - Single-family (up to 4 units) and multi-family residents
    - Non-residential generators, such as businesses, institutions, and government entities
    - Self-haulers, both residents and businesses, who bring materials to division transfer facilities
    - Generators of construction and demolition (C&D) debris
3. Types and quantities of recyclable or reusable commodities that remain in the waste stream, such as food scraps, clean wood, metals, and paper
4. The status of markets for recyclable materials, availability of take-back options for used products, and opportunities to partner with private-sector businesses, national coalitions, and other jurisdictions to effect change

Information from these four categories was used to shape the goals and recommendations presented in this chapter. To set the stage for the chapter, we begin with a description of our regional goals for the future. This discussion is followed by a detailed account of the progress and current status of our WPR efforts. From there we focus on ways to sustain the momentum by looking at additional resource conservation, recycling, and product stewardship opportunities. And finally, we detail the methods used to track our progress, along with ways to improve the data and reporting requirements from various sources.

GOALS FOR THE FUTURE

The goals for WPR set forth in this section were established through extensive discussions with the division's advisory committees – the Solid Waste Advisory Committee (SWAC) and the Metropolitan Solid Waste Management Advisory Committee (MSWMAC). They are countywide goals, intended to improve the

effectiveness of the region's WPR efforts as a whole. The recommendations for implementation presented at the beginning of this chapter were developed to provide general strategies for meeting the goals and to identify the agency(ies) that would lead those efforts. The recommendations are intended to serve as a guideline for the county and the cities. They do not preclude other innovative approaches that may be implemented to achieve our regional goals.

As we consider the goals, it is important to keep in mind that there are factors other than WPR programs and services that can cause increases or decreases in the overall amount of waste generated. For example, the recent economic downturn has resulted in significant, unanticipated reductions in garbage collected, stemming primarily from the drop in consumer spending and business activity in the region. When establishing goals and measuring our success in meeting them, it is important to consider the economy, policy changes, and other factors that may be in play and to adjust the goals as necessary.

Waste Prevention and Recycling Goals

Waste Prevention Goal

By looking at overall waste generation (*tons of material disposed + tons recycled*), we can identify trends in waste prevention activity in the region. A decline in waste generation typically means that the overall amount of materials disposed or recycled, or both, has been reduced.

Waste generation rates to be achieved by 2020

Per Capita – 20.4 pounds/week

This goal addresses residential waste from single- and multi-family homes. The goal of 20.4 pounds/week represents a 15 percent reduction from the rate in 2007 of 24 pounds/week.

Per Employee – 58 pounds/week

This goal addresses waste from the non-residential sector. The goal of 58 pounds/week is the same as the average amount of waste generated in 2007; however, while we expect overall waste generation to remain about the same, we expect the recycling portion to increase and disposal to decrease.

Waste Disposal Goal

Reductions in disposal over time indicate an increase in waste prevention and/or recycling.

Waste disposal rates to be achieved by 2020

Per Capita – 14.2 pounds/week

This goal addresses residential waste from both single- and multi-family homes. The goal of 14.2 pounds/week represents a 15 percent reduction from the disposal rate in 2007 of 16.7 pounds/week. A target of 18.5 pounds/week was set in the 2001 comprehensive solid waste management plan.

Per Employee – 22.9 pounds/week

This goal addresses waste from the non-residential sector. The goal of 22.9 pounds/week is a 15 percent reduction from the disposal rate in 2007 of 26.9 pounds/week. A target of 23.5 pounds/week was set in the 2001 comprehensive solid waste management plan.

Recycling Goal

Recycling will continue to be an important strategy to reduce the disposal of solid waste. The recycling goal combines single-family, multi-family, non-residential, and self-haul recycling activity. It addresses the amount of waste being diverted from disposal at the Cedar Hills Regional Landfill to recycling. It does not include C&D or other wastes, such as car bodies, which are not typically handled through the county system. In 2007, the overall recycling rate for the county was 47 percent.

The goal for this planning period reflects the estimated recycling rate achievable if the recommended strategies in this plan are fully implemented –

Overall recycling rate by 2015: 55 percent

Achieving the 55 percent goal during this planning period would pave the way for implementing additional WPR strategies and setting a higher goal for recycling in the next comprehensive solid waste management plan –

Overall recycling rate by 2020: 70 percent

The role of individual cities will be critical in reaching our countywide WPR goals. The way in which each city contributes to those goals, however, may vary depending on the city's demographic make-up and other factors. For example, a city with a large concentration of apartments and condominiums might focus more efforts on programs for multi-family residents. Communities with primarily single-family homes might focus education and promotion on food scrap recycling for their residents.

Another factor cities may consider is the make-up of their business (or non-residential) sectors. Cities with many restaurants, grocers, or other food-related businesses might look at ways to promote the recycling of food scraps or to partner these businesses with local food banks to donate surplus food to those in need. Similarly, cities with booming construction activity may want to take advantage of markets for the recycling and reuse of

What is Your Recycling Rate? It Depends on What You Count.

Currently, there are no state or national standards for what should be counted in the "recycling rate" for a city or county. As a result, recycling rates reported by various jurisdictions may include different materials. For example, the recycling rate reported by some jurisdictions includes C&D, which can raise a recycling rate based on tons considerably by adding heavy materials such as concrete and asphalt. And some jurisdictions add percentage points to their recycling rate to account for the projected success of their waste prevention efforts.

The division has chosen to calculate King County's recycling rate based on the known amount of materials diverted from disposal at the Cedar Hills Regional Landfill. As such, it does not include materials such as C&D or car bodies that are handled largely by the private sector. Neither does the division include any estimate of waste prevention, primarily because of the lack of measurable data.

The county's recycling rate in 2007, based on the definition above, was 47 percent. If C&D were counted, the rate would be about 60 percent. Adding landclearing debris, car bodies, and other materials would raise the rate to approximately 63 percent.

Given the various methods for calculating the recycling rate, it is important to understand what materials are being included before comparing rates across jurisdictions.

C&D materials. Likewise, the county will consider the make-up of unincorporated areas to focus WPR efforts in those areas.

The county and the cities lead by example to improve WPR in their respective operations, at their facilities, and at sponsored events, for instance:

- Some cities have held their own zero waste events and picnics
- The county and many cities have begun to collect food scraps and food-soiled paper at their offices and associated sites
- The county provides recycling containers at various musical and sporting events held at county-owned venues such as Marymoor Park

The county will continue to play an active role in supporting regional WPR programs. Through programs such as Waste Free Holidays, EcoConsumer, and the Master Recycler Composter, the division continues to provide education and incentives for consumers across the county. The division's work with area schools is furthering recycling education and supports new and ongoing programs that encourage waste prevention and resource conservation. The division is also working to expand markets for recyclable and reusable materials through programs such as LinkUp, which draws together area businesses, public agencies, and other organizations through seminars, roundtable discussions, demonstrations, online forums, and other events and activities. Ongoing collaboration with the cities and the private-sector collection and processing companies in the region will also continue, with efforts to increase the recycling of food scraps and other materials with market value.

Tools Used to Meet the Recommended Goals

The division and the cities have various tools at their disposal to promote waste prevention and increase recycling. The chart below identifies these tools and cites some of the successes achieved through their use.

Tool	Application	Successes
Infrastructure	Establishing the collection and processing infrastructure is always the first step. It can be accomplished through enhanced curbside collection services, additional recycling options at transfer facilities, and partnerships with private-sector processing facilities and manufacturers/ retailers, e.g., to develop take-back programs.	As the division upgrades the transfer system, facilities are being designed with dedicated areas for recyclable materials such as yard waste, clean wood, and scrap metal Nearly all single-family curbside collection customers in the county now have access to collection service for food scraps and food-soiled paper, along with the yard waste Through Washington's electronics recycling program, electronics manufacturers have developed a statewide network of more than 220 collection locations for recycling televisions, computers, and monitors

Tool	Application	Successes
Education and promotion	Educational programs and targeted advertising play a key role in the initiation of new programs and in sustaining the momentum of existing programs. These efforts can be tailored to specific waste generators or materials.	The division's GreenTools team provides education, resources, and technical assistance to contractors, project managers, and property owners on how to recycle and manage C&D as a resource rather than a waste Many cities provide assistance to businesses to establish and maintain recycling programs
Incentives	Incentives have proven highly successful in encouraging the use of recycling services and other programs. For example, if a customer generates less garbage by recycling and reducing their wastes, they may need a smaller garbage container, which means a lower charge on their garbage bill. Incentives can also take the form of a new, larger recycling container, or some other give-away item that makes WPR easier.	To encourage WPR, curbside garbage collection fees increase with the size of garbage can that customers subscribe to – creating a "pay as you throw" system Some cities provide kitchen containers and sample compostable bags to encourage residents to recycle their food scraps
Mandates	Mandates that restrict the disposal of specific materials have proven effective in increasing recycling. Mandates can be legislated at the local, state, or federal level, or implemented through city contracts.	To discourage disposal of yard waste, since 1993 its disposal in the curbside garbage container has been prohibited In 1992, the U.S. Environmental Protection Agency banned the disposal of appliances that contain chlorofluorocarbons

The successful diversion of residential yard waste from disposal exemplifies the effective use of all four tools. First, an ***infrastructure*** was created to make it easy to separate yard waste from garbage. Curbside collection programs were implemented in phases across the county, easy-to-use wheeled collection containers were provided to residents, and private-sector businesses began turning the collected yard waste into compost for building healthy soils. ***Promotions*** were used to inform residents of the availability of curbside collection as implementation was phased in. ***Educational*** campaigns were launched to teach citizens how to compost yard waste from their own yards for use as a soil amendment. Because the cost

of collecting yard waste for composting was less than the cost of disposal in the garbage, residents had an ***incentive*** to subscribe to yard waste collection service. Many cities provided an additional incentive by including yard waste collection as part of their basic package of collection services at the curb. Finally, ***mandates*** were passed by the cities and the county to prohibit residents from disposing of yard waste in the garbage wherever separate curbside yard waste collection was available.

Yard waste is easily collected alongside the garbage and recyclables at the curb.

STATUS OF REGIONAL WASTE PREVENTION AND RECYCLING EFFORTS

Measuring the results of our WPR efforts is a complex process. Discussions and data often focus on recycling and recycling rates, when in fact waste prevention is the number one priority. While programmatic successes for waste prevention can be assessed qualitatively, it is difficult, if not impossible, to measure directly how much waste is "not created" in terms of tons or percentages. What we can measure more accurately is recycling and disposal activities. Data for these activities are available through division tonnage and transaction records, reports from the curbside collection companies and the Washington State Department of Ecology (Ecology), and the division's waste characterization studies. Using data on the types and amounts of materials recycled, combined with measures of waste disposed, we can evaluate our success in reaching the goals established with each successive comprehensive solid waste management plan.

The following discussions take a look at the status of our past and current WPR programs and activities, from a qualitative and/or quantitative perspective. This review gives us a clearer picture of how far we have come, what challenges we face, and what can be done to build upon our successes.

Past and Current Regional Waste Prevention and Recycling Efforts

Waste prevention is simple in concept – if you create less waste, you avoid using the resources needed to recycle or dispose of it. The county, the cities, and a host of manufacturers, businesses, and environmental coalitions are implementing promotions and practices to prevent waste through a number of avenues.

Decisions to reduce waste can be made at several critical stages in a product's life cycle:

- When manufacturers decide what goods to produce, how to produce them, and how to package them
- When consumers decide if and what to purchase
- When consumers adopt ways to use and reuse products more efficiently

While we cannot measure the amount of waste prevented at each stage, we can assess the types and numbers of programs being implemented and determine which efforts appear to be effective. What

follows are brief descriptions of successful regional waste prevention efforts that are currently in progress and are likely to continue:

- The county's EcoConsumer program offers resources and incentives to help citizens balance consuming and conserving.
- The cities and the county promote grasscycling and backyard composting to manage yard waste on site.
- Some cities have distributed reusable shopping bags to residents or issued coupons for free bags that can be redeemed at local retail stores.
- School programs teach waste prevention techniques, such as how to pack a waste free lunch.
- The county's Waste Free Holidays program encourages organizations to offer discounts and incentives to consumers to "give experiences instead of stuff."
- The county is working with architects and other design professionals to incorporate the concept of design for disassembly – a forward-thinking design principle that allows for the easy recovery of products, parts, and materials once a building is disassembled or renovated.
- The county provides technical assistance and resources to those seeking certification through the nationally recognized Leadership in Energy and Environmental Design (LEED) process for construction. LEED offers incentives and points for the reuse of buildings and building materials.
- The cities and the county hold special collection events for reusable household goods, and the county collects reusable household goods, clothing, and building materials at some transfer stations.
- The county and the cities are working with food producers, schools, and restaurants to capture edible foods, which might otherwise be scrapped, for donation to local food banks and other social service agencies.
- The county and other local governments are working with the telephone book industry to reduce the number of books printed and distributed, offering customers the option of online directories in their place.

Product reuse is another way of preventing waste and is accomplished primarily through the private sector. There are numerous charitable organizations that pick up or provide drop-off sites for household items and clothing. Reusable building materials are also collected and resold at several locations in King County.

There has also been major growth in the resale market for items through online classified services, auctions, and exchange programs. The division's Web site features an online materials exchange program for posting household items and reusable building materials for sale or exchange, as well as yard sale events.

Product stewardship is a movement gaining momentum at the state, national, and international levels. It is a management strategy used to encourage the environmentally friendly design of products and to shift the responsibility for managing a product at its end of life from government to product manufacturers.

In 2006, the Washington state legislature led the nation by passing the Electronic Product Recycling Law – E-Cycle Washington (WAC 173-900) – which requires manufacturers of televisions, computers, and monitors to provide recycling services for these products at no cost to residents, small businesses, charities, school districts, and small governments. The program launched on January 1, 2009 with about 35 collection locations across King County. By February 2009, nearly 3.3 million pounds of e-waste was received at take-back locations across the state of Washington. Similar legislation has been drafted by the Northwest Product Stewardship Council (NWPSC) for fluorescent bulbs and tubes and leftover or expired pharmaceutical products.

The division is on the steering committee of the NWPSC and has been participating in the development of product stewardship strategies for additional commodities that contain toxic materials or are difficult and expensive to manage, such as paint, carpet, mercury thermostats, rechargeable batteries, mattresses, junk mail, and telephone books.

A nationwide effort is underway to encourage the telephone book industry to reduce the distribution of unwanted books.

In an effort to reduce the number of product-specific bills that would be introduced to the legislature, the NWPSC is drafting model legislation that would set up a framework to 1) establish the process and criteria for selecting products that can be managed under producer-funded take-back programs, 2) establish the process for manufacturers to follow when setting up their product stewardship programs, and 3) identify the role of state government in providing oversight and enforcement of these programs. Establishing a framework to address these issues reduces the need to introduce product-specific legislation each time a new product is identified as a candidate to be managed under a product stewardship program.

Curbside collection services in the region have flourished over the last two decades, expanding to include a wide array of materials. Curbside recycling began in the early 1990s in King County through the cooperative efforts of the cities, the county, private recycling firms, and the solid waste collection companies. Initial materials collected curbside included plastic bottles and jugs, glass bottles and jars, aluminum cans, tin cans, mixed paper, newspaper, and cardboard. As of 2008, curbside recycling was available to more than 99 percent of residents in the county, and the list of materials collected continues to grow.

Another trend that has increased recycling is the transition to commingled (or single-stream) collection, whereby all the recyclable materials are placed in one large cart for pickup at the curb. Prior to 2001, most residents were required to separate recyclable materials into multiple bins for collection. Over time, however, the material recovery facilities, which sort and process the recyclables for market, have expanded their ability to sort materials on site, allowing the collection companies to transition to commingled recycling. Commingled collection not only makes recycling easier and more convenient for the customer, it is more efficient for the companies that provide the service. (A more detailed discussion is provided in Chapter 4, *Collection and Processing*.)

Collection of organic materials has also been successful in diverting more materials from disposal. In the 1990s, single-family yard waste collection was phased in across the county. Today, curbside yard waste collection is available to all county residents except those on Vashon Island and in the Skykomish and Snoqualmie Pass areas.

In 2001, the division began working with the cities and collection companies to phase in curbside collection of food scraps and food-soiled paper in the yard waste container. Currently, nearly all single-family curbside collection customers have access to food scrap collection, and the number of households using the service is increasing.

C&D – debris from the construction, remodeling, repair, or demolition of buildings, other structures, and roads – was banned from disposal at county facilities in 1993. Since then, the division has contracted with Waste Management, Inc. and Allied Waste to dispose of and recycle these materials. Current contracts with the companies provide monetary incentives to increase their C&D recycling. Materials that can be diverted for recycling or other uses include concrete, asphalt roofing, clean wood, steel and other metals, and gypsum wallboard. With the increase of private-sector recycling facilities in the region, both contractors and homeowners have more options for recycling C&D materials. In 2008, the division published the most recent *King County/Seattle Construction Recycling Directory*, which provides listings for the many companies that handle a variety of C&D materials. The list is kept up to date online.

There are more than 20 recycling companies in the region that will pay for source-separated metals.

Waste prevention is also playing a greater role in the diversion of C&D from disposal. The salvage of building materials during deconstruction is becoming increasingly common, markets for the salvaged materials are growing, and the reuse of entire houses by moving them to new sites is gaining popularity and acceptance by permitting agencies. Another growing practice is design for disassembly – a building design process that allows for the easy recovery of products, parts, and materials when a building is disassembled or renovated. The division has teamed with the City of Seattle and the building community to provide resources and technical assistance to help businesses and residents manage C&D from building design to disassembly. The division has also begun holding events to collect reusable building materials at the Shoreline Recycling and Transfer Station; this program will be expanded to other facilities where space allows and there is demand.

Green building programs have been instrumental in promoting C&D recycling and reuse. The division is actively engaging builders, residents, businesses, and governments, including other county agencies, to create and sustain green buildings and developments in the region. The division's GreenTools program supports county agencies, cities, the building community, and the public in designing buildings and structures that have less impact on the environment, are energy efficient, and use recycled materials.

The services and resources available include:

- Information and technical assistance on managing C&D as a resource rather than a waste for disposal
- Residential green building support through the King County Master Builders Association and the Built Green™ program
- CD-ROM toolkits to help cities in King County create successful green building programs in their jurisdictions
- Assistance on county building projects to achieve the maximum possible green building standards
- Grants to eligible homeowners, builders, and public- and private-sector developers meeting a high level of green building certification

The division also coordinates the countywide Green Building Team, tasked with ensuring that all county construction projects achieve the maximum possible standards of green building, including the application of LEED concepts into all projects. In the U.S. and other countries around the world, LEED certification is the recognized standard for measuring building sustainability. The rating system evaluates buildings in six areas: sustainable site development, water savings, energy efficiency, materials and resources selection, indoor environmental quality, and innovation and design.

County ordinance requires that all county projects seeking LEED certification strive to achieve at least a Gold rating. In cases where LEED certification may not be economically feasible or applicable for a project, such as open-air bus passenger shelters, restroom facilities, pump stations, and conveyance lines, the ordinance requires the completion of a sustainable development scorecard, which indicates what green building strategies are being applied on the project. In accordance with the ordinance, the county has also developed guidelines for the operation and maintenance of existing buildings to incorporate green strategies for water conservation, WPR, green cleaning, and overall improvements in facility operations.

King County is the first local government in the nation to add evaluation of greenhouse gas emissions to the environmental review that construction projects undergo. In addition to incorporating this evaluation into its own projects, the county is providing assistance to developers on the application of this new standard.

The long-term goals of the county's green building program align with the 30-year goals of the state's Green Building Initiative, whereby:

- Green building practices and the demand for green buildings become the norm
- Reuse of buildings and recycling of construction materials are normal business practices
- Buildings and materials are designed for human, economic, and environmental health

Cities are also joining in the adoption of green building strategies, for example:

- Issaquah is developing a multi-family housing project, called zHome, designed to use no more energy than it generates during the course of a year, resulting in a carbon-neutral development.

- Kirkland's Green Building pilot program is offering an incentive for expedited permit processing to encourage sustainable building in the construction of new single-family developments. The

program also offers educational resources, an informative Web site, and seminars on green building topics to help educate builders and the public about the benefits of sustainable building.

- Redmond's Green Building and Green Infrastructure Incentive Program was adopted by their City Council in March 2009. The program encourages developers and homebuilders to incorporate green building techniques into residential developments.

- Shoreline is in the strategic planning process of developing their green building program.

Greenbridge

Collection of recyclables at division transfer facilities began in the 1980s. It started with the addition of collection containers for the standard curbside recyclables at those facilities that had adequate space. At some facilities, textile and appliance collection was also added. Due to space constraints at most facilities,

The division provides recycling opportunities at the transfer stations, where possible.

Green Building and Equity

The goal of the county's Equity and Social Justice Initiative is for all King County residents to live in communities of opportunity. To reach this goal, all communities must be equipped with the means to provide residents with access to a livable wage, affordable housing, quality education, quality heath care, and safe and vibrant neighborhoods. Green building can play an important role in providing safe, healthy, affordable housing, which has historically not been built to the highest standards.

Greenbridge, a mixed-income community in White Center, is an example of how green building practices can be applied to affordable homes. Greenbridge is being built on land that until recently held rundown public housing from the World War II era. The old, inefficient barracks-style duplexes are being replaced with sustainably designed and constructed homes that are affordable, energy-efficient, comfortable, and well built. Greenbridge includes a plaza, a community center, social services, public art, trails and parks, and access to public transportation. The community will ultimately consist of 1,000 homes for approximately 3,500 people.

In addition to the Greenbridge project, the King County GreenTools program has provided technical assistance and education for affordable housing projects of all types. This technical assistance includes working directly with affordable housing developers, with nonprofits such as Habitat for Humanity, and with trade associations. Educational efforts include collaborating with the American Institute of Architects, Community Trade and Economic Development, Master Builders Association of King and Snohomish counties, and the U.S. Environmental Protection Agency to deliver training to the building trades on universal design and green building, as well as developing educational materials on green remodeling tips for senior citizens.

however, few other recyclables have been added for collection. With the transfer system renovations in progress (see Chapter 5, *The Solid Waste Transfer System*), facilities are now being designed with ample space for collecting more recyclables and the flexibility to add and change materials as community needs change or markets fluctuate. The newly rebuilt Shoreline Recycling and Transfer Station (formerly the First Northeast Transfer Station) sets the standard for the other planned station renovations, with added space for collecting yard waste, clean wood, scrap metal, and many other materials.

Numerous private-sector facilities have also emerged across the county where residents and businesses can take recyclables and C&D. Over the years, the list of materials that these facilities accept has grown from paper, cans, and bottles to items such as printer cartridges and cellular telephones. To connect residents and businesses with these recycling services, the division's Web site features a drop-down menu called "What do I do with …?" The menu lists many of the items that customers commonly ask about. Clicking on an item opens a page with the location, details, and contact information for the reuse, recycling, or proper disposal options available for the material or product.

Collaboration between the county and the cities has helped promote common, regionwide goals. In the 1980s, the county and the cities began offering numerous educational, promotional, and technical assistance programs for a diverse audience of community residents, school children, and businesses. Educational programs in area schools have been a useful means to increase awareness of the importance of WPR and provide tips and assistance to implement projects that reduce garbage and increase recycling both in schools and in students' homes.

King County school children learn about recycling and resource conservation.

In addition, the county provides grant funds and technical assistance to cities to help further WPR programs and services within their communities. In 2008, King County distributed $1 million in grant funds to cities; these funds are supported by the solid waste tipping fee. All cities in the service area are eligible for the funds. The formula for their allocation includes a base amount plus a percentage based on the city's population and employment.

Currently, much of these grant funds are used by the cities to hold recycling collection events in their communities. The cities and the county may be able to phase out these collection events and use the funds in other ways that support WPR in their communities as enhanced recycling services are added at renovated transfer facilities, curbside collection for bulky items becomes more cost effective and widely available, and product stewardship programs begin to offer more options for recycling. The grant monies can be used to support a number of activities, including:

- Encouraging and promoting waste reduction
- Continuing to implement and improve general recycling programs
- Improving opportunities for the collection of specific commodities, such as paper

- Improving opportunities for the collection and/or composting of organic materials
- Increasing the demand for recycled and reused products
- Fostering sustainable development through the promotion of sustainable building principles in construction projects
- Managing solid waste generated by public agencies in a manner that demonstrates leadership
- Broadening resource conservation programs that integrate WPR programs and messages
- Providing product stewardship opportunities

Ecology also supports WPR programs in King County through the Coordinated Prevention Grant program. Funds are allocated within the county based on population. The division uses funds allocated to the unincorporated areas to support WPR efforts such as recycling collection events, yard waste and food scrap recycling, and natural yard care education and promotion. The cities can apply directly to Ecology for a portion of the funds to support their own communities' WPR programs.

The division is considering establishment of a new competitive grant program to fund innovative projects and services that further the WPR goals outlined in this plan. Both the cities and commercial collection companies would be eligible to apply for the funds. The division would work collaboratively with the cities and other stakeholders to develop the details of the grant program. The new grant program would be funded through the solid waste tipping fee, so it would be included in a future solid waste rate.

Environmentally preferable purchasing is a strategy for purchasing products that have a lesser or reduced effect on human health and the environment when compared with competing products that serve the same purpose and fulfill the basic requirements of price, performance, and availability. King County's Environmental Purchasing Policy was adopted in 1989 in response to concerns about diminishing landfill space and the need to create markets for newly collected recyclables. The policy, updated in 1995 and again in 2003, requires all county agencies to, "whenever practicable," purchase environmentally preferable products. A life-cycle analysis is used in the selection of a product, considering how the raw materials are acquired and manufactured, packaged, distributed, maintained, and finally disposed. Pollution prevention and resource efficiency are also considered.

County agencies have turned to a wide range of environmentally preferable products, such as porous concrete that allows water to drain through the sidewalk, and services, such as the use of goats for managing vegetation. Other purchases include remanufactured toner cartridges, re-refined antifreeze and motor-oil, biodiesel fuel, hybrid vehicles, bio-based oils, plastic lumber, compost, and retread tires. In addition to their environmental benefits, many of these products are more economical and perform as well as those they replace.

King County provides technical assistance to cities by sharing contracts, specifications, and procurement strategies. Many cities in the county have implemented environmentally preferable purchasing programs.

Benefits of Waste Prevention and Recycling Efforts

The regional commitment to WPR has many benefits – financial, social, and environmental.

Financial benefits are probably the most immediate for many county residents and businesses. Not only do convenient recycling services provide an alternative to the higher cost of disposal, WPR will provide a long-term significant cost savings for ratepayers by increasing the lifespan of the Cedar Hills Regional Landfill, which is estimated to be a more cost-effective means of disposal than the other disposal alternatives currently available (discussed in Chapter 6, *Landfill Management and Solid Waste Disposal*). After Cedar Hills reaches capacity and closes, minimizing the amount of waste that requires disposal will translate directly into lower fees for King County ratepayers.

The social benefits of WPR can be described in terms of economic growth and job creation. Materials diverted from the landfill for recycling must be sorted, processed, and transported. A study by the National Recycling Coalition, funded in part by the U.S. Environmental Protection Agency, estimates that for every 10,000 tons of material recycled 14 people are employed in recycling plants and transport operations (R.W. Beck 2001); subtracting the 5 employees required to landfill that same amount of material, there is a net gain of 9 jobs. The reuse industry also contributes jobs and social benefits to the region.

The positive environmental benefits of WPR are local and ultimately global. Environmental benefits are focused in two primary areas, both of which have wide-reaching and long-term impacts. First, the release of pollutants emitted during the production and disposal of products is decreased, reducing the potential for harm to human health and the environment. Second, is the savings in energy, and associated carbon emissions, and natural resources, contributing to a healthier planet.

Recycling and Composting: Calculating the Benefits

While the concept of waste prevention – *less consumption = less impact* – may be preferable from an environmental standpoint, we know that people will continue to produce, distribute, buy, and use a wide range of products. The environmental impacts of a product can occur at many stages of the product's life from extraction of the raw materials to production, distribution, and final disposal of any residual waste. A life-cycle analysis allows us to look at the environmental pollution generated at each stage of the product's life – from air, soil, and water pollution to the secondary impacts on human health, habitat, and ecosystem – and enables us to recognize the cost of those impacts.

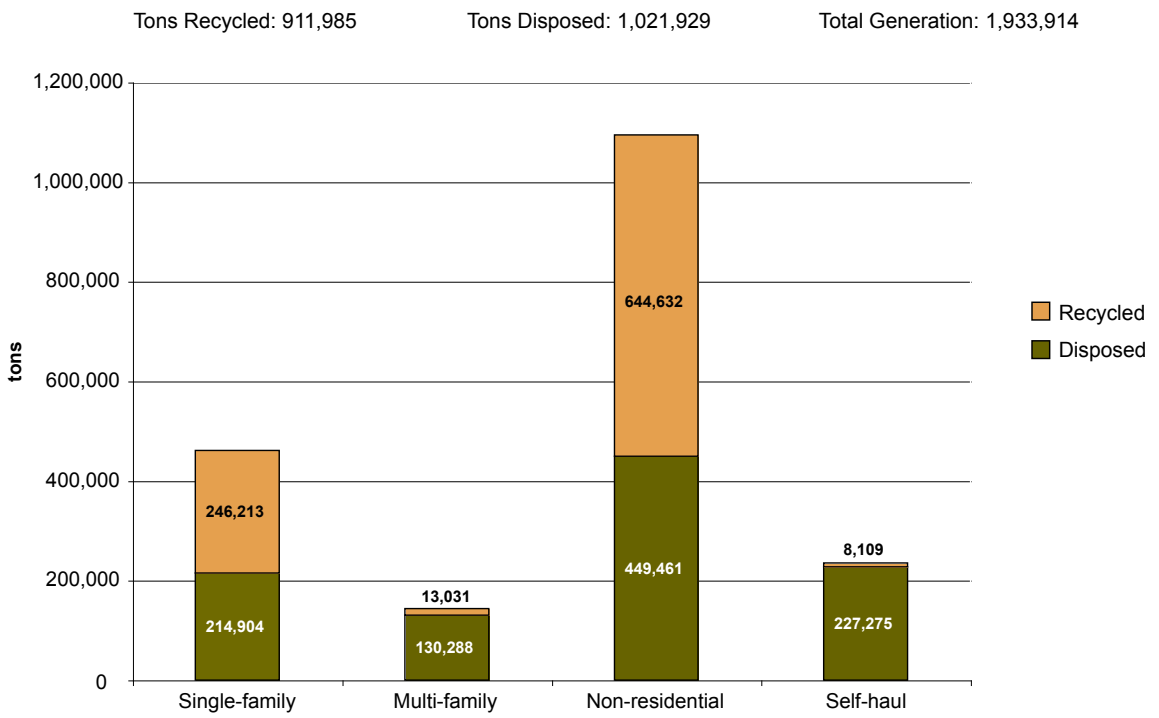
An econometric environmental model developed by Dr. Jeffrey Morris (Morris 2008) performs life-cycle analyses by evaluating areas critical to human health and the environment, including climate change, and then assigns a dollar value to the impact. Dr. Morris' model shows that recycling and composting as much as possible creates fewer environmental impacts than disposal. For example, when the model is applied to the 818,000 tons of recyclable and compostable materials collected in King County in 2007, it calculates a reduction of nearly 950,000 metric tons in greenhouse gas emissions. The model can then calculate a corresponding value for this reduction of more than $37 million.

Current Data on Regional Waste Generation, Recycling, and Disposal

Figure 3-1 shows the tons of materials recycled and disposed in 2007 by category of waste generator – single-family residents; multi-family residents; non-residential customers such as businesses, institutions,

and government entities; and self-haulers who bring materials directly to the division's transfer stations. More specific information on each generator type (including generators of C&D for recycling and disposal) follows. Because recycling data come from various external sources, data for 2007 are the most complete and up-to-date available and are used for the figures throughout this section; complete data for 2008 will be available in early 2010. Note that the scale on each figure varies.

Figure 3-1. 2007 recycling and disposal by generator type



As discussed earlier, while there has been considerable progress in WPR over the years, there is still room for improvement. As Figure 3-1 illustrates, the non-residential sector provides the greatest opportunity to divert materials from disposal, with nearly 450,000 tons of materials disposed in 2007. While single-family residents are recycling more than one-half of their waste, division studies indicate that a large portion of the remaining materials could be recycled or reused (as discussed in the next section). The multi-family sector generates the least amount of garbage and recycling of all sectors, but also shows a need for improvement in their recycling efforts.

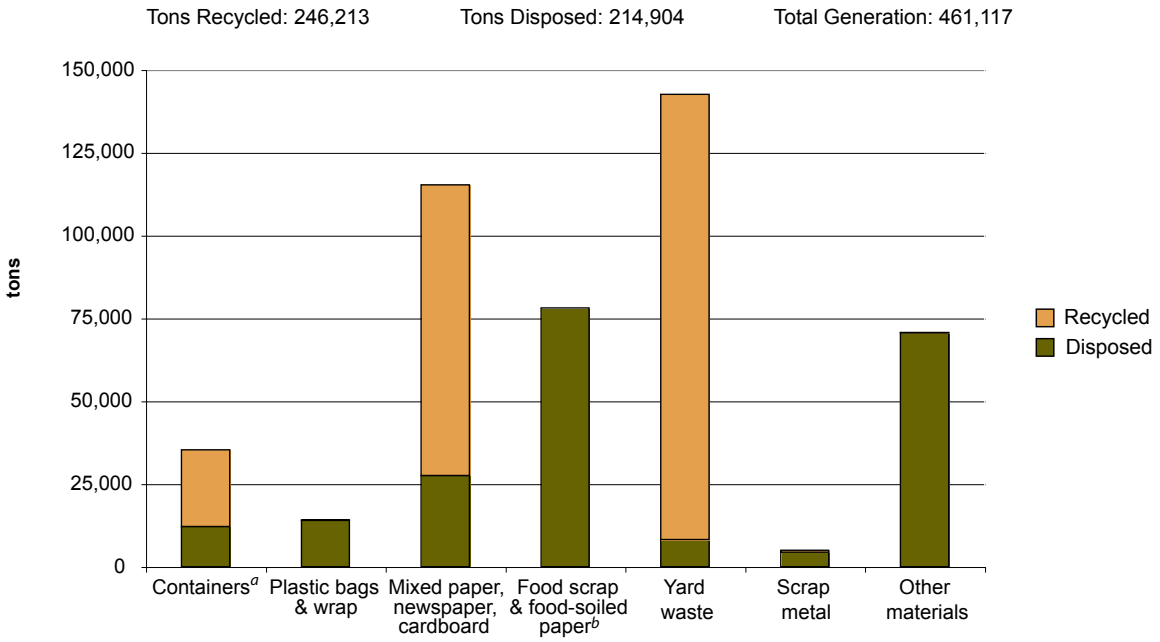
Self-haulers show the least amount of recycling. At this time, many of the division's urban transfer stations are being renovated and other facilities are undergoing major improvements. A goal of the renovation plan is to add space for collection of more recyclables and to build flexibility into the design to allow for collection of additional materials as markets develop. Adding space for collection of greater amounts and a wider array of materials is expected to result in higher recycling rates at the transfer stations.

With studies indicating that more than one-half of the waste that reaches the landfill could have been recycled or reused, and specific data on what those materials are, we can focus on areas that will have substantial influences on the region's per capita disposal rate. The following sections address each category of generator and identify some of the more significant areas for improvement by material type.

Single-Family Residents

Sixty-eight percent of the households in King County's service area are single-family homes. In 2007, these single-family households recycled on average about 53 percent of their waste. More than 94 percent of the yard waste and 76 percent of the paper were recycled by this sector in 2007 (Figure 3-2). While food scraps and food-soiled paper made up about one-third of the waste disposed by single-family residents in 2007, recycling is expected to increase as the curbside program for recycling these materials with the yard waste continues to grow. Considerable amounts of the standard curbside recyclables – glass and plastic containers, tin and aluminum cans, mixed waste paper, newspaper, and cardboard – while easily recyclable, are still present in the waste disposal stream.

Figure 3-2. 2007 recycling and disposal by single-family residents



[a] *Tin, aluminum, glass, and recyclable plastic.*

[b] *Currently, food scraps and food-soiled paper collected with residential yard waste are reported as yard waste tons; methods to determine the amount of residential food scraps/food-soiled paper in the yard waste are under development.*

As we saw with the Recycle More Neighborhood Challenge, increased recycling of food scraps and food-soiled paper, as well as the standard curbside recyclables, could boost single-family recycling significantly. Recommendations for improving and standardizing curbside collection for single-family residents are discussed in Chapter 4.

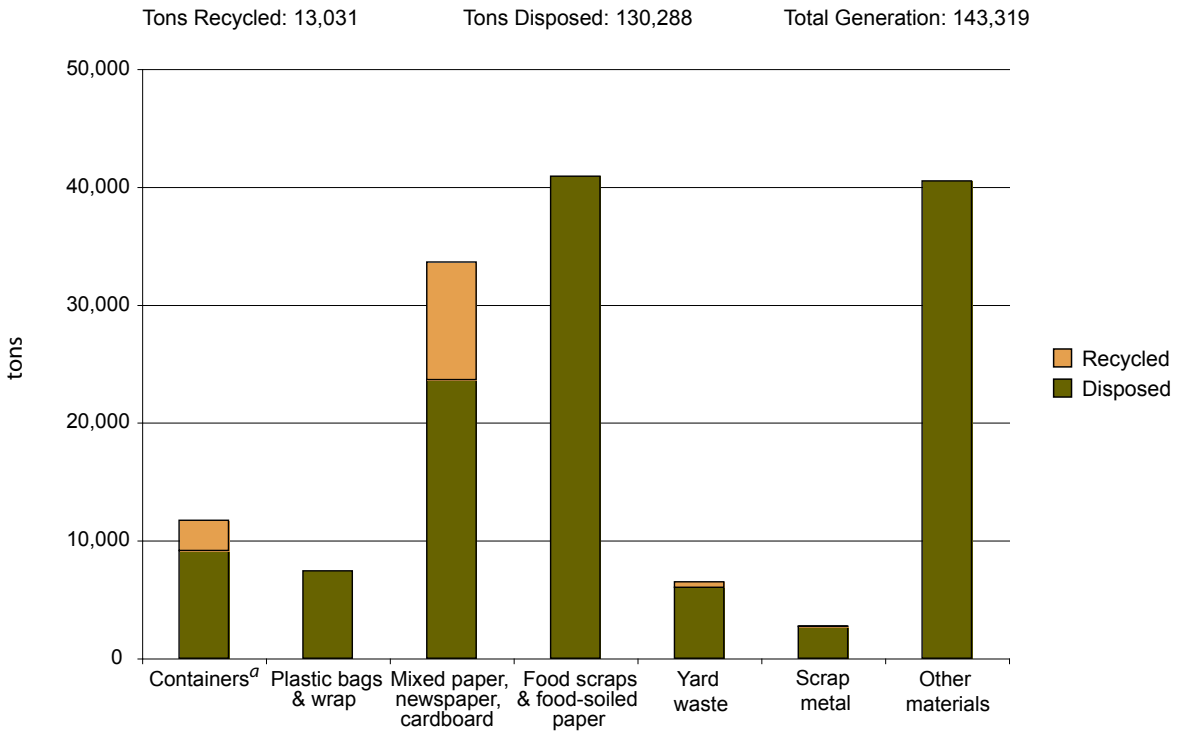
Other recyclables found in the single-family waste stream in smaller amounts include scrap metal, textiles, and some C&D, such as clean wood and gypsum wallboard. Plastic bags and plastic wrap also make up a noteworthy portion of the total, although it is unclear how much of this material could be recycled, partly because it is unknown how many of the bags contain non-recyclable materials such as garbage or pet wastes.

Nearly one-third of the non-recyclable materials in the single-family waste stream are disposable diapers and pet wastes, as well as a variety of plastics for which there are currently insufficient recycling markets.

Multi-Family Residents

Thirty-two percent of the households in King County's service area are in multi-family complexes. In 2007, the average multi-family recycling rate in the county's service area was 10 percent. While this rate is considerably lower than the single-family rate, overall generation and disposal from multi-family residences is lower as well. As with single-family residents, the primary areas of opportunity are in recycling food scraps and food-soiled paper and the standard curbside recyclables (Figure 3-3).

Figure 3-3. 2007 recycling and disposal by multi-family residents



[a] *Tin, aluminum, glass, and recyclable plastic.*

Other materials present in the multi-family waste stream, both recyclable and non-recyclable, are similar to those found in the single-family waste stream.

It is difficult to track multi-family recycling rates because of 1) the varied nature of multi-family complexes, 2) the growth in construction of mixed-use buildings that contain both residential and non-residential units, and 3) the varied levels of recycling services provided. What is clear is the need to provide adequate space for garbage and recyclables collection at these complexes and to standardize collection across the county.

A detailed discussion of ways to improve recycling at multi-family and mixed-use complexes is provided in Chapter 4, *Collection and Processing*.

Non-Residential Generators

Non-residential generators – businesses, institutions, and government entities – recycled an estimated 59 percent of their waste in 2007. Despite having the highest recycling rate of any sector, non-residential generators present the greatest opportunity for increasing King County's overall recycling rate (Figure 3-4). As of March 2007, there were an estimated 690,000 employees in the service area working at an estimated 30,000 businesses and organizations. The make-up of the non-residential sector ranges from manufacturing to high-tech and retail to food services. The recycling potential for any particular business or industry varies depending on the nature of the business. For example, restaurants and grocers are the largest contributors of food waste, while manufacturers may generate large quantities of plastic wrap and other packaging materials. Because of the diversity of business and industry in the region, a more individualized approach is needed to increase recycling in this sector.

There are significant opportunities in the non-residential sector to increase the diversion of food scraps and food-soiled paper. The largest increase will be realized as more restaurants and grocers contract with private-sector companies to collect their food scraps for composting and more cities begin to offer commercial organics collection.

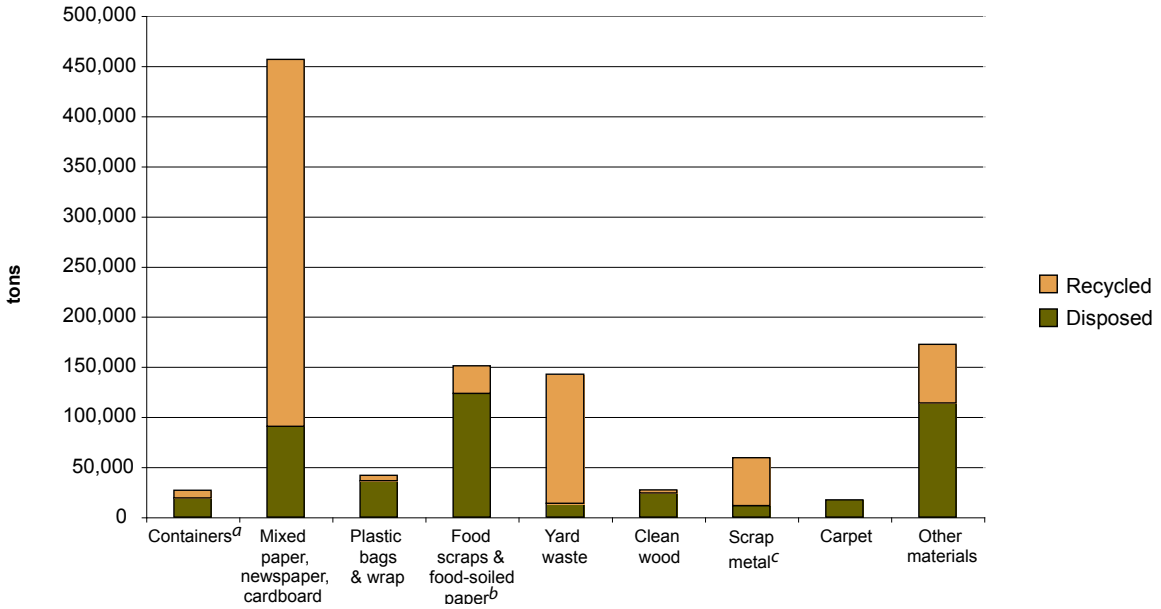
Smaller-scale efforts can also contribute. For example, in spring 2007, the division helped forge a partnership between county school districts and Food Lifeline and Northwest Harvest to distribute food left over from the school year. Five school districts donated more than 5,000 pounds of produce, dairy products, baked goods, and other staples that would have spoiled or reached their pull dates over the summer. Donations amounted to about 3,900 meals for area food banks and other programs.

Another opportunity for reducing overall disposal is with commercially generated paper. While large amounts of paper are being recycled, more than 90,000 tons of recyclable paper was disposed by businesses in 2007. Paper may also provide an opportunity for waste prevention – not just moving from disposal to recycling, but aiming to reduce the generation of waste paper.

Other materials being recycled in smaller amounts by the non-residential sector include electronics and textiles. Non-recyclable materials present in the waste stream include disposable diapers, treated or contaminated wood, and a variety of plastics.

Figure 3-4. 2007 recycling and disposal by non-residential generators

Tons Recycled: 644,632 Tons Disposed: 449,461 Total Generation: 1,094,093



[a] *Tin, aluminum, glass, and recyclable plastic.*
[b] *Includes used cooking oil.*
[c] *Includes only 20 percent of tonnage reported to Ecology; the remaining 80 percent is estimated to be from auto bodies, which have been excluded from King County recycling calculations because they have not historically been disposed as solid waste.*

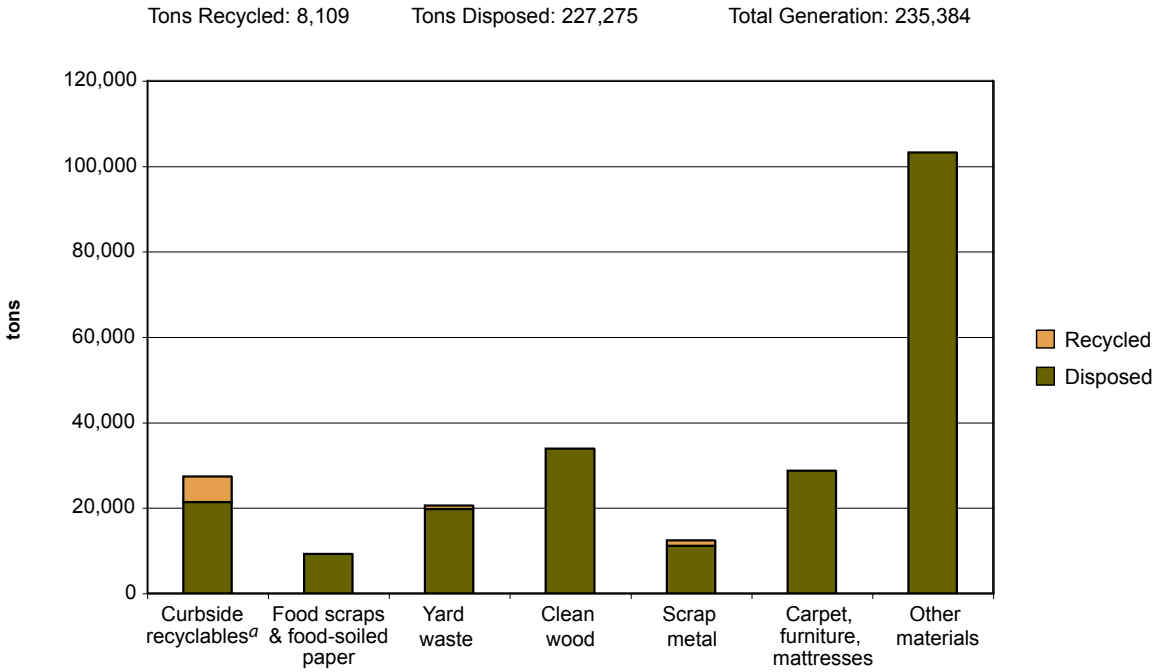
Note: Non-residential recycling data include recyclables from residents who self-haul materials to private-sector drop boxes and recycling from buy-back centers.

Self-haulers

Self-haulers are residential and non-residential customers who choose to bring garbage and recyclables to the transfer facilities themselves. According to telephone surveys conducted as part of the division's waste characterization studies, the most common reasons given for self-hauling are having a large quantity of waste and having large or bulky items to dispose (discussed in more detail in Chapter 5, *The Solid Waste Transfer System*). About one-half of the materials disposed by self-haulers has the potential for recycling, most significantly clean wood, yard waste, scrap metal, and paper (Figure 3-5).

According to the division's 2007 waste characterization study, the percentage of clean wood in the waste stream recently surpassed yard waste. This may be partially explained by the fact that the Shoreline Recycling and Transfer Station, which has traditionally received a large amount of yard waste, was closed during the study period, or by the increase in remodeling and construction activity between the last study and late 2007.

Figure 3-5. 2007 recycling and disposal by transfer facility self-haulers



[a] *Glass and plastic containers, tin and aluminum cans, mixed waste paper, newspaper, and cardboard.*

Currently, six of the eight transfer stations provide collection containers for the standard curbside recyclables, which include glass and plastic containers, tin and aluminum cans, mixed waste paper, newspaper, and cardboard. At some of the stations, textiles and large appliances are also collected. There are a number of materials still prevalent in the self-haul waste stream for which there are currently insufficient or no recycling markets, such as treated and contaminated wood, carpet, and a variety of plastics.

As discussed previously in this chapter and in Chapter 5, *The Solid Waste Transfer System*, many of the division's urban transfer stations are being renovated and other facilities are undergoing major improvements. A goal of the renovation plan is to add space for collection of more recyclables and to build flexibility into the design to allow for collection of additional materials as markets develop and needs change.

At some point, it may be prudent to eliminate the acceptance of most standard curbside recyclables at transfer facilities, as it is more efficient and cost effective to collect them at the curb. The space and resources at the stations could be used instead for collection of other materials that are not easily collected curbside.

The fee for recycling materials at county transfer facilities is less than the fee for disposal. King County code (KCC 10.12.021.G) does not require that fees for recyclables recover the full costs of handling and processing these materials, thus the fees can be set lower to encourage recycling over disposal. In fact,

for materials such as the standard curbside recyclables, there is no fee at all, even though the division pays the cost to have the materials picked up for processing by recycling firms. For some materials, such as appliances, disposal is not an option and the fee reflects the actual cost to the division of handling the material. As collection services for new recyclable materials are added at transfer facilities and more tons of materials are recycled, fees will be evaluated on a regular basis and adjusted as necessary to optimize the financial and environmental benefits.

Shoreline Recycling and Transfer Station

Recycling Rate Increases with Expanded Services

The Shoreline Recycling and Transfer Station opened on February 16, 2008 with expanded recycling services for self-haulers. Customers are now able to recycle a wider array of materials at the station than the standard curbside recyclables. In addition, weekend events have been held at the station to collect reusable building materials. Thus far at the new Shoreline station, about 20 percent of materials received from self-haulers was recycled, far more than at any other county transfer station.

The following recyclables, and associated amounts, were collected from the Shoreline station in 2008[a]:

Curbside recyclables	469 tons	
Organics[b]	1,944 tons	
Clean wood	78 tons	
Scrap metal	426 tons	
Appliances	283 tons	
Household batteries	0.5 tons	
Textiles	3 tons	
Televisions	58 tons	(collection began 6/1/08)
DVD/VCR/CD players	13 tons	(collection began 6/1/08)
Fluorescent bulbs and tubes	0.5 tons	(collection began 6/1/08)
Reusable building materials	3.5 tons	(through 3 collection events)

[a] *Materials were collected from 2/16/08 through 12/31/08, unless noted. Tonnage figures are rounded.*
[b] *Of the organics collected, 88 percent was from self-haulers and 12 percent was from commercial collection companies.*

Note: Collection of televisions and household batteries ended in fall 2009.

Generators of Construction and Demolition Debris

The division contracts with Waste Management and Allied Waste to take C&D for both disposal and recycling. A number of private-sector firms not under contract with the county also accept C&D for recycling. A detailed discussion of the status and planned improvements for C&D collection and recycling is provided in Chapter 4, *Collection and Processing*.

In 2007, more than 1.2 million tons of C&D was generated in King County. C&D includes debris from the construction, remodeling, repair, or demolition of buildings, other structures, and roads. It includes clean wood, painted and treated wood, gypsum wallboard, roofing, siding, structural metal, wire, insulation, packaging materials, and concrete, asphalt, and other aggregates. Of the more than 1 million tons of C&D diverted from disposal in King County in 2007, about 87 percent – more than 900,000 tons – was concrete, asphalt, and other aggregates. Other materials that are being diverted, either to recycling or beneficial use (see adjacent description), include clean wood and gypsum and small amounts of metals, paper, and other assorted materials.

Wood makes up about 40 percent of the C&D that is being disposed. While much of it is not recyclable because it has been painted or treated, in 2007 about 60,000 tons of clean wood that could have been diverted was disposed. Other recyclable C&D materials that are being disposed include a variety of scrap metals, clean gypsum, and asphalt shingles.

What is Beneficial Use?

The accepted hierarchy of waste management is to prevent or reduce, reuse, and recycle. But there is another potential use for some materials referred to as "beneficial use" (or sometimes "beneficial reuse"). As an example, wood from C&D processing facilities is sometimes chipped and burned for fuel, commonly referred to as hog fuel. While there is no standard definition for what constitutes beneficial use, this practice is generally accepted as a beneficial use because it produces energy that would otherwise require some other material as fuel.

Other practices that might be considered beneficial use are more controversial. For example, fine-particle residuals produced during the processing of C&D materials may have no value for recycling, but could be used as daily cover for a landfill. These residuals would replace the use of soil or other cover material in the landfill, which sometimes must be imported for this use. However, because the material is still being disposed of in a landfill, there is some question as to whether this would constitute a beneficial use.

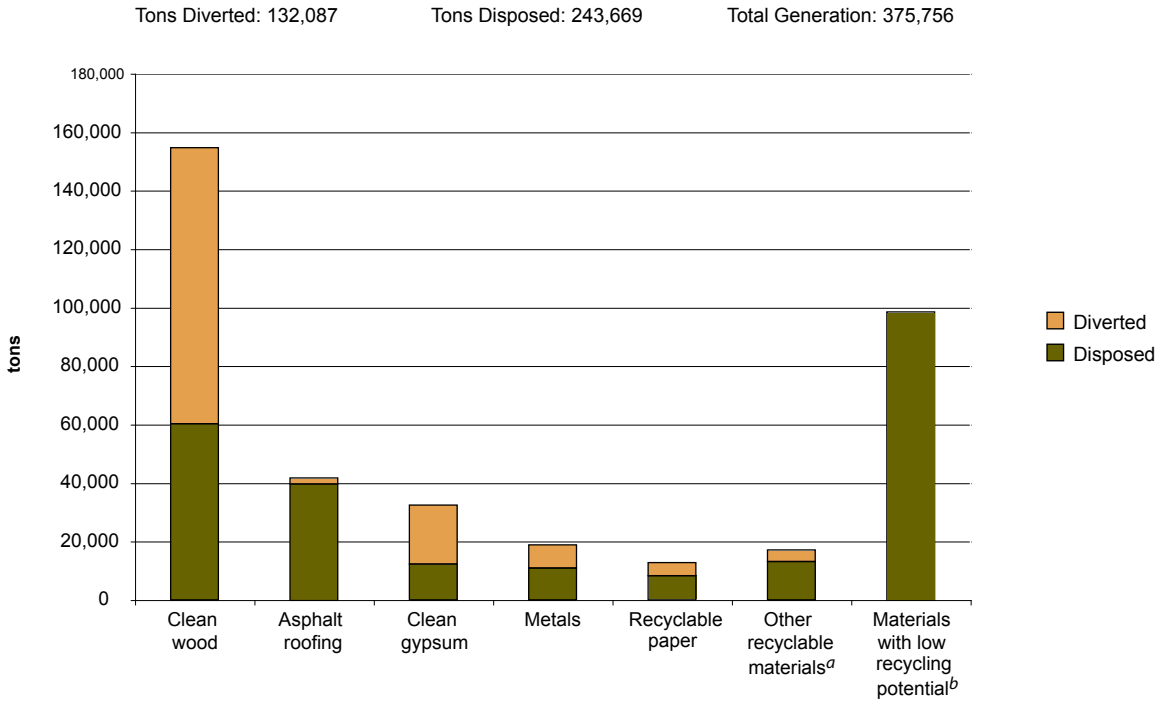
One issue that complicates the definition of beneficial use is the underlying goal to find the highest end use for a recycled product. Notions about what the highest use is could evolve and change over time. For example, given the current status of energy demand, is it more beneficial to use a portion of recycled wood as a source of fuel or as a recycled wood product?

To look at these and other issues regarding beneficial use, the county is participating in a statewide dialogue with Ecology, the City of Seattle, and other stakeholders. Deciding what constitutes waste versus beneficial use versus recycling will have far-reaching effects on energy production and resource conservation in the future.

Figure 3-6 shows the composition of C&D materials – other than concrete, asphalt and other aggregates – diverted and disposed in 2007 (Cascadia 2009a). Most concrete, asphalt, and aggregates are recycled; in 2007 only about 20,000 tons, or 2 percent, was disposed.

Figure 3-6. 2007 C&D diverted and disposed

(excludes concrete/asphalt/aggregates)



[a] *Includes yard waste, carpet and pads, textiles, and plastics.*
[b] *Includes painted and treated wood, painted/demolition gypsum, plastics, and other mixed C&D.*

Over the last 10 years, recycling at the job site has become more commonplace. Green building programs discussed earlier in this chapter, such as LEED and Built Green™, have been instrumental in promoting C&D recycling.

The cities and the county may consider encouraging increased diversion from disposal through permitting requirements. Other cities and counties around the country are doing so through a variety of land use and building permit processes, such as:

- Expediting the permit process for projects with higher rates of C&D diversion or more green building elements.
- Mandating that all job sites meet a specific level of diversion as in San Diego, Santa Monica, and Chicago.

- Requiring that C&D processing facilities meet target rates of C&D diversion for certification, and then requiring contractors to take materials to these certified facilities. For example, San Jose requires contractors to take materials to C&D facilities that divert at least 50 percent of their C&D.

- Requiring developers to pay a deposit when applying for their building permits, which specify a target rate of C&D diversion. The contractor receives the deposit back by submitting facility receipts showing they have reached their targeted diversion level. Several jurisdictions in California are implementing this practice.

TURNING WASTES TO RESOURCES

In 2004, King County adopted "Zero Waste of Resources" as a principle designed to eliminate the disposal of materials with economic value. Zero Waste does not mean that no waste will be disposed; it proposes that maximum feasible and cost-effective efforts be made to prevent, reuse, and reduce waste. The division has been taking steps to eliminate the disposal of materials for which there is economic value and a viable market.

Several factors determine which materials will be the focus of recycling efforts in the county:

- The amount present in the waste stream
- The ability to handle the material – both collection and processing
- Markets for the material
- Environmental considerations

Since the county's last comprehensive solid waste management plan was issued in 2001, the list of materials that can be recycled has grown substantially, primarily due to growth in the infrastructure and markets. According to Ecology's surveys, the following materials have been recycled in King County:

Paper
Corrugated paper
High-grade paper
Mixed paper
Newspaper
Aseptic packaging[a]
Polycoated paper[b]

Organics
Food scraps
Food-soiled paper
Oil - cooking
Yard waste

Containers
Aluminum cans
Tin/steel cans
Container glass
#1 PET plastics[c]
#2 HDPE plastics[d]
#5 Polypropylene[e]

Plastic Wrap and Bags
#4 LDPE plastics[f]

Clean Wood
Unpainted, untreated wood

Scrap Metal
Ferrous metals (contain iron)
Nonferrous metals
Large appliances

Carpets and Pads

(continued)

Electronics
Audio/video equipment
Cellular telephones
Circuit boards
Computer monitors
Printers/peripherals
Computers and laptops
Copier/fax machines
PDAs/pagers
Tapes/discs
Televisions

Textiles
Rags/clothing/etc.
Upholstery

Furniture and Mattresses

C&D
Asphalt shingles
Asphalt/concrete/bricks
Gypsum wallboard
Roofing/siding wood
Roofing material

Other Materials
Anti-freeze
Auto bodies
Batteries - household
Batteries - vehicle
Fluorescent lights
Glass - non-container

Other Materials (cont.)
Landclearing debris
Manure
Oil - used
Oil filters
Paint - latex
Photographic films
Polystyrene foam
#3 PVC plastics[g]
Tires
Topsoil

[a] *A mixture of plastic-coated paper and a small percentage of aluminum, which forms a tightly sealed container that eliminates the need to refrigerate certain products; used to produce juice and other beverage or soup containers.*
[b] *Plastic-coated paper, used to produce items such as milk and ice cream cartons and frozen food containers.*
[c] *Polyethylene terephthalate plastics, used to produce items such as pop and water bottles and food jars.*
[d] *High-density polyethylene plastics, used to produce items such as grocery bags; milk and juice jugs; and laundry detergent, bleach, and fabric softener bottles.*
[e] *Used to produce items such as ketchup bottles, yogurt containers, and dairy tubs.*
[f] *Low-density polyethylene plastics, used to produce items such as dry cleaning bags, bread and frozen food bags, squeezable bottles, and shrink wrap.*
[g] *Polyvinyl chloride plastics, used to produce items such as medical tubing, wire insulation, pipes, and siding.*

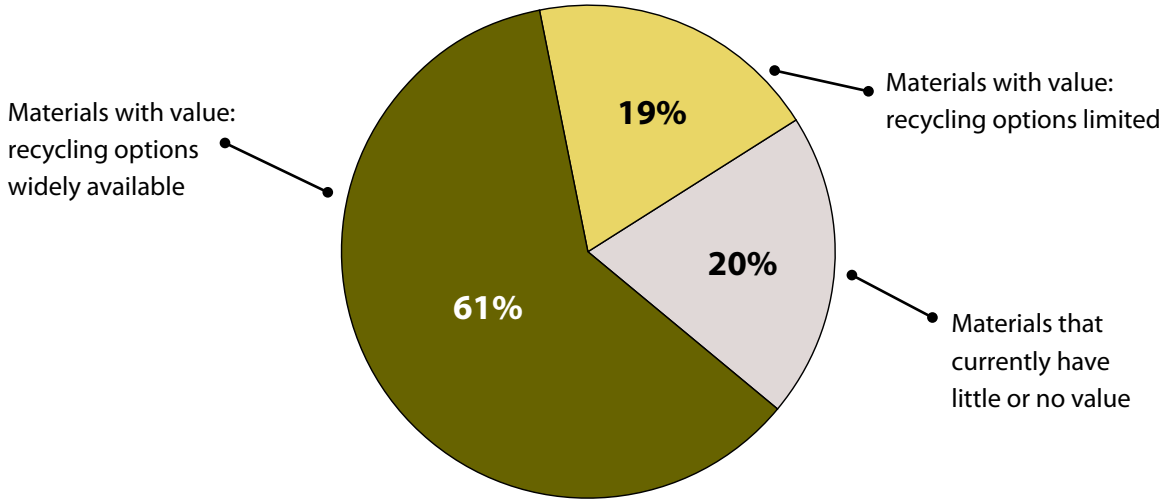
While the list of potentially recyclable materials is extensive, there are only limited markets for some of the materials. Zero Waste of Resources targets the materials in the waste stream that have the most value in the market. In 2007, about 1 million tons of solid waste was disposed at the Cedar Hills Regional Landfill. As shown in Figure 3-7, there exist at least limited options in the market for the recycling of about 80 percent of the materials disposed.

Materials with widely available recycling options include food scraps and food-soiled paper, paper, clean wood, yard waste, metals, and tin, aluminum, glass, and plastic containers. Materials that currently have more limited options include plastic wrap and bags, carpet, polystyrene foam and other plastic packaging, gypsum wallboard, and asphalt products. Materials such as treated and contaminated wood and miscellaneous C&D wastes have little or no value in the marketplace at this time.

Priority Materials for Curbside Collection

With each comprehensive solid waste management plan, new materials that can be efficiently and cost-effectively captured for recycling are added to curbside collection programs. Adding materials for curbside collection requires sufficient infrastructure and markets for their collection, processing, and end use. Standardizing the materials collected across the county simplifies recycling education, reduces confusion among consumers as to what is recyclable, and increases collection efficiency.

Figure 3-7. Recycling potential of materials disposed in 2007



As new materials are identified, they are added to the "minimum collection standards" discussed in greater detail in Chapter 4, *Collection and Processing*. With this plan the following materials have been added to the collection standards recommended in Chapter 4: polycoated paper, shredded paper, aseptic packaging, plastic jugs and tubs, food scraps and food-soiled paper, and smaller scrap metal.

Priority Materials for Collection at King County Transfer Facilities

The division has identified several priority materials to collect at all transfer stations once they are renovated:

- Organic waste, including yard waste, food scraps, and food-soiled paper
- Cardboard
- Clean wood (not treated or painted)
- Scrap metal

Some materials designated for curbside collection and/or as priority materials for transfer station collection will also be collected by private-sector businesses.

Scrap metal is collected for recycling at the new Shoreline Recycling and Transfer Station.

Markets for Recyclable Materials

The division conducts periodic market assessments for recyclables in King County. These market assessments help identify opportunities, establish priorities, and guide programs for market development and increased diversion of recyclable materials from the waste stream. Data from the market assessments help guide the direction of future recycling programs and services recommended in this plan.

Cascadia Consulting Group conducted the most recent market assessment for the division in 2006 (Cascadia 2006b). The study indicated that local, regional, and global markets for recyclables have matured in the last 10 years, and that markets for most materials, particularly for paper and metals, are strong. General findings of the 2006 study included:

- Manufacturers and other end users can easily handle additional quantities of some materials, including plastic containers, glass, paper, tin and aluminum cans, organics, clean wood, electronic products, and textiles.
- A ban on the disposal of select residential and/or business recyclable materials could help provide additional supply to markets.
- Asia continues to grow as a major market destination for materials such as paper, plastics, and, increasingly, metals.

Since the 2006 study was conducted, markets have fluctuated widely in response to the downturn in the economy that began in 2007. Commodity prices have plummeted from their all-time highs. It is anticipated that prices will continue to fluctuate locally, nationally, and globally until the overall economy improves. As noted in the 2006 study, markets for some materials have also fluctuated in response to changes in technology or shifting market demands.

The county is working to expand markets for the use of recyclable and reusable materials through its LinkUp Program. The program helps to facilitate partnerships among businesses, public agencies, and other organizations to increase the use of recycled materials for manufacturing, processing, and resale. Through the LinkUp Program, the division has been monitoring market developments for materials such as container glass, asphalt shingles, polystyrene foam, and clean wood, and is seeking ways to foster their use through local manufacturers, public agencies, and businesses.

A brief description of the markets for several materials is provided below based on the 2006 market assessment and more recent data and trends. The division will continue to monitor technologies and markets for the handling of these and other materials.

Electronic Products

The recycling of electronic products has advanced rapidly in the last several years on a nationwide scale, due in large part to safety concerns. Many electronic products contain potentially hazardous materials, such as lead, mercury, and cadmium, which should be recycled or disposed of in a safe and environmentally sound manner.

Recent technological changes in the electronics field are driving some changes that will affect the amount of electronics waste or e-waste generated in the region. For example, in June 2009, television stations stopped broadcasting in analog signals and converted to digital signals. While there were various options for consumers other than purchasing new televisions (such as buying converters or subscribing to cable services), the change to digital is expected to result in an increased quantity of televisions recycled over the next year.

There are several other notable trends in the e-waste industry:

- The quantity of cathode ray tube (CRT) glass from televisions and monitors available for recycling is likely to increase in the short term as consumers purchase new flat-panel televisions and computers, discarding their older CRT products. Liquid crystal displays and plasma screens are two of the most common types of flat-panel devices.

- CRT glass contains lead, which must be recycled in a manner that protects human health and the environment. There are currently no CRT recycling facilities in the U. S., thus the material must be exported for recycling. The E-Cycle Washington program requires manufacturers to provide documentation of all recycling processes for materials of concern, such as lead in the CRT glass.

- The number of flat-panel monitors that are discarded for recycling will also increase in the long term as more of these products enter the market. Recycling processes for them are still being developed, and little is known about the potential toxicity of the components or health effects of recycling these products. It is known that liquid crystal displays contain small mercury lamps to backlight the screens. These lamps must be removed by the recycler to contain the mercury before the device can be put into a shredder or otherwise processed; however, not all recyclers are currently following this practice. Research is being conducted on how to reclaim other materials in the monitors such as indium, a rare and valuable metal used in the production of liquid crystal displays.

Since January 1, 2009, more than 3 million pounds of e-waste has been received at take-back locations across Washington.

Container Glass

In many areas across the country, including King County, single-stream recyclables collection has become the standard, whereby all curbside recyclables are placed in one large cart for pickup at the curb. While the conversion from separate bins for each commodity to a single cart has made recycling easier for consumers and has resulted in increased recycling, it presents some challenges for the recovery and processing facilities. One of the challenges is cross contamination of materials as they are

sorted and separated. In the case of glass, even small amounts of contamination in the sorted material can reduce the quality and affect the potential end use of the recycled glass.

Most recycled glass in King County is purchased by two end-users; one company manufactures new bottles and the other sells the glass for use as construction fill. While new bottles have a higher market value, because of the lower quality of the recycled glass collected and processed in the region, much of it has been used as fill material. Some material recovery facilities are tackling this problem by investing in updated sorting equipment, such as optical scanners, to improve the separation process and hence the market value of the materials.

Plastics

During the study period for the 2006 market assessment, rising oil prices and strong overseas demand led recycling markets for traditional plastics to all-time highs, although prices varied considerably by type. A brief summary of the market status for various types of plastics follows:

- Recycling rates for plastic bottles are low in King County and across the country; however, markets for the most common types of plastic bottles (PET and HDPE) are currently strong.
- Market prices and demand for other types of plastic, including PVC, LDPE, and polypropylene, are high, but are still far lower than for PET and HDPE plastics.
- Markets for plastic wrap that comes from large generators such as manufacturers that use it for wrapping pallets are strong. The division is exploring a pilot program to link retailers, warehouses, and other generators of large amounts of plastic wrap with material processors.
- Plastic bags have been gaining attention as a commodity with recycling potential; however, current recycling rates are low. Plastic bags mixed with the curbside recyclables and picked up through curbside collection programs present problems for material recovery facilities. There have been growing efforts both regionally and internationally to address this issue. The division is using a two-pronged approach to find effective ways to manage plastic bags. One approach is to encourage the use of reusable bags by consumers at grocery and other retail stores, and a second approach is to work with area retailers to establish a wide-scale take-back network for used plastic bags. Other jurisdictions have opted for different approaches. Most recently, the City of San Francisco passed

legislation that bans non-compostable plastic bags from disposal. The City of Seattle proposed legislation that would require retailers to charge a 20 cent fee for providing disposable paper and plastic bags at the point of purchase; however, the legislation did not pass a public vote in August 2009.

Organics

Yard waste collection programs have been extremely successful in diverting yard waste from the disposal stream. Markets for using yard waste to make compost are strong and could handle more supply. The added collection of food scraps and food-soiled paper with the yard waste has taken off, with the service now available to nearly all single-family curbside collection customers in the county. Education and promotion are underway to encourage the recycling of food scraps and food-soiled paper by single-family residents, as well as multi-family residents and businesses.

There are several privately owned and operated facilities in the region permitted to handle organics, including food scraps. Cedar Grove Composting, Inc. processes nearly all of the organics collected in King County, with facilities located in Maple Valley and Everett in Snohomish County. The Everett facility may be expanding in 2009, which would further increase the capacity for organic material processing. Land Recovery, Inc. in Pierce County and Silver Springs Organics in Thurston County also handle food scraps in addition to yard waste.

Currently, most organics are taken to the processing facilities and converted into compost. However, technologies exist to further maximize this resource prior to composting by using the bulk of the organics collected to generate energy through a process called anaerobic digestion. This process converts the methane gas generated during decomposition into energy such as natural gas or electricity. The resulting green energy can be sold to local power companies, offsetting demand for fossil fuels. The decomposed organic material can then be processed into compost. Facilities in the region are exploring opportunities to expand their operations to capture these resources and maximize their benefits.

Wood beams from a deconstruction site are salvaged for use in new building construction.

Clean Wood

Significant quantities of clean wood (unpainted and untreated) remain in the waste stream even though markets for the material are strong, particularly

for use as hog fuel. Although most clean wood goes to the hog fuel market, the division is working through the county's LinkUp program to develop local higher-value options, such as use in wood pulp and manufactured/milled wood or wood-composite products.

The salvaging of building materials during deconstruction has increased significantly in recent years. End markets for salvaged clean wood need continued development to ensure there is sufficient demand for the materials. The division is encouraging the practice of stamping salvaged clean wood with the grade of the lumber, which helps determine its potential end use, e.g., a higher grade wood has more structural integrity which would allow its use in new construction.

Asphalt Shingles

Local markets for using recycled asphalt shingles are limited, but there is growing potential to use this material in hot mix asphalt pavement and other paving applications. Local processing capacity is developing, and the division is working in partnership with state and local transportation agencies and the hot mix asphalt producers to develop this end-use market.

The division's LinkUp program is currently leading a paving trial to demonstrate the use of recycled asphalt shingles in hot mix asphalt pavement. In 2008, the county's Department of Transportation, Road Services Division agreed to sponsor the project by providing a roadway for the paving trial. The LinkUp team worked with shingles processors and the Washington State Department of Transportation to determine the optimal mix of recycled asphalt shingles and recycled asphalt pavement for the hot mix asphalt pavement. Roadway paving and testing is occurring in 2009, with study results expected in 2010.

Gypsum Wallboard

Green building programs and a strong local construction industry are contributing to a significant supply of scrap gypsum wallboard for recycling. At this time, however, the supply of recycled gypsum exceeds the demand for it by local manufacturers. New initiatives and entrepreneurs are emerging in the gypsum market to research and develop other uses for the material.

TRACKING OUR PROGRESS

The division uses a wide range of available data, both qualitative and quantitative, to evaluate the success of our WPR efforts. Over the years, the division has assimilated a robust collection of surveys and data from a variety of sources to track our progress. In most cases, more than one source of data is needed to accurately quantify how well we are doing in diverting materials from the waste stream. For example, to track our progress toward the goal of 22.9 pounds of waste per employee per week, we take the number of employees in our service area for a given year and divide it into the annual tons of garbage generated by the non-residential sector, as reported in customer surveys conducted at our transfer stations and information submitted to the division by the collection companies. Using these data, we can calculate a

pounds per week figure. The goals are tracked using aggregate data for the county's service area, rather than using data by individual city or unincorporated area.

Provided in this section is information on the types of data collected, how those data are calculated, and how reliable the data are, as well as recommendations on how the data might be improved. Chapter 2, *Solid Waste System Planning*, presents additional information on data sources used for long-term system planning.

Reports from the Collection Companies

The private-sector companies that provide curbside collection of residential garbage and recyclables throughout most of King County submit monthly tonnage reports to the division. These reports are also provided to the cities. Data for single-family households are the most complete, providing the following monthly information for each city and for unincorporated areas operating under a Washington Utilities and Transportation Commission tariff:

- Tons of garbage disposed
- Tons recycled by material type
- Tons of organic materials recycled (yard waste, including food scraps for most areas)
- Number of garbage, recycling, and organics collection customers

Generally, customer counts and tonnage numbers for single-family garbage, recycling, and organics are the most reliable because they are based on weights measured at the entrance scale of either county transfer stations (for garbage) or material recovery facilities (for recyclables). To estimate the tons of individual materials (such as newspaper, aluminum cans, and so on), collection companies take periodic random samples and determine the percentage of each material present in the loads. As overall recycling tonnage is weighed, tons for individual materials are allocated based on the percentages obtained in the random sampling. There is no standard protocol for the sampling methodology and frequency of sampling. Although collection companies have been putting increased resources into improving their sampling methods, this is an area where a standardized protocol would be beneficial. The cities and the county will be working with the collection companies to standardize sampling methodology and frequency.

Curbside collection services for garbage, recyclables, and organics are available nearly countywide for single-family residents.

The same information provided for single-family residents is provided for multi-family residents and non-residential generators; however, the per capita data are less accurate because the number of apartment units and business customers is not provided. In some cases, the same truck collects multi-family and non-residential wastes, so collection companies must estimate how much waste comes from each generator type. Even though some waste may be allocated to the wrong generator type, overall changes in recycling and disposal will still be reflected in tonnage totals, thereby providing a reasonable indicator of change.

Because many other companies provide commercial recycling services, a non-residential recycling rate cannot be calculated from the collection company data, nor can an overall systemwide recycling rate be calculated using these data alone.

Ecology Survey Data

Data on the total tons recycled come from the annual statewide survey of recycling companies conducted by Ecology. These data supplement curbside collection data by including recyclables collected by private-sector companies across the region. Recycling companies are required by state law to report tonnage data on the survey, which asks for tons by material type, by generator type (residential or non-residential), and by the county in which the materials were generated. For King County, companies are also asked if materials were generated in the City of Seattle.

The division uses the Ecology survey data to estimate both our non-residential and overall recycling rates. All of the recycling tonnage reported by Ecology is counted as non-residential except for tonnage that was included in residential collection company reports and recycling tonnage from transfer stations. Use of this accounting method means that recyclables taken by residents to privately owned drop boxes or recycling centers is included in the non-residential recycling tonnage. Ecology survey data are also used to estimate C&D diversion.

While the Ecology data provide the status of statewide efforts, there are some limitations to the usefulness of the data for local planning and evaluation, including the following:

- Data are self-reported by recycling companies, with few resources available to Ecology for checking accuracy.
- Companies make unverified estimates about the county in which the recyclables were generated, and the reporting for data between King County and the City of Seattle has been inconsistent, resulting in tonnage variations from year to year which seem unlikely.
- City-specific information, other than for the City of Seattle, is not available.
- The identification of residential versus non-residential sources is not reliable.
- The identity of the companies that report data is kept confidential, limiting the ability to verify the quantities reported.
- There is a one-year lag time in receiving the data.

Improving the reliability of recycling data would greatly benefit our ability to evaluate progress in reaching our recycling goals. To improve data quality, the division will work with Ecology to improve data reporting

through voluntary agreements with recycling companies serving the county that would allow division staff to review data reported to Ecology and to work directly with the companies to resolve data inconsistencies.

Waste Characterization Studies

Consultants retained by the division conduct periodic studies to analyze the municipal solid waste received at county facilities for disposal at the Cedar Hills Regional Landfill. For these studies, the waste stream is examined by collecting and sorting sample loads delivered to transfer facilities in King County. These studies help the county and the cities understand the composition of both the overall waste stream and what is received from different types of generators, such as residents of single-family homes and apartments, non-residential customers, and self-haulers. Separate analyses are conducted of the C&D and organics waste streams.

Division waste characterization studies are designed to provide a statistically valid picture of what is being disposed by the different generator types. Samples are taken over the course of a full year to account for seasonal variations. The sampling method is designed to ensure that all generator types and geographical areas are sufficiently sampled. The studies provide a high level of confidence of what is in the waste stream. Each study, described below, is conducted by the division as necessary to provide up-to-date information for planning purposes.

Solid Waste Characterization Studies

The most recent study of solid waste destined for the Cedar Hills landfill was conducted in 2007 (Cascadia 2008a). For this study, 420 samples were collected on 28 sampling days. The waste stream was separated into 78 categories of material. For each material and generator classification, the study was designed to achieve a 90 percent confidence interval for the amount of waste disposed countywide. In other words, the study tells us that we can be 90 percent sure that the amount of cardboard disposed in 2007 was 5.8 percent of the total waste stream (59,074 tons), plus or minus 0.9 percent.

These waste characterization studies were not designed to characterize each city's waste stream. However, based on sampling done in a variety of communities, the types of materials disposed by residents are similar, while the amounts may differ. For example, jurisdictions with food waste collection programs will have lower percentages of food in their garbage than those without. These differences are reflected in the recycling rates and pounds disposed per household for each jurisdiction.

Unlike the residential waste stream, non-residential waste disposed may differ considerably by city depending on their mix of business or industry. Additional information about waste generated by business type would be useful when developing programs. The county will be developing a strategy to provide information about waste disposed by business type to assist the cities in tailoring programs to their business sectors.

Organics Characterization Studies

Now that most single-family curbside collection customers in the county have collection services for food scraps and food-soiled paper with their curbside yard waste, we face a new challenge in measuring the amount of these materials collected. Reports from the collection companies provide information about total tons of organics delivered to compost facilities, but cannot differentiate between yard waste tons and food scrap tons. In addition, the solid waste characterization studies described above will measure decreases of food scraps and food-soiled paper in the waste stream, but will not determine whether the decreases result from curbside collection or from other diversion, such as home composting or the use of in-sink garbage disposal units.

Food scraps and food-soiled paper can now be mixed with yard waste for collection at the curb.

To improve our ability to measure progress in organics recycling and establish achievable diversion goals, the division is beginning to conduct periodic characterization studies of organics collected at the curb from single-family households. In 2007, preliminary data were collected on current participation levels in organics recycling; a follow-up study is being conducted in 2009.

Construction and Demolition Debris Characterization Studies

In 2001, the division began to conduct 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 that continues to be disposed instead of recycled. Only two studies have been conducted to date, with the last study completed in 2008 (Cascadia 2009a). A future study is planned for 2012-2013.

4

Collection and Processing

Collection and Processing

Policies

CP-1	Provide for efficient collection of solid waste, recyclables, and organics, while protecting public health and the environment and maximizing the diversion of recyclables and organics from disposal.
CP-2	Promote efficient collection and processing systems that work together to minimize contamination and residual waste, and maximize diversion from disposal.

Collection and Processing

Summary of Recommendations

Responsibility		Action	Detailed Discussion
Collection – General			
1	**County**	Evaluate whether to include Vashon/Maury Island in the county's collection service-level standards.	Page 4-6
2	**Cities, county, collection companies, Washington Utilities and Transportation Commission (WUTC)**	Explore options to increase the efficiency and reduce the price of curbside collection of bulky items, while diverting as many items as possible for reuse or recycling.	Page 4-6
3	**Cities, county**	Discontinue the collection of home-generated sharps mixed with garbage both at the curb and at all county transfer facilities; use alternative methods for proper management of sharps.	Page 4-7
4	**County, in cooperation with the cities, collection companies, material processors**	Determine how customers should prepare shredded paper for collection and in which cart it should be placed.	Page 4-10
5	**Cities, county**	Address space and collection needs of mixed-use buildings.	Page 4-20
Material Recovery Facilities			
6	**Material recovery facilities**	Continue to improve facility sorting and processing equipment and practices to remove contaminants and separate recyclables into marketable commodity grades.	Page 4-8
7	**Cities, county, collection companies**	Educate customers on proper recycling techniques to reduce contamination of recyclables going to the material recovery facilities.	Page 4-9

Responsibility		Action	Detailed Discussion
Single-Family Collection Services			
8	**Cities, county, collection companies, WUTC**	Adopt the single-family minimum collection standards.	Page 4-18
9	**Cities, county**	Increase education and promotion on the recycling of food scraps and food-soiled paper.	Page 4-20
10	**Cities, county, collection companies, WUTC**	Continue education and promotion, and consider financial incentives, to encourage recycling and reduce waste.	Page 4-20
Multi-Family Collection Services			
11	**Cities, county, collection companies, WUTC**	Update and/or enforce building code requirements to ensure adequate and conveniently located space for garbage, recycling, and organics collection containers.	Page 4-20
12	**Cities, county, collection companies, WUTC**	Adopt the multi-family minimum collection standards.	Page 4-20
13	**Cities, county, collection companies, WUTC**	Increase education and promotion, and consider financial incentives, to encourage recycling and reduce waste.	Page 4-21
14	**Cities, county, collection companies, WUTC**	Develop an infrastructure and education program for implementing collection of food scraps and food-soiled paper for multi-family residents.	Page 4-23
Non-Residential Collection Services			
15	**Cities, county**	Update and/or enforce building code requirements to ensure adequate and conveniently located space for garbage, recycling, and organics collection containers.	Page 4-23
16	**Cities, county**	Continue education and promotion to encourage recycling and reduce waste.	Page 4-24
17	**Cities**	Include non-residential recycling services in city contracts (consistent with state law).	Page 4-24
18	**Cities, county, collection companies, WUTC**	Promote recycling collection services available in the unincorporated areas and in cities served by WUTC-regulated collection companies.	Page 4-24

Responsibility		Action	Detailed Discussion
19	**Cities, in cooperation with county and collection companies**	Develop infrastructure, education, and promotion to increase recycling of food scraps and food-soiled paper.	Page 4-23
20	**Cities, in cooperation with county**	Consider developing an incentive-based rate structure for non-residential garbage customers to encourage recycling.	Page 4-24
Collection and Processing of Construction and Demolition Debris (C&D)			
21	**County**	Continue to explore options to increase the diversion of C&D from disposal by C&D processors under contract to the division, particularly for wood, metal, and cardboard.	Page 4-24
22	**County**	Encourage contractors and homeowners to use at least two containers on construction, demolition, or remodeling sites – one for garbage and one for mixed recyclables – and if there is sufficient space, to sort individual recyclables on site to maximize diversion from disposal.	Page 4-25

COLLECTION AND PROCESSING
Garbage—Recyclables—Organics—C&D

The system for curbside collection of garbage is well established in King County. Garbage collected by private- and public-sector solid waste collection companies is taken to county transfer stations, where it is consolidated and transported to the Cedar Hills Regional Landfill for disposal. The addition of recyclables to curbside collection programs has required the development of a more complex infrastructure for collecting and transporting recyclables and organics, and additional capacity for processing the materials collected.

With the Waste Not Washington Act of 1989, the state established waste prevention and recycling as the highest priorities for managing solid waste. In so doing, the legislature established a framework for making recycling services available to residents across the state. In King County, the division, cities, Washington Utilities and Transportation Commission (WUTC), solid waste collection companies, and material recovery facilities (MRFs, pronounced merfs) worked together to launch a coordinated system for curbside collection and processing of recyclables throughout the region.

Since the 2001 comprehensive solid waste management plan was adopted, the collection and processing system in the region has evolved significantly. The number of materials that can be recycled or processed for recycling and reuse has increased, technologies for collecting and processing materials have improved, and participation in curbside recycling has continued to climb.

Two key developments have added to the success of single-family residential curbside recycling in the region. First is the transition to commingled (or single-stream) collection. Since 2001, the collection companies have transitioned to commingled recycling, whereby all the recyclable materials are placed in one large cart for curbside pickup. This shift to commingled collection is possible due to the use of more advanced sorting systems at the MRFs, which allow the mixed loads to be separated by commodity in preparation for market. By making it easier and more convenient for individuals to recycle, the per capita recycling rate and overall amount recycled have increased significantly. In addition, the transition has made curbside collection more efficient for the companies that provide this service.

Commingled collection makes recycling easier and leads to increased participation.

A second development is the addition of food scraps and food-soiled paper to yard waste collected curbside. In 2001, the division began working with

the cities and collection companies to phase in curbside collection of food scraps and food-soiled paper in the yard waste cart. Compostable food scraps and food-soiled paper, which currently make up about one-third of the waste disposed by single-family residents, include all fruit and vegetable, meat, and dairy products; pastas; breads; and soiled paper used in food preparation or handling (such as paper towels). Nearly all single-family customers who subscribe to garbage collection now have access to curbside food scrap collection.

The primary processor for nearly all of the yard waste, food scraps, and food-soiled paper collected in the county is Cedar Grove Composting, Inc. Cedar Grove not only processes organic materials into compost, but offers collection of organics to area businesses and sells the finished compost locally. A growing number of cities now offer organics collection to businesses through their existing curbside collection contracts.

In addition to these major developments, markets are growing for the recycling and reuse of construction and demolition debris (C&D). C&D collection and processing facilities are capturing valuable wood, metals, plastics, and other materials from home remodeling projects and commercial construction and demolition projects throughout the region. Programs such as Leadership in Energy and Environmental Design (LEED) and Built Green™ are also focusing the building community on waste prevention, recycling, and reuse of C&D materials.

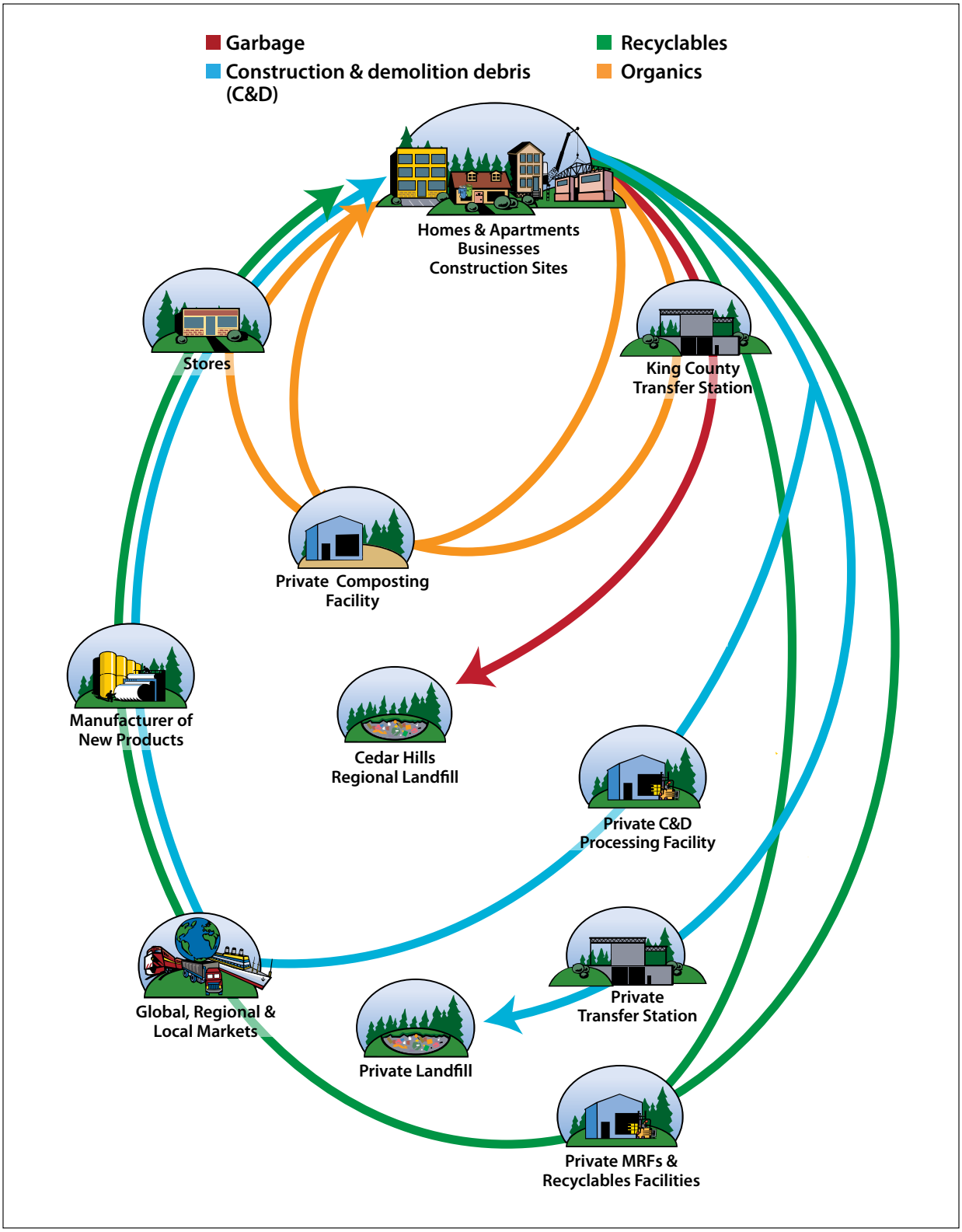
Figure 4-1 provides a general overview of the collection, transportation, and processing systems for garbage, recyclables, organics, and C&D. Garbage is transported to the Cedar Hills Regional Landfill for disposal, while recyclables, organics, and most C&D materials are taken directly to processing or compost facilities where materials are prepared for sale to manufacturers and other users. As shown, these recycled or composted products eventually return to the market for consumer purchase.

As can be seen in Figure 4-1, this multi-faceted system uses the combined resources of the public and private sectors. Regulations and systems for collection and transport that come into play are complex, involving state, county, city, and private-sector responsibilities. The following section describes the rules that govern these important processes in solid waste management.

Garbage collected curbside in commercial collection trucks is taken to county transfer stations for consolidation and transport to the Cedar Hills Regional Landfill.

The remainder of the chapter looks at the current collection challenges and recommendations for improvement for three sectors of generators – single-family households, multi-family complexes, and non-residential customers, which include businesses, institutions, and government entities. For each sector, the issues may vary and present different challenges due to collection methods and the regulations by which they are governed. C&D is discussed separately at the end of this chapter because of the unique nature of C&D collection and processing.

Figure 4-1. Solid waste management system in King County



Governor's Climate Change Challenge Spurs Action

The governor's climate change challenge led to the development of *Leading the Way: Implementing Practical Solutions to the Climate Change Challenge* (November 2008). This report was prepared by the state's Climate Action Team in conjunction with its many members and stakeholders and the Beyond Waste and other Implementation Work Groups. The plan's proposed actions, as they relate to solid waste management, would mandate that citizens and businesses separate their garbage, recyclables, and organics for curbside collection. It would also require all residential and non-residential customers to participate in curbside collection services for all three waste streams. The goal of the plan is to achieve a statewide recycling rate of 80 percent by 2020.

Key excerpts from the plan are as follows:

- *… require source separation of solid wastes by residential and commercial generators into at least three categories: recyclable materials and products, organic materials, and residual solid wastes.*
- *Residential generators must separate their wastes and participate in provided collection services.*
- *Commercial generators must separate their wastes and can select their recycling service provider.*
- *Local governments will be required to update their local comprehensive solid waste management plans …*
- *Local governments are to write plans to assure construction and demolition wastes are reused and recycled at registered recycling businesses.*
- *Financial incentives are provided to the private sector to encourage investment in the infrastructure needed to support this action.*

Based on this plan and its recommendations, House Bill 1718 was introduced in the 2009 legislative session. It was intended to, among other things, optimize solid waste collection systems by reducing energy consumption and greenhouse gas emissions and increase recycling. While the house bill did not move forward in 2009, similar legislation may be proposed in the future. If a similar bill were to pass in a later session, the county would incorporate into its systems any changes resulting from the approved legislation.

THE MECHANICS OF COLLECTION AND PROCESSING

Collection of Solid Waste and Recyclables

In accordance with state law RCW 81.77.020 and 36.58.040, counties are prohibited from providing curbside garbage collection services. Legal authority for collection is shared primarily between the state – acting through the WUTC – and the cities. The WUTC sets and adjusts rates and requires compliance with the state and local adopted solid waste management plans and related ordinances. RCW 81.77 also includes a process for allowing cities to opt out of the WUTC regulatory structure and either contract directly for solid waste collection or provide city-operated collection systems.

The county's 2001 comprehensive solid waste management plan specifies that recycling should be included as part of the basic garbage rate for residents in most of King County. King County enacted a service-level ordinance (KCC 10.18) that includes this requirement for unincorporated areas, and the WUTC required collection companies to develop tariffs that spread the cost and availability of recycling to all residential garbage customers. These tariffs and service-level requirements also apply to cities that have not opted out of the WUTC regulatory structure.

Most of the garbage, recyclables, and organics collection in the county's service area, both contracted for by cities and through the WUTC, is provided by four private-sector companies operating in the region – Allied Waste Services, Inc., Waste Management, Inc., Waste Connections, Inc., and CleanScapes, Inc. Most of the 37 cities in the service area contract directly with one or more of these private companies for collection services. Two cities – Enumclaw and Skykomish – provide municipal collection services within their own jurisdictions.

Enumclaw collects garbage, recyclables, and organics; while Skykomish collects only garbage. Eight cities (Beaux Arts, Black Diamond, Covington, Hunts Point, Kenmore, Medina, Woodinville, and Yarrow Point) and all of the unincorporated areas receive collection services from these same private companies, except CleanScapes, operating under certificates issued by the WUTC.

Revenue Sharing Provides Incentive for Collection Companies to Enhance Recycling

In 2002, the state legislature passed a statute (RCW 81.77.185) establishing a process by which solid waste collection companies regulated by the WUTC could retain up to 30 percent of the revenue paid to them for the recycled materials they collect from households. (The statute does not apply to collection in cities with contracts for recyclables collection.) The purpose of the statute is to provide collection companies with a financial incentive to enhance their recycling programs. Formerly, all revenues from the sale of residential recyclables were passed back to the households as a credit on their garbage bills.

To qualify for the revenue sharing, collection companies must submit a plan to the WUTC that has been certified by King County as consistent with the current comprehensive solid waste management plan. The Solid Waste Division Director has authority to make this certification.

To qualify for certification, the collection company's plan must:

- Be submitted annually for approval
- Demonstrate how proposed program enhancements will be effective in increasing the quantity and quality of materials collected
- Demonstrate consistency with the minimum collection standards
- Incorporate input from the Solid Waste Division
- Be submitted to the Solid Waste Division with sufficient time to review prior to WUTC deadlines

As of June 2009, all WUTC-regulated areas of King County have certified agreements in place.

There is a fundamental difference in how the WUTC regulates residential and non-residential collection of recyclable materials. The Federal Aviation Administration Authorization Act of 1994 prohibits regulation of price, route, or service of any motor carrier transporting property. While this provision does not apply to collection of garbage and recyclable materials from residents, recyclable materials generated by the non-residential sector are considered to be property and are subject to a different regulatory structure. King County cannot enact ordinances that require commercial garbage collectors to include recyclables collection as part of the non-residential collection service. Cities, on the other hand, may include recyclables collection as part of their non-residential collection service, but cannot prohibit businesses and other non-residential entities from choosing other vendors for this service.

More and more cities are adding non-residential recycling services to their collection contracts. While residential recycling has increased steadily over the years, growth in recycling by businesses, institutions, and government entities has been less consistent. Cities that provide recycling as part of their basic collection services provide a financial incentive for businesses to recycle and make recycling more convenient.

Curbside Collection in Rural Areas

When curbside recycling was initiated in King County in the early 1990s, the collection companies (operating under WUTC certificates) that serve unincorporated areas were required to provide curbside recycling services as specified in KCC 10.18 for most of the county. These requirements, consistent with the 1989 comprehensive solid waste management plan, stated that curbside recycling would be offered to all households as part of the basic garbage service, and that yard waste service would be available to all households as a subscription service. However, some rural areas were exempted from these requirements because their low population density or lack of participation in garbage collection services suggested that curbside recycling might not be cost effective.

Currently, three unincorporated areas are not included in the county's collection service-level standards as specified in KCC 10.18:

- **Vashon/Maury Island** – Historically, a comparatively high percentage of Vashon/Maury Island residents have chosen to self-haul garbage and recyclables to the division's Vashon Transfer Station; however, the number of households subscribing to garbage service has increased over time. Waste Connections, the company providing garbage collection service on Vashon/Maury Island, also offers subscriptions to recyclables collection services. About 30 percent of residential garbage customers currently subscribe. Organics collection service is not currently offered.

- **Skykomish Area** – The area around Skykomish is remote and sparsely populated. Residents of Skykomish and some residents in surrounding unincorporated areas receive curbside garbage collection service from the Town of Skykomish. Skykomish does not collect curbside recyclables or organics. Customers may self-haul garbage and recyclables to the division's drop box facility located in Skykomish; however, separate organics collection is not provided at the facility.

- **Snoqualmie Pass** – The Snoqualmie Pass area is also very sparsely populated. Residential garbage collection is available from Waste Management of Ellensburg in Kittitas County, but is not widely used. Curbside recycling is not available; however, the division does provide drop boxes at the pass for the standard curbside recyclable materials. Organics collection is not available.

Working with the community, the division will explore the inclusion of Vashon/Maury Island in the service-level standards. Skykomish and Snoqualmie Pass will not be included at this time because of their remote locations and low population densities.

Curbside Collection of Bulky Items for Residents

An ongoing issue with collection is finding the most efficient and cost-effective way to handle bulky waste – larger, individual items that do not fit in a garbage can or recycling cart. This type of waste includes recyclable items such as appliances, potentially reusable items such as furniture, and other large items that must be disposed.

Bulky waste collection services are available from collection companies throughout the county; however, these services are not widely used. Residents may not use the service because it is expensive, ranging from $25 to $100 per item, with the possibility of additional charges for travel time and labor. Customers may also be unaware of the collection options available to them. The primary alternatives to bulky curbside collection are self-hauling the materials to transfer stations for disposal or recycling, or taking them to collection events sponsored by the county or the cities. Neither of these self-haul options is an efficient way of handling the materials because of the number of vehicle trips, the increased number of transactions at transfer stations, and the high cost of staging collection events.

Options are being explored to identify an efficient and cost-effective means of collecting large, bulky items.

The current recommendation is to work with collection companies and the WUTC to explore options to increase the efficiency and reduce the price of curbside collection of bulky items. For example, the cost would be lower if a small charge were included in the regular garbage fee, and curbside collection days were regularly scheduled and promoted, thereby increasing the efficiency of the collection routes. Collection systems for bulky items should be designed, to the extent possible, to divert reusable items to charitable organizations for resale and recyclable items to processing facilities.

Collection of Sharps

Sharps are medical products, such as hypodermic needles, scalpel blades, and lancets, which require special handling to ensure their safe collection, transfer, and disposal. Without proper containment, sharps can pose a safety hazard to workers through potential exposure to blood-borne pathogens or other disease-causing agents. Within King County, the disposal of sharps is regulated by Title 10 of the King County Board of Health Code and by King County's Waste Acceptance Rule (PUT 7-1-5 [PR] 6/05).

Separate, secure receptacles for sharps collection are provided for residents and small businesses at the Vashon transfer station and for residents only at the Shoreline Recycling and Transfer Station. The division will provide separate sharps receptacles at new transfer facilities, where practicable. Business-generated sharps are not accepted at the transfer facilities, except at Vashon with prior permission from the division's Special Waste Unit. Sharps generated by medical facilities or businesses are accepted for disposal at the Cedar Hills Regional Landfill with permission from the Special Waste Unit.

If contained in a properly marked, two-liter polyethylene terephthalate (or PET) plastic pop bottle, home-generated sharps are currently accepted with the garbage at the curb and at division transfer facilities. Until recently, PET bottles were considered the best available and affordable container for home-generated sharps. The PET bottles, however, are now being manufactured with thinner plastic, and

heavier equipment and new processes at solid waste facilities are allowing greater compaction of garbage. Together, these factors make it more likely that the PET bottles that contain the sharps could break during handling. Both the Centers for Disease Control and the U.S. Environmental Protection Agency have withdrawn support for this method of containment because of the exposure risks to workers.

Because of these risks, the division is recommending that the county and the cities stop accepting sharps mixed with garbage at the curb or at any transfer facility. This recommendation is consistent with the policies of other regional governments, federal agencies, and at least one of the solid waste collection companies in the region.

There are alternative methods for the proper management of sharps. For example, some health care providers and pharmacies will take back used sharps in pre-approved containers. There are also mail-in programs available.

Processing of Commingled Recyclables

Facilities that process mixed recyclables require solid waste permits and are regulated by Public Health – Seattle and King County (Board of Health, Solid Waste, Chapter 10.12).

The processing of recyclable materials into new commodities begins at a MRF. MRFs receive material loads from the commercial collection trucks, remove contaminants from the loads, sort materials to meet the specifications of the end users or markets, and compact or bale the material for efficient shipping. As the residential collection system has moved to commingled collection, MRFs in the region have upgraded their facilities to improve their ability to remove contaminants and sort materials into marketable commodity grades. Any residuals, or non-recyclable waste products, from recyclables processing facilities within the King County service area must be disposed of at a King County solid waste facility.

The two largest collection companies in King County – Waste Management and Allied – each own a MRF located within the county to process most of the recyclable materials they collect. Waste Management's Cascade Recycling Center was designed and constructed in 2002 as part of their transition to fully commingled recyclables collection. Allied's Recycling Center in south Seattle was substantially redesigned in 2007 to improve its ability to sort commingled materials.

Other MRFs processing commingled recyclables collected in King County include Smurfit Recycling in Renton, SP Recycling in Thurston County, and JMK Fiber in Pierce County. Tacoma

At a local MRF, sorted paper moves on to be baled for shipment to manufacturers and other end users.

Recycling processes materials collected curbside on Vashon Island. Numerous other private-sector facilities have also emerged across the county where residents and businesses can take source-separated recyclables for processing, from paper, cans, and bottles to printer cartridges and cellular telephones.

While the conversion to commingled collection makes recycling easier for consumers and has resulted in increased recycling, it presents some challenges for the recovery and processing facilities. One of the challenges is cross contamination of materials as they are sorted and separated. This is a problem particularly for the paper stream, where materials such as plastic milk jugs end up in the baled paper. Paper mills overseas typically perform additional sorting of the materials to recover misplaced recyclables; however, most domestic paper mills dispose of these materials. In the case of glass, even small amounts of contamination in the sorted material can reduce the quality and affect the potential end use of the recycled glass. These problems illustrate a fundamental conflict between the benefits of commingled recycling (it makes collection easier and leads to increased recycling) and the need for the MRFs and end users to minimize the costs of handling these materials.

For the processing of commingled recyclables to be most efficient, it is important that consumers are careful about preventing contamination in the recycled loads by 1) preparing recyclables for the collection cart (i.e., rinsing out bottles and jars, breaking down cardboard boxes) and 2) placing materials in the proper collection container. Contamination in the recyclables can cause a wide array of problems during processing, which can lead to a reduction in the value of the materials processed for market or, in extreme cases, the disposal of entire mixed loads. This issue can best be remedied through education programs offered through local governments and the collection companies on proper recycling techniques.

As we move forward, the recommended role of the county and cities is to focus on increasing the supply and improving the quality of recyclable materials delivered to processors. The value of materials for recycling can be maximized through public education – to decrease contamination in the recycling stream and ensure that materials are properly prepared before being placed in the recycling container – and through market development – by encouraging businesses to invest in technologies used to sort and process recyclables.

There are materials that present unique challenges or require more definitive decisions about the optimal way to process them, such as container glass and shredded paper:

- **Container Glass** – With the advent of single-stream recycling, glass is being collected in the same cart as other recyclables. While commingled collection is more efficient for the collection companies, it does create some challenges for the processors. Glass containers are often broken as they are loaded into the collection trucks or when the collection trucks dump the materials onto the floor of the MRF, which causes added wear and tear on the equipment. When the glass breaks into very small fragments during processing it can limit the markets for these materials (e.g., the glass may not be suitable to be made into new glass containers). In addition, the glass sometimes gets into the paper stream where it contaminates the paper bales.

  However, the efficiencies of commingled collection far outweigh the benefits of separating the glass from the other recyclables at the curb. Thus, the MRFs have been working to minimize contamination of the paper stream by glass and are exploring new and higher-value markets for the glass.

- **Shredded Paper** – The increase in identity theft has caused increasing concern about discarding personal or confidential documents. As a result, shredding these kinds of papers has become a common activity. Loose shredded paper causes problems at MRFs where it can jam machinery and be difficult to sort from other material streams. Finely shredded (cross-cut) paper fibers cannot be recycled at all, making them a nuisance at processing facilities.

  Some recycling companies have tried to address their customers' interest in recycling shredded paper by providing special on-site shredding/recycling services for businesses or instructing customers to place shredded paper in clear plastic bags or paper bags for collection, which makes it easier for the material to be handled separately at the MRF. Some residents have been instructed to layer shredded paper in their yard waste cart. This method can create two potential problems: 1) shredded paper not properly layered with the organics can cause a litter problem at the composting facility and 2) too much paper received at the facility can create an imbalance in the correct carbon-to-nitrogen ratio necessary to make compost.

Shredded paper presents challenges for collectors and processors.

  Because of the problems of collecting and processing this material and because information given to customers about how to handle this material is inconsistent, the cities and the county will be working with the collection companies and processors to clearly determine how customers should prepare shredded paper for collection and in which cart it should be placed. And the answers may be different for residential collection versus non-residential collection, where the volumes could be much greater.

RESIDENTIAL COLLECTION

The residential garbage collection system in King County is a well-established system that serves the region in a safe, efficient, and cost-effective manner. With the shift toward increased collection services for recyclables and organics, customers can choose to subscribe to smaller, less expensive collection cans for their garbage. Container sizes now range from the micro-can at 10 gallons to the mini-can at 20 gallons and on up to the larger 90+ gallon cart. The reduced fee for the smaller cans creates an incentive to generate less waste and divert as much material as possible to the recyclables or organics carts.

Throughout King County, individual city contracts for collection of garbage, recyclables, and organics differ in a number of aspects. Cities have entered into contracts with the collection companies at different times and then renewed contracts as they have expired. Each time a contract is negotiated and renewed, the city may make adjustments to their services such as changing the range of materials being collected, the collection frequency, container types or sizes, fee structures, and more. Changes to services may also

be negotiated for in-place contracts. The varying collection standards among cities that have resulted from these changes over time have led to inconsistencies in regional education and messaging, confusion among customers, and difficulties in measuring and potentially attaining regionwide goals.

To illustrate the varying collection standards that currently exist, Table 4-1 presents a summary of single-family collection services by city and unincorporated area, showing the various types of contracts held, container sizes offered, collection frequency, and fee structures. The recycling rates for each jurisdiction and unincorporated area, with and without organic materials, are also presented for comparison.

Curbside collection has become more automated over time.

As shown in the table, the single-family recycling rate varies significantly among the cities and unincorporated areas, ranging from 33 to 70 percent (combining organics and the curbside recyclables). While it would be difficult to identify a single factor or factors that will ensure a higher recycling rate, there are some factors that appear to lead to increased participation and amounts of waste diverted from disposal, as discussed in the following sections.

Range of Materials Collected

In addition to the materials identified for curbside collection in the last comprehensive solid waste management plan – newspaper, mixed paper, and cardboard; tin and aluminum cans; plastic bottles; glass bottles and jars; and yard waste – new materials have been added over time. These materials include polycoated paper, shredded paper, aseptic packaging (such as juice boxes), plastic tubs and jugs, scrap metal, and food scraps and food-soiled paper. The county's service-level ordinance and many city contracts have already been updated to include these materials. Some cities have added other materials for collection, such as electronics, fluorescent bulbs and tubes, and plastic bags.

Curbside collection, however, is not necessarily the most efficient and cost-effective way to capture every type of recyclable or reusable product. Some products cause problems for MRFs because of their size or composition, while others are better candidates for take-back programs by manufacturers and retailers to extract potentially harmful components and recycle other components. Examples of these types of materials and their particular challenges include the following:

- **Plastic Bags** – Plastic bags and plastic wrap are prevalent in the waste stream, particularly residential. Collection of plastic bags in the recyclables cart creates a nuisance further down the line at the MRFs. As the bags move through the facility they sometimes catch in and jam the sorting machinery, and they

can blow around and cause litter problems. For these reasons, curbside collection may not be the best option for plastic bags at this time. More appropriate options for consideration may be an increased use of reusable shopping bags and the establishment of take-back programs at the retail level.

- **Electronic Products and Fluorescent Bulbs and Tubes** – Collecting these products at the curb is complicated by the fact that some of the products tend to break easily and contain potentially hazardous materials that must be safely disposed. In Washington State, legislation was passed in 2006 that requires manufacturers of computers, monitors, and televisions to provide separate locations for free recycling of these items. Handling electronics through product stewardship ensures that the various components, such as glass, plastic, and metals, are separated and recycled as appropriate and that any potentially hazardous materials are recycled or disposed of in a safe and environmentally sound manner. For similar reasons, take-back programs are being implemented for fluorescent bulbs and tubes. Relying on product stewardship efforts reduces costs to local governments and their ratepayers by eliminating the costs to recycle these products.

  Through their curbside recycling contracts, some cities have offered collection of some small appliances and home electronics not covered by Washington's current product stewardship laws. For appropriately sized products that do not contain hazardous materials, curbside collection is a viable and efficient option.

As an authorized E-Cycle Washington collector, Total Reclaim of Seattle accepts televisions and other electronics for recycling.

- **Polystyrene Foam** – One type of plastic that is not recommended for residential curbside collection is polystyrene foam, which includes clamshell containers for take-out foods and blocks of plastic that are used to package many electronics and other goods. These materials are difficult to collect curbside because they are light and bulky, can break easily into small pieces, mix with other materials causing contamination, and are difficult to process at the MRFs. In addition, the quantity collected is so small that it takes a long time to collect enough of the material to ship to market. Through the county's LinkUp program, the division is working with local recycling firm Total Reclaim Environmental Services to establish a polystyrene processing facility to serve Seattle and King County. LinkUp is providing financial, technical, and marketing assistance to support the project. The City of Seattle has taken another approach and banned the use of polystyrene containers for take-out foods.

Size of Collection Container

The size of the recycling collection cart can affect recycling success. Larger carts generally lead to higher recycling rates. As more materials are identified for commingled recycling, and food scraps are added to the yard waste cart, recyclables carts are getting larger and the size of garbage can to which customers

Table 4-1. Summary of single-family collection services in King County

Jurisdiction or Unincorporated Area	Type of Collection[a]			Cart Size (gallons) and Collection Frequency[b]					Fee Structure		Disposal and Recycling Rates		
	Collection Company	Contract/ WUTC Tariff No.	Mandatory Garbage Collection	Standard Recycling Cart	Standard Yard Waste Cart	2008 Frequency of Recycling Collection	2008 Frequency of Organics Collection (spring-summer-fall)	2008 Frequency of Organics Collection (winter)	Recycling Included in Garbage Fee	Organics Included in Garbage Fee	2008 Garbage Disposal (lbs/cust/ wk)	2008 Recycling Rate (including organics)	2008 Recycling Rate (excluding organics)
Cities													
Algona	WM	Contract	X	64	96	EOW	EOW	EOW	X		29	42%	26%
Auburn	WM/KM	Contract[c]	X	64	96	EOW	W	EOW	X		22	53%	33%
Beaux Arts	AW	11		96	96	EOW	EOW	EOW	X		26	71%	50%
Bellevue	AW	Contract		96	96	W	W	W	X	X	23	66%	44%
Black Diamond	KM	27		34/96	96	EOW	EOW	EOW	X		31	35%	23%
Bothell	WM	Contract	X	64	96	W	W	W	X	X	25	64%	40%
Burien	WM	Contract		96	96	EOW	W	EOW	X		27	54%	37%
Carnation	WM	Contract	X	64	96	EOW	W	EOW	X		27	58%	26%
Clyde Hill	AW	Contract		96	96	EOW	W	EOW	X		28	64%	36%
Covington	KM	27		34/96	32/96	EOW	EOW	EOW	X		31	39%	23%
Des Moines	AW	Contract		34/96	96	EOW	EOW	EOW	X		28	45%	30%
Duvall	WM	Contract	X	64	96	W	W	EOW	X		25	59%	35%
Enumclaw	City	City	X	96	96	EOW	EOW	EOW	X		27	54%	23%
Federal Way	WM	Contract		64	96	EOW	W	EOW	X		26	54%	32%
Hunts Point	AW	11		96	96	EOW	EOW	EOW	X		34	54%	38%
Issaquah	WM/AW	Contract[c]		96	96	W	W	W	X	X	22	59%	42%
Kenmore	AW	11		96	96	EOW	EOW	EOW	X		27	53%	35%

Jurisdiction or Unincorporated Area	Type of Collection[a]			Cart Size (gallons) and Collection Frequency[b]					Fee Structure		Disposal and Recycling Rates		
	Collection Company	Contract/ WUTC Tariff No.	Mandatory Garbage Collection	Standard Recycling Cart	Standard Yard Waste Cart	2008 Frequency of Recycling Collection	2008 Frequency of Organics Collection (spring-summer-fall)	2008 Frequency of Organics Collection (winter)	Recycling Included in Garbage Fee	Organics Included in Garbage Fee	2008 Garbage Disposal (lbs/ cust/ wk)	2008 Recycling Rate (including organics)	2008 Recycling Rate (excluding organics)
Cities													
Kent	KM	Contract	X	34/96	96	EOW	EOW	EOW	X		29	51%	33%
Kirkland	WM	Contract	X	64	96	W	W	W	X	X	20	68%	45%
Lake Forest Park	AW	Contract		96	96	EOW	EOW	EOW	X	X	24	61%	41%
Maple Valley	WM	Contract		96	96	EOW	EOW	EOW	X		28	50%	32%
Medina	AW	11		96	96	EOW	EOW	EOW	X		30	60%	38%
Mercer Island	AW	Contract		96	96	EOW	EOW	EOW	X	X	27	62%	38%
Newcastle	WM	Contract		96	96	EOW	W	EOW	X		28	56%	37%
Normandy Park	AW	Contract/26[d]		34/96	32/96	EOW	EOW	EOW	X		29	47%	29%
North Bend	AW	Contract	X	64	96	W	EOW	EOW	X		30	49%	33%
Pacific	WM	Contract	X	64	96	EOW	EOW	EOW			26	41%	17%
Redmond	WM	Contract		64	96	W	W	EOW	X	X	22	63%	43%
Renton	WM	Contract[c]	X	96	96	EOW	W	W	X	X	22	57%	34%
Sammamish	WM/AW	Contract		96	96	EOW	W	EOW	X		28	59%	41%
SeaTac	AW	Contract		96	96	EOW	EOW	M	X		27	41%	30%
Shoreline	CS	Contract		96	96	EOW	EOW	EOW	X		24	56%	39%
Skykomish	City	City	X	NS	NS	NS	NS	NS					
Snoqualmie	AW	Contract	X	64	96	W	EOW	EOW	X		29	46%	35%
Tukwila	AW	Contract		96	96	EOW	EOW	EOW	X		39	46%	31%
Woodinville	WM	14		96	96	EOW	W	EOW	X		27	52%	37%
Yarrow Point	AW	11		96	96	EOW	EOW	EOW	X		29	61%	37%
Subtotal Cities											**25**	**57%**	**37%**

Jurisdiction or Unincorporated Area	Type of Collection[a]			Cart Size (gallons) and Collection Frequency[b]					Fee Structure		Disposal and Recycling Rates		
	Collection Company	Contract/ WUTC Tariff No.	Mandatory Garbage Collection	Standard Recycling Cart	Standard Yard Waste Cart	2008 Frequency of Recycling Collection	2008 Frequency of Organics Collection (spring-summer-fall)	2008 Frequency of Organics Collection (winter)	Recycling Included in Garbage Fee	Organics Included in Garbage Fee	2008 Garbage Disposal (lbs/cust/ wk)	2008 Recycling Rate (including organics)	2008 Recycling Rate (excluding organics)
Unincorporated Areas													
Juanita	AW	11		96	96	EOW	EOW	EOW	X		29	52%	34%
Eastgate/ Sammamish Plateau	AW	11		96	96	W	W	EOW	X		26	48%	30%
Eastern county	KM	27		34/96	32/96	EOW	EOW	EOW	X		30	34%	23%
South-central county	AW	26		96	96	EOW	W	EOW	X		25	50%	32%
Northeastern county	WM	14		96	96	EOW	W	EOW	X		30	51%	34%
Southern county	WM	21		96	96	EOW	W	EOW	X		26	51%	35%
Vashon Island	WC	7		4-bin	NS	EOW	NS	NS			27	6%	6%
Snoqualmie Pass	WM	10		NS	NS	NS	NS	NS					
Subtotal Unincorporated Areas											**28**	**46%**	**30%**
Total County											**26**	**55%**	**35%**

[a] *Collection Companies:*
AW - Allied Waste
CS - CleanScapes
KM - Kent Meridian (owned jointly by Allied and Fiorito Enterprises, Inc.)
WC - Waste Connections
WM - Waste Management

[b] *Collection Frequency:*
EOW - every other week
EW - every week
M - monthly
W - weekly

[c] *City also has recently annexed areas served by WUTC-regulated hauler(s); these areas may have different cart sizes, collection frequencies, and fee structures.*

[d] *Garbage collection is regulated by WUTC; recycling rates and service are established by city contract.*

Note: NS = no service provided

subscribe should become smaller. In the Eastern unincorporated area of the county, most residential customers have been using smaller recycling carts and have shown lower recycling rates (see Table 4-1). In this same area, when larger carts have been provided the recycling rate has increased.

Frequency of Collection

Making adjustments to the frequency of curbside collection for garbage, recyclables, and organics is a tool that can be used to influence recycling and disposal behaviors and reduce collection costs and truck traffic. Garbage collection across King County typically occurs on a weekly basis. This collection schedule has been driven, in part, by the presence of food scraps and other organics in the garbage that rapidly decompose and have the potential to lead to environmental or public health concerns. With recycling and recent advancements to separate organics for collection, there is an opportunity to alter weekly garbage collection to benefit ratepayers and the environment.

One of the most important factors in determining the appropriate collection frequency for the various material streams, particularly for organics (yard waste and food scraps), is compliance with the public health and environmental standards in Title 10 King County Board of Health Solid Waste Regulations Health Code. To study the effects of changing the collection method and possibly the frequency of collection, in summer 2007 the division conducted a pilot study in cooperation with the City of Renton, Waste Management (the collection company), and Public Health – Seattle and King County (the Health Department). The purpose of the study was to explore the public health and environmental impacts, customer responses, and effects on potential waste diversion that would result from changes in collection. In particular the Health Department was concerned about the feasibility of collecting meat and bones every other week in the yard waste cart and changing garbage collection to less than weekly. To explore these concerns, approximately 1,500 Renton households participated in the 6-month pilot study to look at two different collection schedules:

- Every-other-week collection of all three solid waste streams – garbage, recyclables, and organics
- Every-other-week collection of garbage and recyclables and weekly collection of organics

The pilot study showed positive results for both collection schedules tested. There were no negative health or environmental impacts observed, and customers were highly satisfied with the varied collection schedules and the container sizes provided to adjust for the shift in schedule. Study results indicated not only a 20 percent decrease in the amount of garbage disposed, but an overall reduction in the generation of garbage, recycling, and organics. An added benefit was the reduction in truck traffic and transportation costs with the less frequent collection cycles.

As a precursor to changing the Title 10 Health Code based on the successful results of the pilot study, the Health Department approved a variance that would allow all organics and garbage to be collected less than weekly (see page 4-17). As a result, the City of Renton rolled out a citywide program in January 2009 to offer every-other-week collection of garbage and commingled recyclables, with every week collection of organics. Renton is the first city in King County to provide every-other-week garbage collection as the standard collection service.

Regulatory Changes Allow Adjustments in Collection Frequency Schedules

After successful completion of the Renton pilot study, a variance to the Title 10 King County Board of Health Solid Waste Regulations Code was approved to allow every-other-week collection of organics (with the yard waste) for single- and multi-family residents, as well as every-other-week collection of garbage. The variance applies as long as the following standards (excerpted directly from the variance) are met. During the next scheduled review of the Title 10 Health Code, these variances are scheduled to be adopted:

Residential (Single-Family) Garbage Collection

Residential garbage may be collected every other week provided that:

- Garbage is contained in a provided cart
- A food scrap collection program is available and actively promoted to residents
- The garbage collection and food scrap collection services are offered on alternating weeks to ensure that customers have access to an at least weekly disposal or composting option for problematic compostables
- Residents are instructed to bag all garbage before placing it in carts to reduce vectors, free liquids, and litter

Residential (Single- and Multi-family) Organics Collection (with yard waste)

- When mixed with yard debris, residential food scraps may include all vegetative, meat, dairy products, pastas, breads and soiled paper materials used for food preparation or handling, provided that all collected materials are picked up by haulers which deliver the mixed yard waste to a permitted transfer and/or permitted composting facility for serviced customers.
- Combined food scraps and yard debris shall be collected no less frequently than every-other-week, year-round provided that there are no leachate generation, odor, or vector problems.
- Combined food scraps and yard debris shall be collected in carts. Residents shall be instructed to place food scraps only in the cart provided to them. Any extra customer-provided cans or large paper bags shall contain only yard debris.
- Compostable bags may be used to consolidate food scraps placed in carts if and only if the bags have been approved by the facility receiving the material for composting. Plastic bags shall not be used for yard debris.
- Haulers shall make available a cart-cleaning or replacement service for customers with carts which have unacceptable residue or odor levels to avoid improper disposal of rinsewater to storm drains, yards, etc and reduce the need for customers to self-clean their containers.
- Educational and promotional materials from the county, city, and haulers shall inform residents about the benefits of recycling food scraps and soiled paper; appropriate options for managing kitchen waste, including the use of approved compostable bags; and appropriate options and restrictions for cleaning carts.

(*continued*)

Based on a separate commercial pilot, an additional variance is under review by the Health Department to allow collection of non-residential and multi-family organics that are not mixed with yard waste.

Commercial/Multi-Family Food Scraps Collection (without yard waste)

- Food scraps shall be collected in leak proof contractor-provided containers with tightly-fitting lids.
- Containers shall be kept clean through the use of contractor-cleaning, compostable bagging, compostable cart lining or boxing, or limiting the types of materials collected from a particular customer.
- Containers shall be cleaned by the customer or the hauler immediately upon the request of City, County or Public Health personnel.
- Customers shall be informed of container cleaning restrictions (i.e. Proper disposal of rinsewater and any residues from containers outside of storm drains, landscaping, etc.).
- Customers shall be informed of what is not acceptable in containers and the need to keep container lids closed when not in use and inaccessible overnight on commercial containers.
- Collection of commercial/multifamily food scraps shall occur at a minimum weekly. Any exception to the minimum weekly schedule will have to be justified by information on a particular customer's food scrap composition where it can be shown that less frequent collection can occur without leachate generation, odor, and vector problems.

Fee Structure

In nearly all areas of King County, households paying for garbage collection services are also required to pay for recycling collection. The fee for recycling services includes the cost of the recycling containers and, in most cases, the ability to set out unlimited amounts of recyclables for the same flat fee. In contrast, the fee for garbage service varies depending on the number or size of containers a household sets out. Consequently, King County residents have a clear financial incentive to reduce the amount they dispose and increase the amount they recycle.

Eight cities, comprising about 30 percent of the single-family households in the county, have adopted rate structures that require residents to pay for organics collection (yard waste and food scraps), providing a further incentive for residents to reduce disposal and maximize use of the recycling options for which they are paying. In 2008, the average pounds of garbage disposed per household in these eight cities was 17 percent lower than the average for the rest of King County.

Single-Family Residential Collection

As shown in Table 4-1, single-family collection services for garbage, recyclables, and organics are well established. As discussed earlier, however, there are many variations among the cities in the specific methods of collection and rate structures. The division has evaluated the factors that appear to lead to higher recycling rates and an increase in the diversion of materials from the garbage. Based on

this evaluation, it is recommended that minimum collection standards be adopted by the cities and unincorporated areas to provide the optimal service level for reducing waste and increasing the diversion of recyclables and organics from disposal. Establishing minimum collection standards countywide will help us 1) meet a target of 45 percent single-family recycling by 2015 (not including organics), 2) lead to more efficient operations by standardizing services, and 3) clarify what or how materials are collected through more consistent messaging regionwide.

The new minimum collection standards can be implemented as the county updates its service-level ordinance and jurisdictions amend their collection contracts (some changes may not require changes to contracts). A description of the recommended collection standards is provided below.

Single-Family Minimum Collection Standards

	Garbage	Recyclables	Organics
Required Materials for Collection	Mixed solid waste	Newspaper, cardboard, mixed paper, and polycoated paper Plastic bottles, jugs, and tubs Tin and aluminum cans Glass bottles and jars Aseptic packaging Small scrap metal Shredded paper[a]	Yard debris Food scraps Food-soiled paper Shredded paper[a]
Container Type	Wheeled carts or containers	Wheeled carts	Wheeled carts
Container Size	Subscriptions available for various sizes	60+ gallons if collected weekly 90+ gallons if collected every other week Smaller size if requested by customer	60+ gallons if collected weekly 90+ gallons if collected every other week Smaller size if requested by customer
Frequency of Collection	Every other week	Weekly or every other week	Weekly or every other week
Fee structure	Fee increases with container size	Recyclables collection included in garbage fee Additional containers available at no extra charge	Organics collection included in garbage fee Additional carts may be included in base fee or available at an extra charge Customers requesting smaller carts may be offered a reduced rate

[a] *The cities and the county will be working with the collection companies and processors to determine how customers should prepare shredded paper for collection and in which cart it should be placed.*

Continuing education and promotion will also be important for increasing recycling and reducing wastes generated by single-family residents. The cities and the county will increase education and promotion to encourage the recycling of food scraps and food-soiled paper. In concert with the commercial collection companies, the cities and the county will also continue to focus promotions on the proper recycling of the standard curbside materials to increase participation and reduce contamination in the recycling containers. Financial incentives will also be explored through the fee structure for garbage and recyclables and grants to cities (discussed in Chapter 3).

Target: 45 Percent for Single-Family Curbside Recycling

The waste prevention and recycling goals are countywide goals that are not calculated on a city-by-city basis. However, the rate for single-family curbside recycling, which is reported to the division and the cities by the collection companies, can be measured for each city and unincorporated area. If every city and unincorporated area in King County were to achieve at least a 45 percent single-family curbside recycling rate (excluding organics) by 2015, we will have diverted an estimated additional 230,000 tons of material from disposal at the Cedar Hills Regional Landfill.

Recycling rates for each city and unincorporated area can vary widely – from a high of 50 percent to a low of 17 percent in 2008, with most falling somewhere in the range of 30 to 40 percent (excluding organics). Reaching a target of at least 45 percent curbside recycling can be achieved through a combination of producing less garbage and recycling more. For a city or unincorporated area with a lower recycling rate, one of the best ways to improve the rate would be to adopt the recommended minimum collection standards outlined in detail on page 4-19.

It should be noted that a lower recycling rate is not always a negative outcome. The simultaneous reduction of both garbage and recyclables can be a positive outcome – it may mean that overall waste generation is decreasing through waste prevention.

Multi-Family Residential Collection

As discussed in Chapter 3, *Waste Prevention and Recycling*, multi-family recycling has not been as successful as single-family recycling. There are a number of contributing factors, including space constraints for collection containers and a higher turnover of residents and property managers. These factors make it difficult to implement standardized collection services and provide consistent recycling messaging to this diverse sector.

In addition, in many areas of the county there is an ever-growing trend in the construction of mixed-use buildings, which contain retail shops in the lower level(s) and residential units above.

Mixed-use buildings present somewhat similar challenges for recycling, including:

- A lack of space for adequate garbage, recycling, and organics collection (often competing with parking needs and other uses)
- A need for collaborative planning among property developers, garbage and recycling collection companies, and cities early in the development process to ensure that adequate space is designated for garbage, recycling, and organics containers in the building design
- Different customer types, both residents and employees, with different recycling needs

Recycling could be increased substantially at multi-family complexes and mixed-use buildings by adopting the new minimum collection standards for multi-family collection. The multi-family standards vary somewhat from the single-family standards to account for differences in service structure. To improve recycling at mixed-use buildings, the cities and the county must consider both the multi-family collection standards and the recommendations for non-residential collection.

Multi-Family Minimum Collection Standards

	Garbage	Recyclables	Organics
Required Materials for Collection	Mixed solid waste	Newspaper, cardboard, mixed paper, and polycoated paper Plastic bottles, jugs, and tubs Tin and aluminum cans Glass bottles and jars Aseptic packaging Small scrap metal Shredded paper[a]	Yard debris Shredded paper[a] Optional: Food scraps Food-soiled paper
Container Type	Wheeled carts or dumpsters	Wheeled carts or dumpsters	Wheeled carts or dumpsters
Container Size	Subscriptions available for various sizes	Container with at least 150% of garbage container capacity Smaller size if requested by customer	60+ gallons if collected weekly 90+ gallons if collected every other week Smaller size if requested by customer
Frequency of Collection	Weekly, or more often if needed	Weekly or every other week	Weekly or every other week
Fee structure	Fee based on container size and/or collection frequency	Recyclables collection included in garbage fee Additional containers available at no extra charge	Subscription service available for an added fee

[a] *The cities and the county will be working with the collection companies and processors to determine how customers should prepare shredded paper for collection and in which cart it should be placed.*

Increased education and promotion are needed to improve recycling at multi-family complexes. In 2007-2008, the division conducted a pilot education campaign to increase recycling in five large, multi-family complexes in the county. The study results indicated the need to overcome some fundamental challenges in order to increase recycling, including:

- Differing levels of recycling services, often due to space constraints, and inconsistent communication to residents
- A lack of consistent building standards for locating collection containers and/or unclear information provided to residents about the container locations
- Inconsistencies in the quality of signage on the collection containers, which can lead to a higher rate of contamination in the containers (i.e., improper materials in the various containers)

- In some cases, even with an increase in the amount of recyclables in the container, the need to dispose of the entire contents because of contamination
- A high turnover rate of residents and oftentimes property managers, which requires ongoing efforts to provide proper education about recycling

During the pilot education campaign, the division initiated a multi-faceted education program, including one-on-one contact with property managers by the division's recycling coordinators; improvements to the recycling/garbage collection areas; improved signage; and distribution of multi-lingual education materials. The pilot program was costly on a per-unit basis, and the results were inconclusive, with slight increases in recycling at some complexes and no measurable changes at others. The overall recycling rate did not increase. At complexes where recycling did increase, it was not clear what led to the change.

Increasing multi-family recycling will require concerted efforts on the part of many to standardize the collection infrastructure and provide ongoing education and promotion for property managers and residents alike. The City of Bellevue has embarked on an education campaign to increase multi-family recycling in the city and will share their results when they become available.

In general, improving multi-family recycling will likely require, at a minimum, the following actions:

- **Clarify and strengthen building code requirements** – The county and the cities should update and/or enforce building code requirements to ensure there is adequate and conveniently located space for garbage, recycling, and organics containers.

- **Provide manager and maintenance staff education** – Involvement and support from the property managers and staff is important to the long-term success of multi-family recycling. With the high turnover of residents, property managers become the ones with the institutional knowledge to provide recycling education to residents. Inspection for contamination in the recycling containers, posting of adequate signage, and providing feedback to residents is necessary to the success of a recycling program.

- **Provide ongoing recycling education for residents** – Because of the high turnover of residents in multi-family complexes, recycling education will be needed on a continuing basis. Recycling information should be provided in the lease agreement and distributed to all residents at least annually. On a periodic basis, residents could get information about the recycling program through newsletters and posters.

- **Involve collection companies to assist with service improvements and education** – The collection companies should be involved to provide insight and information about the complexes' recycling systems and to help with their programs. The companies should monitor the recycling performance of the complexes and tag or refuse pickup of loads that are contaminated. They can also help with recycling education by improving signage on containers.

- **Provide financial incentives** – Financial incentives for both the property managers and residents should be considered. Reduced garbage rates that are passed on to residents to reinforce successful recycling efforts may be an effective incentive to increase recycling rates and decrease contamination in the containers.

Currently, only a few cities offer collection of food scraps and food-soiled paper to multi-family residents. The county and the cities will be working with the collection companies to develop a collection system for capturing these materials for composting. To explore appropriate container sizes and collection methods that will work best for multi-family complexes, the division may conduct pilot programs and/or work with the cities that have food scrap collection programs in place. Education and promotion will be a critical component of a new food scrap collection program. The cost for the new collection service could be included in the garbage rate.

NON-RESIDENTIAL COLLECTION

The non-residential sector comprises a range of businesses, institutions, and government entities from manufacturing to high-tech and retail to food services. This sector has achieved recycling successes in the last few years, with a recycling rate of 59 percent in 2007.

Unlike the residential waste stream, the types of materials discarded by the non-residential sector differ widely from business to business. Thus, the recycling potential for any particular business or industry can vary greatly. For example, restaurants and grocers are the largest contributors of food scraps, while manufacturers may generate large quantities of plastic wrap and other packaging materials.

Because of the diversity of businesses in the region, a more individualized approach is needed to increase recycling in this sector. One area with significant room for improvement is the diversion of food scraps and food-soiled paper. The largest increase will be realized as more restaurants and grocers contract with private-sector companies to collect their food scraps for composting, and more cities begin to offer commercial organics collection.

Strategies for increasing recycling in the non-residential sector present some of the same challenges as the multi-family sector, including:

- The lack of consistent and/or adequate building standards for locating collection containers.

- The need for financial incentives for business owners, property managers, and tenants to take advantage of recycling services. For example, cities that include recycling services in their garbage rate provide a financial incentive for businesses to recycle.

- A need for consistent and ongoing technical assistance and education. Involvement and support of the business owners and property managers is important to the long-term success of recycling at individual businesses or complexes. Educating building maintenance staff about properly collecting recyclables from building tenants is important to ensure the proper handling of recyclables. Education for employees about proper recycling methods is also crucial.

To assess the relative size of the non-residential waste stream in different jurisdictions, we have looked at the number of jobs located within them. About 93 percent of jobs in King County are located within incorporated cities. More than one-half of these jobs are in cities where the garbage collection contracts include recyclables collection in the garbage fee. Most contracts define the capacity required for recycling collection as 150 to 200 percent of the amount of garbage capacity. And most contracts provide for collection of the same materials collected in residential curbside programs.

Non-residential customers have the option to take advantage of recyclables collection offered by their service provider or to contract with other collection companies that may pay for the more valuable recyclable materials, such as high-grade office paper. For cities with collection contracts, adding recycling service to their contracts and including the cost of service in the garbage rate does lead to higher non-residential recycling rates and ensure that recycling services are available to all businesses. However, while including recycling service in the rate requires all business to pay for the service, it does not require that those businesses use the service that the city contractor provides. In fact, there is a wide array of recycling service providers in King County from which businesses in unincorporated King County and cities with WUTC-regulated collection services can choose for their recycling needs. Promotion of these services by the county and these cities will help increase awareness among businesses of the available options. For example, the county's "What do I do with…?" feature on the Web site is one place businesses can look for a service provider.

Another strategy that might increase recycling for some business customers is to consider a rate structure based on weight or composition of waste, rather than the size of the container. A study was conducted to measure container weights for non-residential wastes on five weekday collection routes in the City of Kirkland over a 12-month period (KCSWD et al. 2008a). This study determined that businesses with large amounts of food scraps generate garbage that is significantly heavier than the garbage generated by businesses without large amounts of food scraps.

In Washington, non-residential garbage rates are based on the size of the garbage container. So generators of heavy materials, such as food scraps, pay less than they might if the rates were based on weight, as they are in some jurisdictions across the country. Because a weight-based rate would likely cost more for generators of large amounts of food scraps, it would provide an incentive for increased participation in organics recycling programs.

C&D COLLECTION AND PROCESSING

C&D includes debris from the construction, remodeling, repair, or demolition of buildings, other structures, and roads. It includes clean wood, painted and treated wood, gypsum wallboard, roofing, siding, structural metal, wire, insulation, packaging materials, and concrete, asphalt, and other aggregates. As with recycling,

C&D collection and processing is handled primarily by private-sector firms. Debris from new construction sites is fairly easily separated and recycled. At demolition sites, however, while some of the debris can be salvaged, the remaining mixed materials are difficult to separate and recycle.

Separation of recyclable C&D materials from C&D and other wastes at the job site is generally more cost effective than disposal. Proper separation at the job site also ensures that materials go to higher end uses, such as the manufacture of new recycled-content building materials. C&D materials are typically hauled from a job site by 1) the contractor or the individual working at the job site, 2) an independent C&D hauler permitted to handle C&D for recycling only, or 3) a collection company permitted to haul materials for both recycling and disposal. C&D processing of recyclable materials occurs using either source-separated or commingled methods. Source-separated processing, which occurs particularly on large projects with adequate space, involves sorting specific types of C&D material on the job site (e.g., metals, concrete, and clean wood) and transporting them to a recycling facility(ies). Commingled processing involves placing all recyclable C&D in one container and then transferring the mixed C&D loads to a facility that uses mechanical and manual methods to sort the recyclable materials.

With improvements in the ability of processing facilities to separate materials, the current trend is toward the commingling of recyclable C&D. If C&D and garbage are commingled, however, the recyclables cannot be extracted for processing. These mixed loads must therefore be disposed of in their entirety. At large job sites, demolition debris or construction materials are sometimes loaded into 100-cubic-yard containers and transported by a solid waste-permitted hauler directly to an intermodal facility where they are loaded onto railcars and sent directly to a landfill for disposal. Again, in these cases, there is no opportunity for the recycling of any materials in these loads.

Independent C&D haulers with commercial permits can transport recyclable C&D materials from job sites to either source-separated or commingled C&D processors. These independent haulers cannot, however, transport C&D materials for disposal. Only collection companies permitted by the WUTC to haul solid waste can transport C&D materials for disposal, as well as recycling.

At the C&D processing facilities, loads are deemed either appropriate or inappropriate for recycling. For loads deemed appropriate for recycling, the materials are sorted for shipment to market. If deemed inappropriate for recycling (typically due to contamination by garbage or materials that cannot be recycled), the materials are transferred directly to a disposal facility. In some cases, easily separated recyclables may be extracted for recycling before the load is disposed.

Separation of materials with economic value, such as metals, at a construction site can help reduce project costs.

The division contracts with Waste Management and Allied Waste to take C&D for both disposal and recycling. Between them, the two companies operate six facilities in the region that collect C&D. While initially most of the C&D was collected for disposal, both companies have been increasing their ability to sort and recycle more and more of these materials (Table 4-2).

Improving separation of recyclable and non-recyclable materials at the job site would have a positive effect on the recycling rates at these facilities. Effective April 2009, a statewide rule took effect that requires job sites to have separate containers for recyclable materials and non-recyclable materials (garbage), wherever C&D recycling is being performed. The intent is to reduce contamination in the container slated for recyclable C&D.

Table 4-2. C&D facilities under contract to the division

C&D Facility	Location	Status of Efforts to Increase Recycling
Allied Waste		
Third & Lander Recycling Center & Transfer Station	2733 - 3rd Ave. S Seattle	Installed a C&D sort line in 2008 to separate out recyclables. Working to gradually increase diversion of C&D materials.
Black River Recycling & Transfer Station	501 Monster Rd. Renton	Does not divert C&D for reuse, recycling, or beneficial use. May begin diverting materials on-site in the next couple of years.
Waste Management		
Cascade Recycling Center	14020 NE 190th Woodinville	Processes all C&D through screens, grinders, and a sort line to separate out recyclables. Expected to continue this process.
Eastmont Transfer/Recycling Station	7201 W Marginal Way SW Seattle	Processes selected C&D loads through a sort line to separate out recyclables. No other changes expected.
Recycling Northwest	701 2nd St. NW Auburn	Occasionally diverts incoming single-source loads to recycling or beneficial use. No other changes expected.
Argo Yard (intermodal containers only)	5000 Denver Ave. S Seattle	Accepts sealed intermodal containers of C&D for direct transport to a landfill. No recycling occurs.

Current contracts between the county and Waste Management and Allied Waste offer monetary incentives to encourage the recycling and diversion of C&D materials. In 2008 about 8.5 percent of what was delivered to their facilities was diverted from disposal. A challenge for these companies is that by contract

they are required to accept all loads of C&D brought to their facilities, including loads that contain mixed materials or garbage that cannot economically be separated for recycling.

There are a number of facilities not under contract with the county that also accept C&D for recycling. Because they do not accept all loads of C&D, their recycling rates may approach 100 percent. These facilities range from those that accept only limited materials, such as concrete and asphalt, to those with operations similar to the contracted facilities that accept commingled C&D materials for separation and recycling.

Management of Residuals from C&D Processing

The processing of C&D produces materials that are reused, remanufactured, or put to what is termed "beneficial use." Beneficial use, per WAC 173-350, refers to the use of solid waste as an ingredient in a manufacturing process, or as an effective substitute for natural or commercial products, in a manner that does not pose a threat to human health or the environment. The avoidance of processing or disposal costs alone does not constitute beneficial use.

In King County, the amount of residuals generated during C&D processing can vary from 15 to 50 percent depending on the amount of non-recyclable materials present in the processed load and the efficiency of the operation. Under state law (WAC 173-345) recyclable materials are defined "pursuant to a local solid waste management plan." Residuals, which consist mainly of fine-grained particles and other small-diameter materials, have little market value and are not appropriate for recycling in markets for materials such as metals and wood. However, these processing residuals typically have properties that allow them to be used as daily cover or engineered structural fill in a permitted landfill. Two landfills in Washington reportedly use processing residuals as daily cover, and one landfill uses the residuals for structural fill.

If the C&D residuals for landfill application are considered wastes and not beneficial reuse (i.e., recycling), transport and processing of the materials would be limited to those with permits to handle solid waste, which could significantly reduce the number of available options for recycling of C&D in King County. As recommended in Chapter 4, *Waste Prevention and Recycling*, the division will be clarifying the definitions of recycling and beneficial use, and working with other jurisdictions to establish common definitions.

Currently, residual waste from C&D processing facilities within the King County service area must be disposed at a county-designated C&D receiving facility.

5

The Solid Waste Transfer System

Solid Waste Transfer System

Policies

TS-1 Provide solid waste services to commercial collection companies and self-haul customers at transfer stations, and to self-haul customers at drop boxes.

TS-2 Provide solid waste transfer services in the urban and rural areas of the county based on local and facility conditions.

TS-3 Work with cities and communities to develop mitigation measures for impacts related to the construction, operation, and maintenance of transfer facilities, as allowed by applicable local, state, and federal laws.

TS-4 Incorporate green building principles and practices in all new transfer facilities and seek a Gold or higher rating in the Leadership in Energy and Environmental Design (LEED) certification process.

TS-5 Provide for collection of recyclable materials at transfer facilities – recognizing resource limitations, availability of markets, and service area needs – focusing on maximum diversion of recyclables from the waste stream and on materials that are not easily recycled at the curb.

Solid Waste Transfer System

Summary of Recommendations

Responsibility		Action	Detailed Discussion
1	**County**	Continue to implement the transfer system renovation plan set forth in the 2006 *Solid Waste Transfer and Waste Management Plan* and approved by the King County Council in 2007, except as noted in the next recommendation.	Page 5-2, 5-17
2	**County**	Although approved for closure under the 2006 *Solid Waste Transfer and Waste Management Plan*, reserve the option to retain the Renton station until the new urban transfer facilities have been sited and the impact of closure has been fully evaluated.	Page 5-2, 5-17
3	**County**	Consider adding a second scale and an additional collection container at the Cedar Falls Drop Box to improve capacity.	Page 5-24
4	**County**	If service-level assessments indicate the need for additional capacity in the rural areas after the siting of two new stations, consider siting drop box facilities in these areas.	Page 5-24
5	**County, commercial collection companies**	Explore prospects for the transfer of commercial loads of organics through county transfer stations.	Page 5-22
6	**County**	Evaluate options for ensuring there is adequate transfer capacity and recycling/reuse opportunities for construction and demolition debris in the private sector now and in the future.	Page 5-6
7	**County, cities**	In the event of an emergency, reserve the transfer system for municipal solid waste and make the recycling of related debris a priority.	Page 5-27
8	**County, cities**	Identify potential temporary Debris Management Sites where emergency debris can be stored until it is sorted for recycling or proper disposal.	Page 5-27

THE SOLID WASTE TRANSFER SYSTEM

Planning, design, and construction are well underway in the development of a new generation of solid waste transfer facilities. Our aging transfer system is in need of extensive improvements after nearly 50 years of service to a growing region. Increased population and advancements in the industry have led to the need to reconstruct or build new facilities to provide greater capacity and update station technology. In addition, the increased focus on environmental stewardship has reshaped the role of transfer stations in managing solid waste, creating the need for more robust and modern facilities that will pave the way for a sustainable future.

Transfer facilities are the public face of the solid waste system. In 2008, county transfer facilities received about 930,000 tons of garbage, through nearly 840,000 customer visits. The division operates eight transfer stations and two rural drop boxes dispersed throughout the urban and rural areas of the county (Figure 5-1). Both the transfer stations and the two rural drop boxes accept garbage and, in most cases, recyclable materials from business and residential self-haulers. The transfer stations also provide accessible drop-off locations for garbage picked up at the curb by the commercial collection companies. From these geographically dispersed transfer stations, garbage is consolidated in division transfer trailers and taken to the county-owned Cedar Hills Regional Landfill in the Maple Valley area. Private-sector haulers transport the recyclable materials to material recovery facilities throughout the region.

The division's regional transfer stations provide a hub for transporting garbage collected at the curb to larger transfer trailers destined for the Cedar Hills Regional Landfill.

Using a collaborative, regional approach to solid waste management, the division and its advisory committees – the Solid Waste Advisory Committee (SWAC) and the Metropolitan Solid Waste Management Advisory Committee (MSWMAC) – developed a plan to renovate the transfer system. Given the potential effects of station renovation, siting, and construction on the cities and other stakeholders, it was important to engage them in the early stages of planning. This effort began in 2004 with a comprehensive analysis of the current transfer system and the adequacy of each facility in the network. The division and advisory committees focused initial evaluations on the urban transfer stations.

Five of the urban transfer stations, with the exception of the newly constructed Shoreline Recycling and Transfer Station, were evaluated using 17 criteria. In general, the criteria focused on the level of service to users, the capacity of stations to handle garbage and recyclables both now and in the future, structural integrity, and the effects of facilities on surrounding communities. Once the criteria were applied to each urban station, the results were used to evaluate its condition to determine whether the station should be reconstructed in its current location, whether it should be closed and a new station built in a different location, or whether it should be closed without being replaced.

Site preparations are underway for constructing the new Bow Lake Transfer Station on property just north of the existing station.

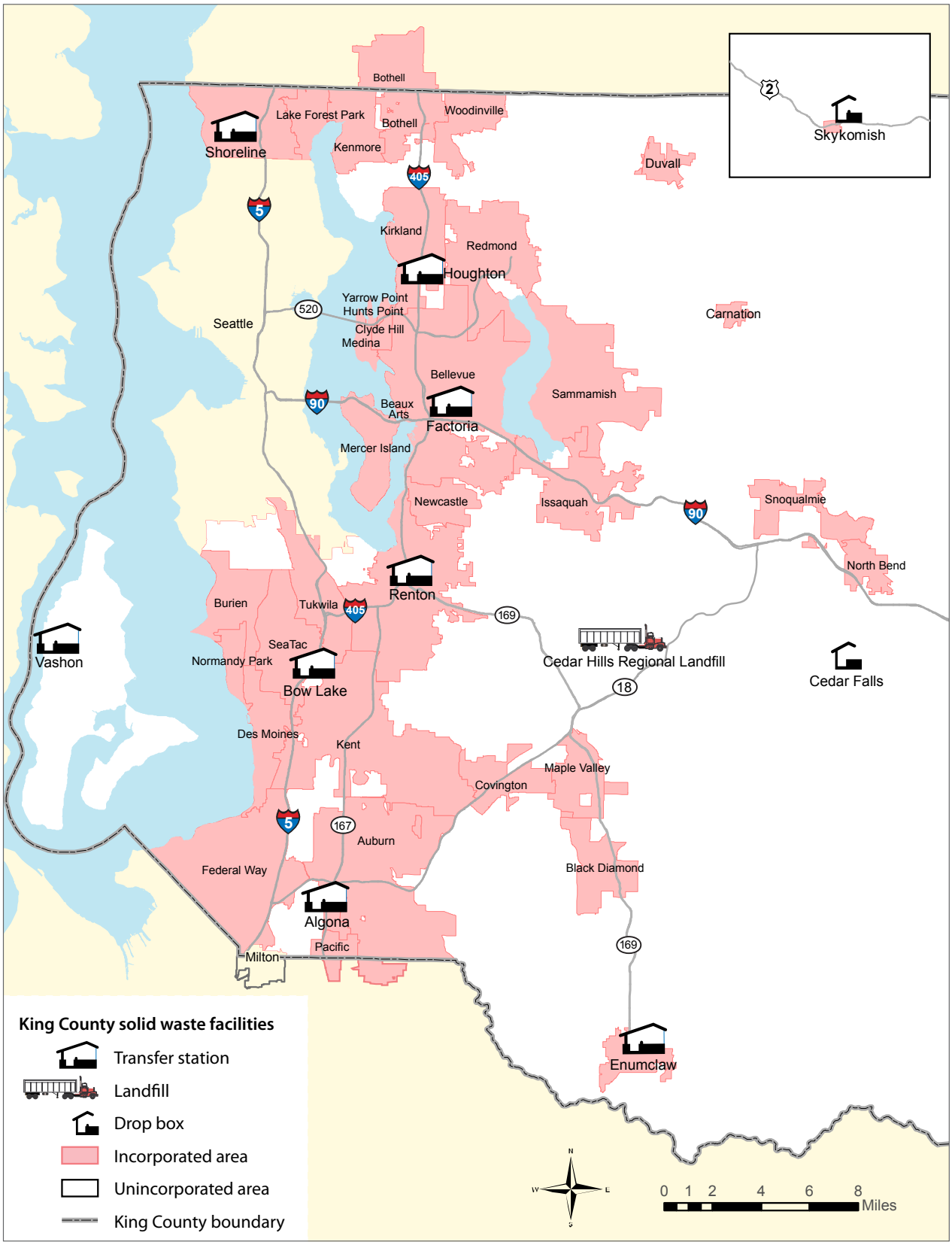
The advisory committees worked closely with the division to develop and apply the 17 criteria, evaluate options, and formulate recommendations for upgrading the transfer system. The work of the division and the committees culminated in the 2006 *Solid Waste Transfer and Waste Management Plan* (Transfer Plan; KCSWD 2006b), which contains recommendations for the station renovations. This plan was approved by the King County Council in December 2007. The approved recommendations authorize the division to completely reconstruct or build newly sited facilities to replace four outmoded transfer stations and to close three existing stations.

As outlined in the Transfer Plan, the Bow Lake and Factoria stations will both be deconstructed, and new recycling and transfer stations will be built on the existing sites and adjacent properties. Both the Algona and Houghton stations will be closed and replaced with newly sited recycling and transfer stations in the South County and Northeast Lake Washington areas, respectively. The Renton station was approved for closure.

The rural facilities in the transfer network – the Enumclaw and Vashon transfer stations and the drop boxes at Cedar Falls and Skykomish – were assessed after completion of the urban station evaluation using the same 17 criteria. While the Vashon and Cedar Falls facilities each failed one evaluation criterion, improvements can be made on site, and recommendations are provided in this chapter. The analysis of rural service also resulted in a recommendation to reserve the option to retain the Renton station until the new urban transfer facilities have been sited and the impact of closure can be fully evaluated. Should the closure leave Renton and surrounding rural areas underserved, the division may consider retaining the station in some capacity.

This chapter traces the planning process for the solid waste transfer system through the development of the facility renovation plan. What emerges is a system plan that will improve the network's current level of services, with the flexibility to adapt to changing needs and emerging technologies. The chapter also discusses division plans for effectively managing potential local and regional emergencies through early response planning.

Figure 5-1. Locations of solid waste facilities



THE TRANSFER SYSTEM AND SERVICES

The concept of a regional transfer and disposal network in King County grew out of a nationwide movement in the 1960s to impose stricter standards for protection of public health and the environment. The original purpose of the transfer network was to replace the open, unlined community dump sites in use at the time with environmentally safe transfer facilities where garbage could be delivered by curbside collection trucks and self-haulers. From these transfer sites, garbage could then be consolidated into larger trailers for transport to the Cedar Hills Regional Landfill.

The Vashon Transfer/Recycling Station replaced the Vashon landfill in 1999.

Locations of the eight transfer stations (six urban and two rural) and two rural drop boxes in King County are shown in Figure 5-1. In addition to meeting standards for the safe and environmentally sound transfer of solid waste, the transfer network has reduced the amount of truck traffic on the highways by providing geographically dispersed stations where garbage collected throughout the region can be consolidated into fewer loads for transport to the landfill. While this network has served the region well over the years, it was not built to accommodate the three-fold increase in population that has occurred between the 1960s and 2008, the larger-sized commercial collection vehicles now in use, and the space needed to collect the growing array of recyclable materials. Table 5-1 lists the locations of current transfer facilities, along with the tons of garbage received, numbers of customers served, and recycling services provided for each facility.

Recycling portals at the Vashon Transfer/Recycling Station blend instruction with public art.

As shown in Table 5-1, in addition to accepting garbage, most stations provide for collection of standard curbside recyclables, which include glass and plastic containers, tin and aluminum cans, mixed waste paper, newspaper, and cardboard. Exceptions are the Algona and Factoria stations where space is limited. At Factoria, collection services for household hazardous wastes replaced the area formerly dedicated to the collection of recyclables. Some stations collect additional materials for recycling and reuse as space allows.

Table 5-1. Current facilities and services

Facility and Address by Area Served	Year Opened	Garbage Tons Received[a] (2008)	Customer Transactions (2008)	Recycling and Other Services Provided
North County				
Shoreline Recycling and Transfer Station 2300 North 165th St. Seattle 98133	2008[b]	38,467	58,297[c]	Standard curbside recyclables, organics (yard waste and food scraps), clean wood, scrap metal, textiles, fluorescent bulbs and tubes, appliances, cell phones, PDAs, 2-way radios, VCR/DVD/CD players, separated residentially generated sharps
Northeast Lake Washington Area				
Factoria Transfer Station 13800 Southeast 32nd St. Bellevue 98005	mid-1960s	150,022	116,071	Household hazardous waste
Houghton Transfer Station 11727 Northeast 60th St. Kirkland 98033	mid-1960s	162,415[d]	129,365	Standard curbside recyclables, textiles
Central County				
Bow Lake Transfer Station 18800 Orillia Rd. S Tukwila 98188	1977	305,623	196,881	Standard curbside recyclables, appliances (recycling services stopped in March 2009 to accommodate station reconstruction)
Renton Transfer Station 3021 Northeast 4th St. Renton 98056	mid-1960s	70,332	76,009	Curbside recyclables, textiles
South County				
Algona Transfer Station 35315 West Valley Hwy. Algona 98001	mid-1960s	145,549	152,333	None

Facility and Address by Area Served	Year Opened	Garbage Tons Received[a] (2008)	Customer Transactions (2008)	Recycling and Other Services Provided
Rural County				
Cedar Falls Drop Box 16925 Cedar Falls Rd. SE North Bend 98045	1990	3,789	21,575[c]	Standard curbside recyclables, textiles, yard waste
Enumclaw Transfer/ Recycling Station 1650 Battersby Ave. E Enumclaw 98022	1993	23,333	49,863[c]	Standard curbside recyclables, yard waste, clean wood, appliances, textiles, reusable household goods
Skykomish Drop Box 74324 NE Old Cascade Hwy. Skykomish 98288	1980	696	1,777	Standard curbside recyclables
Vashon Transfer/ Recycling Station 18910 Westside Hwy. SW Vashon 98070	1999	8,148	21,817	Standard curbside recyclables, appliances, textiles, separated residentially and business generated sharps, construction and demolition debris

[a] *Does not include yard waste or other recyclables.*
[b] *Opened February 15, 2008; replaced the First Northeast Transfer Station, which had been in operation since the1960s.*
[c] *Includes garbage and yard waste transactions.*
[d] *Includes the 696 tons received at Skykomish, which was taken to Houghton for transport to the landfill.*

Services for Construction and Demolition Debris

The county does not accept commercial or large loads of construction and demolition (C&D) debris at any of its transfer facilities, except for the Vashon Transfer/Recycling Station. C&D includes debris from the construction, remodeling, repair, or demolition of buildings, other structures, and roads. It includes clean wood, painted and treated wood, gypsum wallboard, roofing, siding, structural metal, wire, insulation, packaging materials, and concrete, asphalt, and other aggregates. The county banned the disposal of large loads of C&D at the transfer stations and Cedar Hills landfill in 1993.

To manage the majority of the region's C&D, the division contracts with two private-sector companies – Allied Waste and Waste Management. Together, these two companies currently operate six facilities, which

accept all loads of C&D, both recyclable and non-recyclable. While initially most of the C&D collected was disposed, these facilities are taking steps to increase their C&D recycling (as discussed in Chapter 4, *Collection and Processing*). In addition to the facilities listed below, there are many other private-sector facilities throughout the region that accept C&D materials for recycling or reuse (discussed in Chapter 4).

C&D Facility	Location
Allied Waste	
Third & Lander Recycling Center & Transfer Station	2733 - 3rd Ave. S Seattle
Black River Recycling & Transfer Station	501 Monster Rd. Renton
Waste Management	
Eastmont Transfer/Recycling Station	7201 W Marginal Way SW Seattle
Cascade Recycling Center	14020 NE 190th Woodinville
Recycling Northwest	701 2nd St. NW Auburn
Argo Yard (intermodal containers only)	5000 Denver Ave. S Seattle

The division's current C&D contracts with Allied Waste and Waste Management are scheduled to expire in 2014. Before the expiration date, the division will evaluate options for ensuring there is adequate transfer capacity and recycling/reuse opportunities for C&D in the future. Options could include negotiating new contracts for C&D handling or allowing C&D to flow to private-sector facilities without division contracts. Criteria used to choose an option will include the potential to increase the amount of C&D that is recycled, accessibility of the C&D disposal and recycling facilities, and ability to maintain reasonable disposal fees. There also may be options to accept more C&D at county transfer stations as the new facilities are constructed.

Services for Household Hazardous Wastes

Many common household products, such as pesticides and certain cleaning products, contain ingredients that are toxic, flammable, reactive, or corrosive. Disposed improperly, these products can pose a threat to human health and the environment. Household hazardous waste (HHW) generated in King County is

managed through the Local Hazardous Waste Management Program (LHWMP). This program is jointly managed by King County, the City of Seattle, the 37 cities within our service area, and Public Health – Seattle and King County. The guiding policies and plans are contained in the joint Local Hazardous Waste Management Plan, mandated under RCW 70.105.

The county accepts HHW from residents through two avenues: the traveling Wastemobile and a stationary drop-off site at the Factoria Transfer Station. The City of Seattle operates two HHW collection sites within its borders, which are open to all King County residents. Wastes collected through these services are recycled, beneficially reused, or incinerated, when necessary. None is disposed at the Cedar Hills Regional Landfill. HHW collection for residents is funded through a surcharge on garbage disposal, residential and business garbage collection, and wastewater discharge fees, thus residents using the services are not charged at the drop-off locations. Jurisdictions receive funds from the LHWMP to provide the service.

Created in 1989, the county's Wastemobile was the first program of its kind in the nation. It is a mobile service that travels to communities within King County, staging collection of HHW at each site for one to two days at a time. The Wastemobile is also providing regularly scheduled HHW collection at the Supermall in Auburn on the first and third full weekends of each month. In 20 years of operation, the Wastemobile has collected more than 13,770 tons of HHW from about 300,000 customers. In 31 collection events in 2008, the Wastemobile served more than 14,000 King County residents, collecting an average of 54 pounds of hazardous waste per customer (for a total of 385 tons).

The county's Factoria Transfer Station offers HHW drop-off service six days a week. In 2008, 12,270 customers brought an average of 46 pounds of HHW per customer to Factoria (for a total of 283 tons).

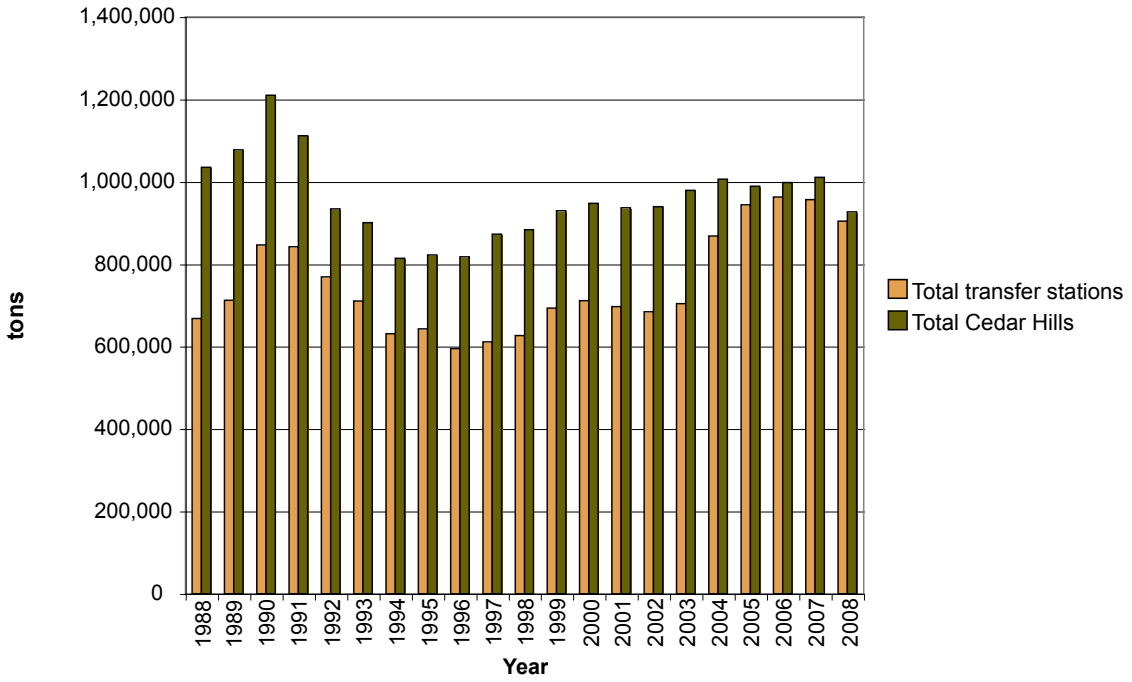
In February 2008, the division initiated a pilot program to accept HHW from small businesses at the Factoria station and the Wastemobile. (Previously only residential customers were offered the service.) During the pilot, the collection services received materials from 130 small businesses. The division will continue to offer and promote the service for small businesses.

TRENDS IN TRANSFER STATION USAGE

With regional growth and changes in technology over the years, the division has modified its solid waste facilities, where possible, to keep pace. Figure 5-2 shows the tons of garbage received at the transfer stations and the landfill over the last 20 years.

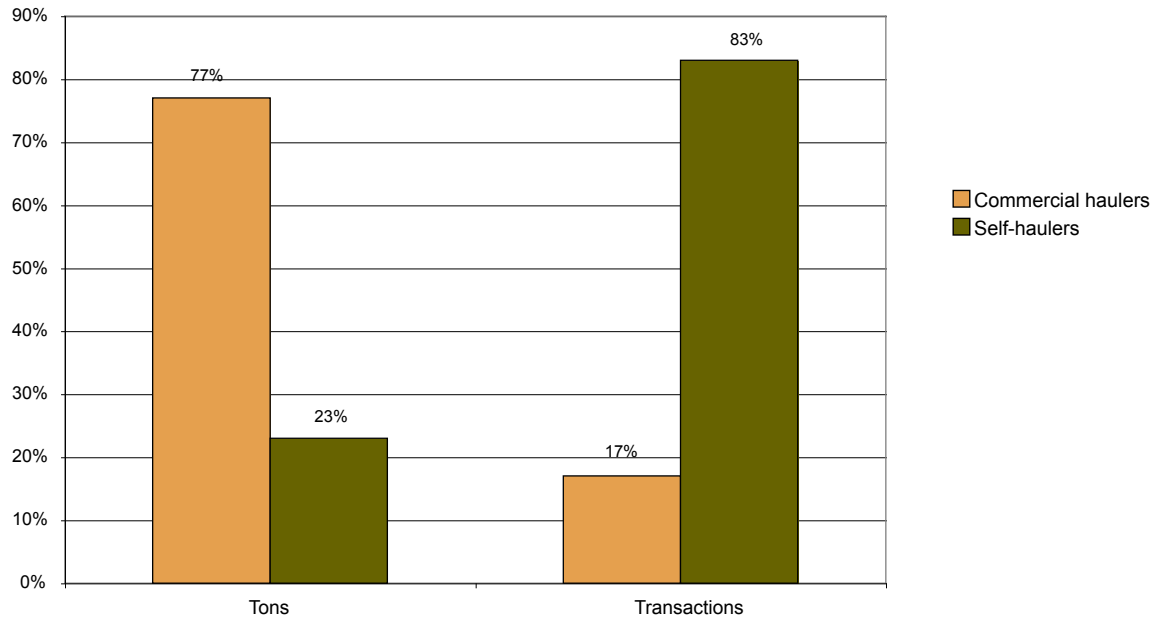
The drop in total tons disposed in the early to mid-1990s is attributable to the success of waste prevention and recycling programs that began in the late 1980s, the withdrawal of the City of Seattle from the county's system in 1991, and the ban on most C&D from the division's solid waste system in 1993. In 2004, the amount of garbage taken directly to Cedar Hills decreased significantly due to an increase in the fee charged to commercial collection companies that were hauling wastes directly to the landfill. The fee increase discouraged this practice, resulting in more wastes being processed through county transfer stations. The economic downturn is responsible for the tonnage reduction from 2007 to 2008. The division expects tonnage to remain at this lower level for several years.

Figure 5-2. Total tons processed at transfer stations and disposed at Cedar Hills (1988 – 2008)



In 2008, about 77 percent of the garbage received at the transfer facilities was brought by the larger, commercial curbside collection trucks, with the remaining 23 percent delivered by business and residential self-haulers (shown in Figure 5-3). While the larger garbage loads come from the commercial haulers, self-haulers account for 83 percent of the customer transactions (Figure 5-3). At some of the urban stations that are operating at or near maximum capacity, the mix of self-haul and commercial customers can cause long traffic queues and crowded conditions on the tipping floor. The division has managed these problems, to the extent possible at each station, by providing separate queuing lanes for the two customer types and allowing maximum separation on the tipping floor, for safety as well as efficiency. Potential crowding is further eased by the fact that self-haulers typically use the stations more on weekends, while commercial transactions occur primarily on week days. The division is committed to providing service to self-haulers, viewing the solid waste disposal network as a public system that exists for the benefit of the community.

Figure 5-3. Percent of total tons and transactions at transfer stations by hauler type (2008)



To understand who self-hauls to the transfer facilities and why, the division conducts periodic surveys of customers through countywide telephone interviews and on-site questionnaires at each facility. Self-haulers consist of single- and multi-family residents and non-residential customers, such as landscapers, small contractors, industries, offices, stores, schools, government agencies, and, increasingly, independent haulers for hire. The most common type of self-hauler is the single-family resident.

Of the self-haul trips, about 90 percent are made by residential customers, who bring in about 85 percent of the self-haul tons. About 10 percent of the trips are made by non-residential self-haulers, bringing about 15 percent of the self-haul tons.

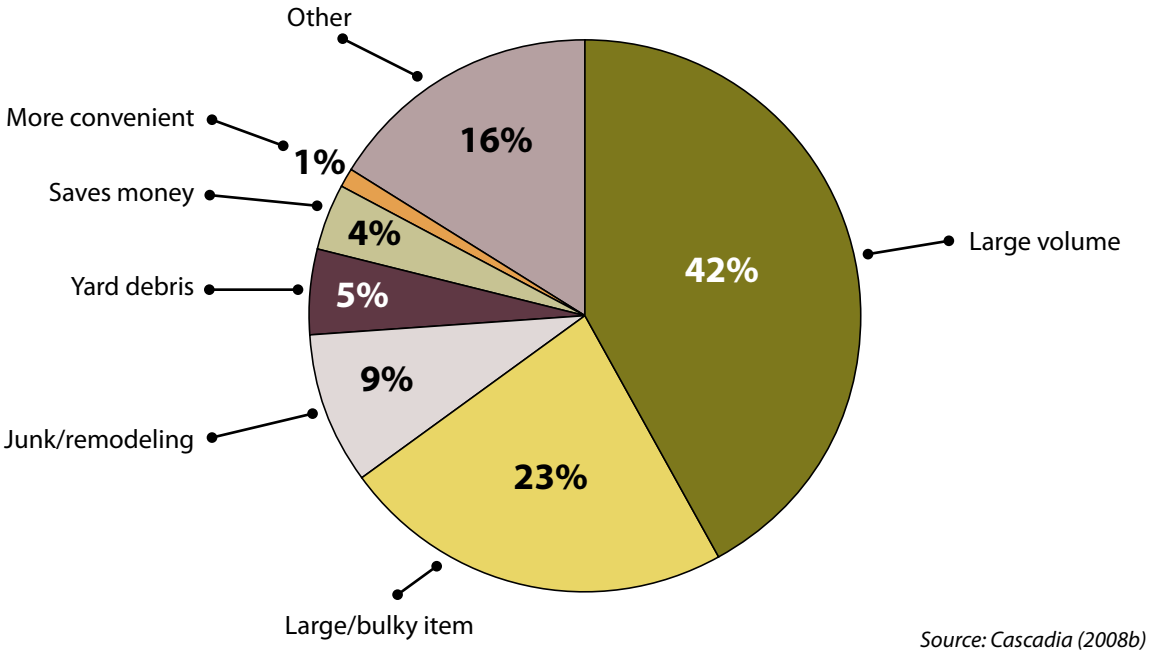
The number one material disposed by self-haulers is yard waste, followed by wood, C&D, scrap metal, and paper, including cardboard. The division's waste characterization studies indicate that approximately 60 percent of the tons disposed by self-haulers is recyclable.

Telephone surveys conducted in 2007 indicate that 47 percent of county residents used a

A self-hauler unloads a vehicle at the Shoreline Recycling and Transfer Station.

transfer facility during the previous year. Of those users, 18 percent said they used a transfer facility once during the year, and 8 percent said they used a transfer facility more than four times during the year. The most common reason given for self-hauling to a transfer facility was having a large quantity of waste, while the second most common reason was having a large or bulky item that could not be collected at the curb (Figure 5-4). The surveyors found that residents who subscribe to curbside services use transfer stations occasionally, while those who do not subscribe to collection services use the facilities more often.

Figure 5-4. Most common customer reasons for self-hauling



Source: Cascadia (2008b)

A separate survey of self-haulers on-site at the transfer facilities during 2006 provided similar responses. For both residential and non-residential self-haulers, the number one reason for using the transfer station was having a large amount of waste – 24 and 25 percent, respectively. The number two reason for residential self-haulers, 12 percent, was having an item that was too big to fit in the garbage can. The number two reason for non-residential self-haulers, 21 percent, was that they were an independent hauler; in the previous survey in 2002/2003, independent haulers accounted for only 4 percent of non-residential self-haulers.

EVALUATION AND PLANNING FOR THE URBAN TRANSFER STATIONS

The transfer network has served the region well for nearly five decades; however, all of the urban transfer stations are now outdated and over capacity, with the exception of the newly constructed Shoreline station. Along with the growth in population, the late 1980s brought about an emphasis on recycling to reduce

wastes. Recycling containers have been placed at transfer stations, wherever space allows, to collect some materials brought by self-haulers; however, space constraints continue to limit the number of containers and the range of materials that each site can accommodate. These space constraints prohibit the addition of recycling opportunities for materials that are commonly disposed at the stations, including yard waste, clean wood, and scrap metal. Changes in the industry have also created operational constraints. For example, commercial collection trucks have become larger, making it more difficult to unload the vehicles efficiently. Given these and other factors, in 2004 the division and its advisory committees embarked on a comprehensive analysis of each urban transfer station to determine how best to update the system to meet current needs.

As discussed in detail in Chapter 2, *Solid Waste System Planning*, the division, SWAC, MSWMAC, and the Interjurisdictional Technical Staff Group developed four analytical milestone reports to evaluate the urban transfer stations. These reports culminated in the approved Transfer Plan, which provides recommendations for upgrading the transfer station system and its services.

Two outbound scales at the Algona Transfer Station help keep traffic moving through the station.

In the first milestone report (KCSWD and ITSG 2004), the division and advisory committees developed 17 criteria to evaluate the urban transfer facilities. To determine the appropriate standards of performance, the division consulted the local commercial collection companies and other subject experts, and applied national environmental and transportation standards. Details on the application of these evaluation criteria to individual facilities are contained in the second milestone report prepared by the division and advisory committees and approved by the County Council (KCSWD 2005a). Criteria to address costs and rate setting considerations were applied during the development of system alternatives in the final milestone report (KCSWD 2006a).

The evaluation criteria were applied to five of the six urban stations – Algona, Bow Lake, Factoria, Houghton, and Renton. The former First Northeast station was not evaluated because it was in the process of being rebuilt; the newly constructed station opened in 2008 as the Shoreline Recycling and Transfer Station.

For the station evaluations, the 17 criteria were grouped into three broad categories – level of service to customers, station capacity and structural integrity, and effects on surrounding communities. As expected for these five aging facilities, the majority of the criteria were not met, resulting in decisions to reconstruct or close the stations when sufficient replacement capacity was available.

The three categories of evaluation criteria are described below, followed by a table that shows the results of their application to the five urban transfer stations.

Level of Service

- *Estimated travel time to a facility* – This criterion measures how conveniently located the facilities are for customers, measured by the maximum travel time to the closest facility in their service area. The standard was established as 30 minutes for at least 90 percent of the customers. It provides an indication of whether the transfer stations are well dispersed throughout the county.

- *Time on site* – Time on site measures the time to get in and out of the station, including unloading time. It was evaluated separately for commercial haulers (with a standard of 16 minutes) and business and residential self-haulers (each with a standard of 30 minutes). It provides an indicator of whether a transfer station can efficiently handle customers in a timely manner.

- *Facility hours* – Individual days and hours of operation for each station are set based on the division's usage data and customer trends. Some of the urban stations are open in the early morning or late evening hours to serve the commercial haulers. Currently, the only days that the entire system is closed are Thanksgiving, Christmas, and New Year's Day.

- *Level of Recycling Services* – The final criterion in this category was whether recycling services provided at the stations met the waste prevention and recycling policies established in the last comprehensive solid waste management plan. In general, the policies direct that all stations should 1) provide for collection of the curbside recyclables, including glass and plastic containers, tin and aluminum cans, mixed waste paper, newspaper, and cardboard, 2) where feasible, provide areas for source-separated yard waste collection, and 3) maintain the capacity to add collection of new materials based on market opportunities and community needs.

Station Capacity

Station capacity is likely the single greatest limitation of the five urban transfer stations, both now and in the future. It was measured using a number of criteria that affect daily operations, future expansion, and emergency capacity.

- *Vehicle and tonnage capacity* – Two major operational considerations measured were station capacity for vehicle traffic and solid waste tonnage, both now and over the 20-year planning horizon. Optimal operating capacity is the maximum number of vehicles and tonnage that can be efficiently processed through the station each hour based on the station design and customer mix. To derive criteria that would indicate how well a station could be expected to perform, the division modeled its criteria after the transportation standards used to measure roadway capacity. The transportation standards were modified to assign measures of capacity to transfer facilities. The optimal level of service was defined as "able to accommodate vehicle and tonnage throughput at all times of the day, except for occasional peak hour times." Based on the criteria, a station that provides the optimal level of service more than 95 percent of the time is considered underutilized, meaning it offers more capacity than required for

the area it serves. A level of service in which capacity is exceeded during 5 to 10 percent of operating hours is considered optimal.

- *Space for 3 days' storage* – Available storage capacity establishes whether a transfer station can continue to operate, or accept garbage, for at least three days in the event of a major regional disaster.

- *Space for station expansion* – Stations were evaluated to determine 1) whether there is space for expansion on the existing property or 2) whether there is adjacent land available on which to expand operations. These two standards were used primarily to determine if the station could be expanded in its current location or if a new location would be needed to efficiently manage current and future needs.

- *Meets facility safety goals* – While all stations hold current permits from Public Health – Seattle and King County and meet the health and safety standards, overall safety is a concern as stations become more congested and operations more constricted. The presence of these physical challenges at the stations does not mean they operate in an unsafe manner; it does mean that it takes extra effort by staff and management at the stations to ensure the facilities are operating safely.

- *Roof clearance* – This criterion measures a station's capacity to handle the larger, commercial collection trucks. Through discussions with the commercial collection companies, it was determined that a minimum clearance of 25 feet was needed to allow the new, larger trucks to unload efficiently. The longer truck/trailers with automated lifts, which allow the garbage to slide out the back of the trailers, require higher vertical clearance than they did in the past. At some of the older stations, the collection trucks can hit and potentially damage station roofs, supporting structures, or hanging lights as they unload.

- *Ability to compact waste* – This criterion examines whether the station is equipped with, or has the space to install, a waste compactor. Waste compactors increase efficiency and reduce costs by compressing more garbage into fewer loads for transport to the landfill or other disposal option. When garbage has been compacted, transfer trailers can carry about one-third more tons per trip, resulting in less traffic through host city neighborhoods, less wear on local roads, less fuel use, and a reduction in greenhouse gases.

- *Structural integrity* – The purpose of this criterion is to ensure the facility meets code requirements for seismic, wind, and snow events. All facilities were constructed in compliance with the applicable standards of the time and were grandfathered in in their current condition. They presently meet

the "life safety" standard, meaning the station would not endanger occupants in the event of an emergency. The current standard for assessing new transfer buildings for seismic performance is the Immediate Occupancy standard, developed by the Federal Emergency Management Agency (FEMA). This standard means that the facility could be occupied immediately following a seismic event. Because the King County Emergency Management Plan identifies transfer stations as critical facilities in the event of an emergency, this FEMA standard applies to all new stations.

Effects on Surrounding Communities

One of the division's highest priorities is to minimize the effects of its facilities on the host cities and surrounding communities. Through its advisory committees, the division has worked closely with the cities and communities to understand their issues and concerns and bring their perspectives to bear on system planning. Working together, five criteria were developed to evaluate effects on communities.

The new Shoreline Recycling and Transfer Station is fully enclosed to mitigate any potential impacts from noise, odor, and dust.

- *Meets applicable local noise ordinance levels* – This criterion is to ensure that a facility does not violate state or local (city) standards for acceptable noise levels. State and city standards are based on maximum decibel (dBA) levels that consider zoning, land use, time of day, and other factors. Evaluations were based on the existence of any reports of noise violations to the cities and additional noise level measurements performed at each station by a consultant.

- *Meets Puget Sound Clean Air Agency standards for odors* – The primary measure of whether odors are a problem is through complaints by the public or employees. Complaints are typically reported to the Puget Sound Clean Air Agency (PSCAA) or directly to the division. Complaints to PSCAA are verified by an inspector. If an odor is verified and considered to be detrimental, PSCAA issues a citation to the generator of the odor. The division also tracks and investigates any odor complaints.

- *Meets goals for traffic on local streets* – This criterion measures the impacts on local streets and neighborhoods from vehicle traffic and queuing near the transfer stations. The area that could be affected by traffic from self-haulers and commercial collection trucks extends from the station entrance to the surrounding streets. The division hired a consultant to evaluate this criterion based on two standards: 1) that additional traffic meets the local traffic level of service standard as defined in the *American Association of State Transportation Officials Manual* and 2) that traffic does not extend onto local streets during more than 5 percent of the station's operating hours.

- *Existence of a 100-foot buffer between the active area and nearest residence* – A criterion developed by the division is the maintenance of a 100-foot buffer between the active area of the station and the nearest residence.

- *Compatibility with surrounding land uses* – The final criterion used to evaluate the stations was the most subjective and difficult to apply. It looks at consistency with land use plans and zoning regulations, aesthetics, and compliance with state and local regulations. This criterion was evaluated for each station during lengthy discussions between the division and its advisory committees.

The 17 criteria described above were applied to each of the five urban stations. Table 5-2 presents the results of those evaluations.

Table 5-2. Level-of-service criteria applied to urban transfer stations

		Algona	Bow Lake	Factoria	Houghton	Renton
1. Estimated time to a transfer facility within the service area for 90% of users	< 30 min=yes	YES	YES	YES	YES	YES
2. Time on site meets standard for 90% of trips						
a. commercial vehicles	< 16 min=yes	NO	YES	NO	NO	NO
b. business self-haulers	< 30 min=yes	YES	NO*	NO*	NO*	YES
c. residential self-haulers	< 30 min=yes	YES	NO*	YES	YES	YES
	* Meets criterion on weekdays, but not weekend days.					
3. Facility hours meet user demand	YES/NO	YES	YES	YES	YES	YES
4. Recycling services . . . meet policies in 2001 Solid Waste Plan						
a. business self-haulers	YES/NO	NO	NO	NO	NO	NO
b. residential self-haulers	YES/NO	NO	NO	NO	NO	NO
5. Vehicle capacity						
a. meets current needs	YES/NO	NO	YES	NO	NO	YES
b. meets 20-year forecast needs	YES/NO	NO	NO	NO	NO	NO
6. Average daily handling capacity (tons)						
a. meets current needs	YES/NO	NO	NO	YES	NO	YES
b. meets 20-year forecast needs	YES/NO	NO	NO	NO	NO	YES
7. Space for 3 days' storage						
a. meets current needs	YES/NO	NO	NO	NO	NO	NO
b. meets 20-year forecast needs	YES/NO	NO	NO	NO	NO	NO
8. Space exists for station expansion						
a. inside the property line	YES/NO	NO	YES	YES	YES	YES
b. on available adjacent lands through expansion	YES/NO	YES	YES	YES	NO	NO

		Algona	Bow Lake	Factoria	Houghton	Renton
9. Minimum roof clearance of 25 ft	YES/NO	YES	YES	NO	NO	YES
10. Meets facility safety goals	YES/NO	NO*	NO*	NO*	NO*	NO*
	* The presence of these physical challenges does not mean that the stations operate in an unsafe manner. It does mean that it takes extra effort by staff and management to ensure the facilities are operating safely, which reduces system efficiency.					
11. Ability to compact waste	YES/NO	NO	NO	NO	NO	NO
12. a. Meets goals for structural integrity	YES/NO	YES	YES	YES	YES	YES
b. Meets Federal Emergency Management Act immediate occupancy standards	YES/NO	YES	NO	NO	NO	YES
13. Meets applicable local noise ordinance levels	YES/NO	YES	YES	YES	YES	YES
14. Meets Puget Sound Clean Air Agency standards for odors	YES/NO	YES	YES	YES	NO*	YES
	* One complaint about Houghton was verified two years preceding the evaluation. No citation was issued.					
15. Meets goals for traffic on local streets						
a. meets level of service standard	YES/NO	YES	NO	YES	YES	YES
b. traffic does not extend onto local streets 95% of time	YES/NO	NO*	NO*	NO*	YES	YES
	* Meets criterion weekdays, but not weekend days. Yes or no rating based on evaluating all days within study period.					
16. 100-foot buffer between active area & nearest residence	YES/NO	YES	YES	YES*	NO	YES
	* Meets 100 ft from residence criterion, but there are businesses within 100 ft.					
17. Transfer station is compatible with surrounding land use	YES/NO	YES	YES	NO*	NO**	YES
	* Factoria station is a 30+ year old facility in need of maintenance that has been deferred over the years. It is visible on the approach to adjacent businesses. The neighborhood is primarily commercial/industrial. ** Houghton station is a 30+ year old facility in need of maintenance that has been deferred over the years. It is in a residential/recreational area and clearly visible from the road. Transfer station parking is located within 100 ft of nearest residence.					

The results shown in Table 5-2 indicate that the current network of stations is efficiently distributed throughout King County with adequate service hours that meet the needs of our customers. However, most stations require major improvements to address current capacity, service, and operational needs. In addition, structural changes are necessary to improve emergency response and operational efficiency, as well as meet desired safety goals.

Future Plans for the Urban Transfer Stations

Based on the application of evaluation criteria, the division and its advisory committees developed a plan to modernize the transfer system, including the addition of waste compactors and other changes needed to provide efficient and cost-effective services to the region's customers.

The activities approved by the County Council in the Transfer Plan include the following:

Bow Lake – deconstruct the existing transfer station and construct a new recycling and transfer station on the existing site and adjacent property purchased from the Washington State Department of Transportation

Factoria – deconstruct the existing transfer station and construct a new recycling and transfer station on the existing site and adjacent properties to the northwest of the site, which the division purchased in 2007

Algona – close the station and replace it with a new recycling and transfer station in the South County area

Houghton – close the station and replace it with a new recycling and transfer station in the Northeast Lake Washington area

Renton – close the station and do not replace it

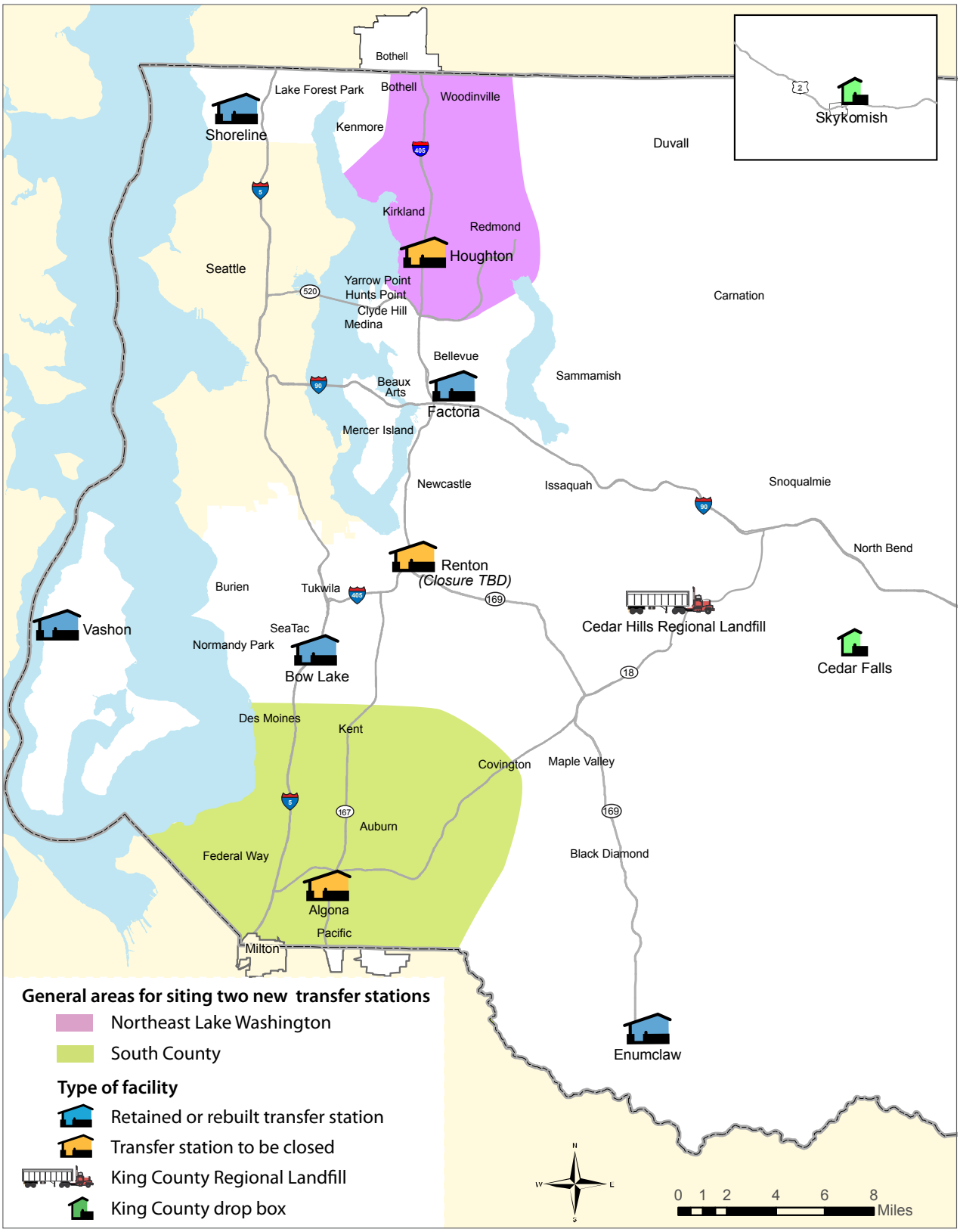
Although approved for closure, the division recommends reserving options to retain the Renton station, in some capacity, should its closure leave Renton and surrounding rural areas underserved. After the new transfer stations have been sited, the impact of closure can be fully evaluated.

Figure 5-5 shows the planned changes for the urban transfer stations and the two areas identified for construction of new stations. As described on page 5-20, the northernmost station, the new Shoreline Recycling and Transfer Station, exemplifies the public process and station design that will be used for all stations slated for construction.

The Bow Lake station is being constructed on the existing site and on adjacent property purchased from the Washington State Department of Transportation. During construction of the new station, the existing station will remain open to commercial haulers, while self-haulers may have limited access, if necessary to ensure safety. The new transfer station will open to customers in two phases. In 2011, the new transfer building will open. At that time, work on the existing site will begin, with deconstruction of the original transfer building and construction of the expanded recycling area and a new scalehouse. In 2012, all site construction is expected to be complete.

The conceptual design of the new Bow Lake transfer building has met with approval in meetings with the City of Tukwila and in public hearings.

Figure 5-5. Locations of existing and planned solid waste facilities



Shoreline Recycling and Transfer Station Sets the Bar for New Stations

The Shoreline Recycling and Transfer Station was built to meet the highest standards of environmental sustainability, and is the first transfer station built in the U.S. to be registered with the U.S. Green Building Council. Their nationally recognized rating system – Leadership in Energy and Environmental Design (LEED) – evaluates buildings in the areas of protection of human and environmental health, sustainable site development, water savings, energy efficiency, materials selection, indoor environmental quality, and innovation in design.

The Shoreline station earned a platinum certification, the highest rating possible, under the LEED rating system. A few of the many features that earned the station this rating include:

- **Natural daylighting** – windows and skylights that allow natural light to filter into the building. Sensors also detect the levels of daylight and adjust the lighting accordingly. This feature has the potential to reduce annual energy use by as much as 50 percent.
- **Solar energy** – photovoltaic panels installed on the south-facing roof that generate electricity even on cloudy days, providing about 5 percent of the building's energy needs.
- **Rainwater collection and reuse** – rainwater collected on the rooftop and stored in tanks that provide water for washing station floors and equipment and for flushing toilets. This feature is expected to reduce water needs by 57 percent.

Solar panels

Running through the Shoreline property is Thornton Creek, which hosts a diversity of wildlife. Protection of the creek was an extremely high priority for the local community. Therefore, the station design incorporates innovative systems to protect and restore the creek corridor through several means:

- Invasive plants were replaced with a buffer of drought-tolerant native vegetation to conserve water, protect creek banks from erosion, and provide habitat for birds and other wildlife
- Paved areas were removed, and the buffer around the creek was increased
- Runoff from roadways was channeled to a stormwater filtration system and detention pond; this system releases stormwater to the creek at a rate that prevents erosion or flooding

The Thornton Creek Alliance recognized the division for working with local residents and alliance members to ensure that improvements at the site would help restore and enhance Thornton Creek. An educational kiosk, which features a mosaic representation of the creek made of recycled glass, was placed overlooking the creek to display the key message that we all share the watershed and to describe the green building features of the station.

At the new station, commercial and self-haul customers use separate entrances and separate sections of the transfer building. Commercial and other large, automated-dump vehicles enter directly onto a flat receiving floor where they can unload garbage, organics, clean wood, and scrap metal. Self-haul vehicles enter onto a raised tipping floor. To dispose of garbage they back their vehicles to a safety wall and unload over the wall onto the lower receiving floor. Garbage is pushed into a compactor chute at the south end of the receiving

floor, which provides a gravity feed for one waste compactor located in the lower tunnel level of the station. The lower floor has provisions for the future installation of a second compactor if needed. Containers for recyclables such as scrap metal and appliances are located at one end of the building; chutes for recycling organics and clean wood are located nearby.

Rainwater collection system

In the transfer building, the large, flat-floor design gives the facility the ability to accept surges of waste. Waste can continue to be received even if all trailers on site are full. In an emergency, if the compactor is not functioning, solid waste may be loaded into trailers through top-load chutes. The maximum facility capacity is approximately 9,000 cubic yards on the receiving floor and 25 full trailers.

The Shoreline station was designed to maximize capacity to accept recyclables. The division collaborated with the host city and three other nearby cities to determine the list of materials to collect initially at the new station. A few materials added to the recyclables collected include organics (yard waste and food scraps), clean wood, and scrap metal. The station also has the built-in flexibility to accept additional or different recyclables as markets continue to develop and customer needs change.

To minimize possible traffic impacts of the transfer station on the host community, the division collaborated with King County's Metro Transit on an agreement with the Washington State Department of Transportation to allow solid waste transfer trailers to share Metro's dedicated access ramps to and from the adjacent Interstate 5. This arrangement will keep solid waste trucks off the neighborhood streets.

Public artwork at station entrance

In 1973, King County adopted legislation creating the 1% for Art program, whereby capital construction projects set aside 1 percent of the budget, less property cost, for above-grade portions of the project to fund public artwork. The artist selected for this project worked with the Shoreline/Lake Forest Park Arts Council, the 4 Culture Artist Selection Committee, the City of Shoreline, and the division to develop artistic design elements for the new station. The artist's design concepts call for us to question how our choices affect the environment and consider other uses for items before we throw them away.

In summary, the new Shoreline facility reflects a change in 1) how we approach the planning of new facilities – incorporating early community involvement; 2) how we build them – using the greenest elements possible; and 3) how we operate them – increasing recycling now, with the flexibility to expand as new markets emerge in the future.

The division is planning to build the new Factoria station on the existing site and two adjacent properties. The division is exploring options to maintain some level of service during construction of the new station. Final plans will be made when the station permitting and design are complete.

A new Northeast Lake Washington station will be sited and constructed to replace the existing Houghton station, while a new South County station will replace the current facility in Algona. The division is committed to closing the Houghton and Algona stations after the siting and construction process for the new stations is complete.

All new stations will be built to the same standards of service and sustainability as the new Shoreline Recycling and Transfer Station. While there will be some differences to accommodate community needs (e.g., Factoria will maintain a stationary household hazardous waste facility), all stations will have improved capacity, waste compactors, and additional space for recycling more materials. For each new station, the division will seek a Gold or higher LEED certification.

The new Shoreline transfer station also provides additional space and capacity to handle more organics than what comes in from self-haulers alone. One commercial collection company that collects curbside organics in Shoreline has begun bringing the organics directly to the Shoreline station, instead of transporting them to the Cedar Grove Composting facility. Organics are consolidated at the transfer station and then transported to Cedar Grove. This practice reduces truck travel time for the commercial collectors, thereby increasing overall efficiency. The division will explore the possibility of accepting organics from the commercial collectors at the other new stations wherever it proves to be more efficient.

The timeline for completing the siting, design, construction, and closure of the urban transfer stations is shown in Table 5-3.

Table 5-3. Timeline for the facility renovation plan

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bow Lake	Construct new station		Open new transfer building	Open completed transfer station					
Factoria	Design and permit station				Construct new station		Open		
South County	Site new station				Design and permit station		Construct new station		Open
Northeast Lake Washington	Site new station				Design and permit station		Construct new station		Open
Algona									Close
Houghton									Close
Renton									Close or modify operations[a]

[a] *Decision to close subject to evaluation after siting of the new South County transfer station.*

EVALUATION AND PLANNING FOR THE RURAL TRANSFER FACILITIES

Historically, the rural areas were served by small community landfills. As those landfills closed, most were replaced by either a transfer station or a drop box; the Duvall and Hobart landfills (near Maple Valley) were closed without replacement. Currently serving rural King County are two transfer stations – in Enumclaw and on Vashon Island – and two drop boxes – in North Bend (Cedar Falls) and Skykomish.

In 2007, the division applied the same 17 criteria used for the urban stations to the rural facilities. Because the drop boxes are essentially collection containers covered by roof structures, there is no building *per se* to evaluate, so many of the criteria did not apply. Criteria specific to the rural system were not developed because a preliminary look indicated that the rural facilities, for the most part, met the standards set for the urban system.

Countywide planning policy, FW-9 d. – *Rural Infrastructure and Service*, states that, "Rural residents outside cities should anticipate lower levels of public services and infrastructure than those available in Urban Areas, maximizing self-sufficiency and independence." However, the rural transfer stations provide essentially the same garbage and recycling services as the urban stations, although they may be open for fewer hours and days. To provide an appropriate level of service to area residents and the commercial collectors, the division's two rural transfer stations are currently open five days a week to the public and seven days a week to the commercial collection companies. The Cedar Falls drop box is open five days a week to self-haulers, and the Skykomish drop box is open seven days a week to self-haulers and the City of Skykomish.

The drop boxes are scaled-down facilities, designed to provide cost-effective, convenient drop-off services in the more remote areas of the county. The Skykomish drop box consists of two containers for garbage and a collection area for curbside recyclables. The Cedar Falls drop box has two containers for garbage, one container for yard waste, and a collection area for curbside recyclables; the facility also accepts textiles for recycling.

The Enumclaw Transfer/Recycling Station, which opened in 1993, serves the City of Enumclaw and southeastern King County. The City of Enumclaw provides its own garbage collection service and takes the waste to the Enumclaw transfer station, which is equipped with a waste compactor. Standard curbside recyclables, large appliances, reusable household goods, textiles, clean wood, and yard waste are collected for recycling. This station met all of the evaluation criteria, with the capacity to provide a wide range of services and the flexibility to respond to future needs. If additional capacity were needed at the station, it could be accomplished by increasing the hours of operation.

The rural Enumclaw station provides a wide array of recycling opportunities.

The Vashon Transfer Station opened in 1999 to serve residents and businesses on Vashon Island. This station accepts the standard curbside recyclables plus textiles and large appliances. Because of its remote island location, the facility accepts some C&D and special wastes for disposal that the other stations do not. The Vashon station met all but one of the evaluation criteria, including the presence of a waste compactor. The only criterion not met was the level of recycling services, because yard waste is not collected at the station. Past studies of customer needs at the Vashon station have indicated there is little demand for yard waste service at the facility, primarily due to the presence of private-sector services on the island and backyard composting; however, the division will reevaluate the need to add yard waste collection at the site. If additional solid waste capacity were needed at this station, it could be accomplished by increasing the hours of operation.

The Cedar Falls Drop Box provides garbage and recycling services to customers five days a week.

The Cedar Falls Drop Box, which opened in 1990, serves self-haulers in the North Bend area. Collection containers are provided for curbside recyclables, plus yard waste and textiles. This facility met all applicable evaluation criteria except for vehicle capacity, which is due primarily to heavy weekend use. Currently, there is only one scale shared by both inbound and outbound traffic, which can lead to backups on weekends when the station is most busy. The division is considering the addition of a second scale at the station to address heavy weekend use and an additional collection container, which could be used for garbage or yard waste. If needed, hours of operation could be increased to add weekday capacity at the site.

The most remote facility operated by the division is a drop box in the Town of Skykomish. Built in 1980, the drop box serves Skykomish and the communities of Grotto and Baring. Skykomish provides its own garbage collection service and takes the wastes to the Skykomish Drop Box. The drop box is also used by self-haulers. The Skykomish facility is unstaffed; payment is made at an automated gate using a credit or debit card, or by purchasing a solid waste disposal card from the division or at locations in Skykomish. There are cameras at the site to monitor activities, and division staff make regular visits to the site to perform maintenance. In addition, the King County Roads Department has a facility next door, from which Roads staff help monitor the site. The drop box met all the applicable evaluation criteria and appears to provide an appropriate level of service for the area. The facility received a new roof in 2008, after the old roof collapsed under record snowfall in January of that year.

Some rural area customers may be affected by changes to the urban transfer system, primarily self-haulers who currently use the Houghton or Renton transfer stations. Depending on where new urban facilities in Northeast Lake Washington and South County are eventually sited, they may or may not adequately

meet the service needs of these rural areas. Should it be necessary to provide additional facilities in these areas, the division may consider siting drop box facilities to serve the local area residents. Construction of regional transfer stations in these areas is not being considered as it would be inconsistent with countywide planning policy LU-21, which states, "Regional public facilities which directly serve the public shall be discouraged from locating in Rural Areas." The division recommends deferring decisions about whether to site drop boxes in these potentially underserved areas and whether to close the Renton transfer station until after the new urban transfer stations have been sited and the impact on service capacity has been fully evaluated.

HOST CITY MITIGATION

Transfer stations provide an essential and beneficial public service. The stations have the potential, however, to cause undesirable impacts on a community, such as increased litter, odor, noise, road/curb damage, and traffic, as well as aesthetic impacts. The division works to mitigate these impacts in a number of ways, such as collecting litter, landscaping on and around the site, limiting waste kept on-site overnight to reduce the potential for odor, making road modifications, and siting facilities on or near major roadways to keep traffic off local streets.

Eight cities in the division's service area currently have county-owned transfer facilities within their boundaries:

- **Algona** – the Algona Transfer Station
- **Bellevue** – the Factoria Transfer Station
- **Enumclaw** – the Enumclaw Transfer and Recycling Station
- **Kirkland** – the Houghton Transfer Station
- **Renton** – the Renton Transfer Station
- **Shoreline** – the Shoreline Recycling and Transfer Station
- **Tukwila** – the Bow Lake Transfer Station, and **SeaTac** – the Bow Lake station recycling area

As new transfer stations are constructed in the near future, the division will work with cities to build stations that are compatible with the surrounding community. For example, during the design of the new Shoreline Recycling and Transfer Station, the division worked closely with the community to identify impacts and mitigation measures for the surrounding community. One result is that transfer trailers drive directly from the station onto Interstate-5 using King County Metro Transit's dedicated freeway ramps, rather than using city streets for access. In addition, sidewalks on nearby streets were improved, a new walking path was constructed at nearby Ronald Bog Park, trees were planted, and the portion of Thornton

An educational kiosk at the Shoreline station highlights the importance of protecting Thornton Creek and its surrounding ecosystem.

Creek that flows through the site underwent significant restoration. The station building was also moved farther from residences and is now fully enclosed to mitigate impacts from noise, odor, and dust. While mitigation measures will vary depending on the site, all new transfer station buildings will be fully enclosed.

The division has also worked closely with the City of Bellevue on siting the replacement of the Factoria Transfer Station. A new facility was to be constructed on property to the south of and adjacent to the current station, that fronts Interstate-90 (I-90). However, as a result of discussions with Bellevue, the division has purchased two properties to the northwest of and adjacent to the current station, with the intention of building a new facility there. The division could then sell the property that fronts I-90, since it is viewed by the City of Bellevue as more desirable for commercial development.

Additionally, state law, RCW 36.58.080, allows cities or towns to charge counties "to mitigate impacts directly attributable to the solid waste facility: PROVIDED, That any city or town establishes that such charges are reasonably necessary to mitigate such impacts and that revenue generated from such charges is expended only to mitigate such impacts." No city or town has thus far charged King County for mitigation of impacts. The cost of mitigation beyond what the division is currently performing would need to be included in the solid waste rate.

An area of interest for cities is that the same state law that allows for mitigation of impacts directly attributable to a solid waste facility prohibits cities from charging tax to county-owned solid waste facilities or any other essential public facility. To compensate for potential lost tax revenues, it was suggested by the Interjurisdictional Technical Staff Group in a 2007 governance report (ITSG 2007) that the Business & Occupation Tax that King County currently pays to the State of Washington for transfer station operations be redirected to the host cities as a per ton fee. State law would need to be changed to allow for redirection of these tax revenues. The division is not pursuing this change.

TRANSFER FACILITY SITING

As described earlier in this chapter, identifying the need for new transfer facilities in the Northeast Lake Washington and South County service areas involved a comprehensive analysis of the transfer system network, with extensive involvement of the division's advisory committees. While this process identified general areas for site locations (Figure 5-5), it did not identify any specific sites or specific site selection criteria.

Technically, the siting of a transfer facility is based on operational needs and site constraints, such as site size and shape; however, a successful siting effort must also be tailored to address the needs and concerns of the service area communities. The siting process involves a number of steps – from development of site selection criteria to final selection of a site – and public involvement plays an important role each step of the way.

Through the ongoing meetings of the division's advisory committees, public meetings and workshops, and Citizens Advisory Committees (CACs), the public is given the opportunity to learn about and participate in the siting process. An effort is made to engage historically marginalized communities to enable them to

influence decisions, and to work closely with community partners who can both lead and support efforts that ensure fairness for all King County residents.

CAC members are volunteers recruited through letters of invitation to city staff and elected officials of the potential host and surrounding cities, Unincorporated Area Councils, the commercial collection companies, local environmental groups, and other community leaders, and through public meetings and announcements. The CAC helps assess site selection criteria, identifies community concerns and impacts, creates public awareness of the project, provides general review and input throughout the siting process, and has the opportunity to express opinions and preferences to county decision-makers.

Identifying potential sites is an active search for those properties that best match the desired site characteristics. A small number of sites are selected for environmental review. The environmental review, conducted in accordance with the State Environmental Protection Act, identifies potential adverse environmental impacts and reasonable mitigation measures.

Based on the environmental review, cost, community interests, and other established criteria, a preferred site can be selected.

The U.S. Environmental Protection Agency Identifies Siting Considerations

Siting a transfer facility is a multi-dimensional, multi-step process. The U.S. Environmental Protection Agency identifies the following issues that must be considered when siting solid waste facilities:

- Environmental and health risks – air quality and transportation
- Economic issues – effects on property values and construction and operating costs
- Social issues – equity in site choices, effects on community image, and aesthetics
- Political issues – local elections and the vested interests of community groups

(*Source: Sites for Our Solid Waste: A Guidebook for Effective Public Involvement*. 1990. U.S. Environmental Protection Agency; Office of Policy, Planning, and Evaluation; Office of Solid Waste.)

TRANSFER SERVICES AFTER AN EMERGENCY

Emergencies, including windstorms, floods, electrical outages, and snow and ice storms, affect the residents and businesses of the county and the transfer system nearly every year. The county is also vulnerable to significant events that could generate a high volume of debris, including major flooding, earthquakes, landslides, and volcanic eruptions. The debris generated by an emergency can threaten public health and hinder or complicate response and recovery work.

To minimize disruptions and provide for efficient management of emergency debris, the division is preparing a Debris Management Plan for unincorporated King County. The division is also collaborating with cities within the county to develop similar plans that will ensure a coordinated regional response to emergencies. The debris planning process is being conducted under the direction of the Seattle Urban Area Security Initiative (UASI), guided by the federal Homeland Security Department and the state of Washington's Emergency Management Division.

The division's Debris Management Plan stipulates that during emergency response and recovery, the roles within the King County solid waste system will remain the same. This means that the division will continue to accept municipal solid waste at the transfer stations to the extent possible and will maximize recycling in accordance with RCW 70.95.010 (8) and KCC Title 10. The transfer facilities will not be used for disposal of emergency debris that could be recycled.

The debris created by a larger event, such as an earthquake, would likely consist primarily of recyclable materials, such as concrete, metal, and wood. The division's Debris Management Plan is coordinated with emergency plans prepared by other jurisdictions to maximize the recycling of these materials. The division is working with the Regional Emergency Communications Center to coordinate public information and help cities and residents identify recycling options in preparation for and in response to emergency events. Recycling the majority of emergency debris will maximize the division's capacity to continue to handle municipal solid waste.

In the event of an emergency, transfer services may be suspended in the short term. The division's priorities are to:

1. Ensure the safety of staff and customers
2. Confirm the structural integrity of facilities and environmental control systems
3. Coordinate with the Regional Emergency Communications Center to determine any immediate needs for Solid Waste Division staff or equipment
4. Resume service

The division will attempt to maximize the use of existing transfer facilities after an emergency through operational measures such as increased staffing or hours. If some transfer facilities are closed or damaged as a result of the event, customers will be rerouted to remaining stations, and commercial haulers may be routed directly to the Cedar Hills Regional Landfill. Additionally, the division and the cities may establish temporary Debris Management Sites where debris can be stored until it can be sorted for recycling or proper disposal. It is recommended that potential sites in unincorporated King County and in cities be identified by each jurisdiction in advance of an emergency. The acceptance policies at these sites would be determined in response to the nature of the event and the debris that is generated.

The new Shoreline station has an overall facility capacity of 9,000 cubic yards on the receiving floor and 25 full trailers.

6

Landfill Management and Solid Waste Disposal

Landfill Management and Solid Waste Disposal

Policies

DS-1 Operate and maintain the Cedar Hills Regional Landfill to meet or exceed the highest federal, state, and local standards for protection of public health and the environment.

DS-2 Maximize the capacity and lifespan of the Cedar Hills Regional Landfill, subject to environmental constraints, relative costs to operate, and stakeholder interests.

DS-3 Monitor and maintain closed landfills to meet or exceed the highest federal, state, and local standards for protection of public health and the environment.

Landfill Management and Solid Waste Disposal

Summary of Recommendations

Responsibility		Action	Detailed Discussion
1	**County**	Monitor options for disposal once the Cedar Hills Regional Landfill reaches capacity and closes. Consider waste export to an out-of-county landfill, a waste-to-energy facility(ies), and other disposal or conversion technologies, to handle all or a portion of the county's waste.	Page 6-2, 6-9
2	**County**	Evaluate partial early waste diversion considering effects on system costs versus benefits.	Page 6-2, 6-9
3	**County**	Explore beneficial reuse options for closed landfills, designing monitoring and environmental systems that will facilitate reuse of the properties and provide continued benefit to the surrounding communities.	Page 6-18
4	**County, cities, tribal governments**	To prepare for potential emergencies, work with state and regional authorities to coordinate a Debris Management Plan for King County.	Page 6-20

LANDFILL MANAGEMENT AND SOLID WASTE DISPOSAL

Solid waste generated in King County is disposed of at the Cedar Hills Regional Landfill – the only active landfill remaining in the county. Located on a 920-acre site in the Maple Valley area, Cedar Hills has provided for the safe and efficient disposal of the county's solid waste since 1965. In 2008, the landfill received about 930,000 tons of municipal solid waste.

The Cedar Hills Regional Landfill has been in operation since the early 1960s.

Estimates in the *Final 2001 Comprehensive Solid Waste Management Plan* (2001 Solid Waste Plan) indicated that Cedar Hills would reach its permitted capacity and close in 2012. This projected closure date has been extended to 2018, however, through the implementation of best management practices in daily landfill operations, natural settling of the waste through decomposition, ongoing waste prevention and recycling, and recent declines in tonnage attributable to the economic downturn.

A comparative evaluation of alternative disposal options (R.W. Beck 2007) indicates that disposal at the Cedar Hill Regional Landfill is the most economical way to handle King County's solid waste. It is significantly less expensive than the projected costs of other disposal options, including transporting waste to an out-of-county landfill or constructing a waste-to-energy or other waste conversion facility. By extending the life of the landfill and delaying the transition to a new disposal method, the county will be able to delay the unavoidable rate increases that will be needed to accommodate this transition.

The *Solid Waste Transfer and Waste Management Plan* (Transfer Plan) approved by the King County Council in December 2007 contains the following recommendation for the future of the landfill:

> Explore opportunities for taking advantage of available landfill capacity to extend the life of this cost-effective disposal option; revise the *Cedar Hills Site Development Plan* and seek to maximize the capacity (lifespan) of the landfill, subject to environmental constraints, relative costs to operate, and stakeholder interests

Under this direction, the division has begun the process of updating the 1998 Cedar Hills Regional Landfill Site Development Plan (Site Development Plan). Five action alternatives to add capacity to the landfill and a no action alternative have undergone comprehensive environmental review as required by the State Environmental Protection Act (SEPA). A draft environmental impact statement (EIS) is expected to

The landfill area has been developed in sequential stages over time.

be issued in fall 2009. The draft EIS outlines the environmental impacts of each alternative and potential mitigation measures for any adverse impacts. After review of comments to the draft EIS, a final EIS will be prepared and issued around the end of 2009. Based on the environmental review, operational feasibility, and cost, a preferred alternative will be identified and recommended to the King County Council for approval. The updated Site Development Plan is being developed concurrently with this draft plan. Information on the results of the EIS and the final alternative selected for landfill development will be presented in the final version of this plan.

Consistent with the recommendation to extend the life of Cedar Hills, the division will also consider the benefits of diverting a portion of the waste stream from Cedar Hills to another disposal option(s) before the landfill closes. Partial early diversion would further extend the life of the Cedar Hills landfill and would provide an opportunity to assess other options before it is necessary to make a final decision. If the division were to implement early waste diversion, a wide range of disposal options would be evaluated, including export to an out-of-county landfill and waste-to-energy technologies. A decision about whether to proceed with partial early diversion will be made after the revised Site Development Plan is complete.

Even with a sound landfill development alternative and other strategies to extend the life of Cedar Hills, it is likely to reach capacity and close within this 20-year planning period. In the 2001 Solid Waste Plan, county policy stated "the county should not seek to site a replacement landfill for the Cedar Hills regional landfill" and directed that the county "initiate solid waste export" and "contract for long-term disposal capacity at an out-of-county landfill" to handle the county's waste when Cedar Hills reaches its permitted capacity. While waste export to an out-of-county landfill is still a viable alternative, there are current and emerging conversion technologies that might also offer viable alternatives for handling all or some components of King County's waste in the future. As the timeframe for landfill closure approaches, the division will continue to monitor both landfill capacity and advancements in waste conversion technologies.

This chapter provides a brief background of the Cedar Hills landfill, a discussion of strategies and options for extending the life of the landfill, a snapshot of the range of potential disposal options after Cedar Hills closes, and an outline of criteria that would be used to screen options for future disposal and partial early waste diversion. The final sections of the chapter address the restoration of closed landfills, disposal of special wastes, and disposal in an emergency.

BACKGROUND OF THE CEDAR HILLS REGIONAL LANDFILL

The Cedar Hills Regional Landfill was originally permitted in 1960 by the King County Board of Commissioners, at a time when there were few regulations in place to govern the design and operation of landfills. Since then, environmental regulations have become increasingly rigorous, requiring the placement of an impermeable,

high-density polyethylene liner and clay barrier at the bottom of the landfill, daily cover (using soil or other approved materials) over the waste, and frequent environmental monitoring, among other requirements.

Over time, the Cedar Hills landfill has been developed in sequential stages (or refuse areas) in accordance with the most current Site Development Plan. The division has invested considerable effort and resources to upgrade older areas of the landfill, while designing and operating new areas to meet or exceed regulatory requirements. Figure 6-1 shows the layout of the landfill, including the boundaries of the past, active, and future refuse areas as currently permitted. As shown, Area 6 is the currently active refuse area, and Area 7 is the last refuse area permitted for development at this time. The transition from Area 6 to Area 7 is expected to occur in late 2009 to 2010.

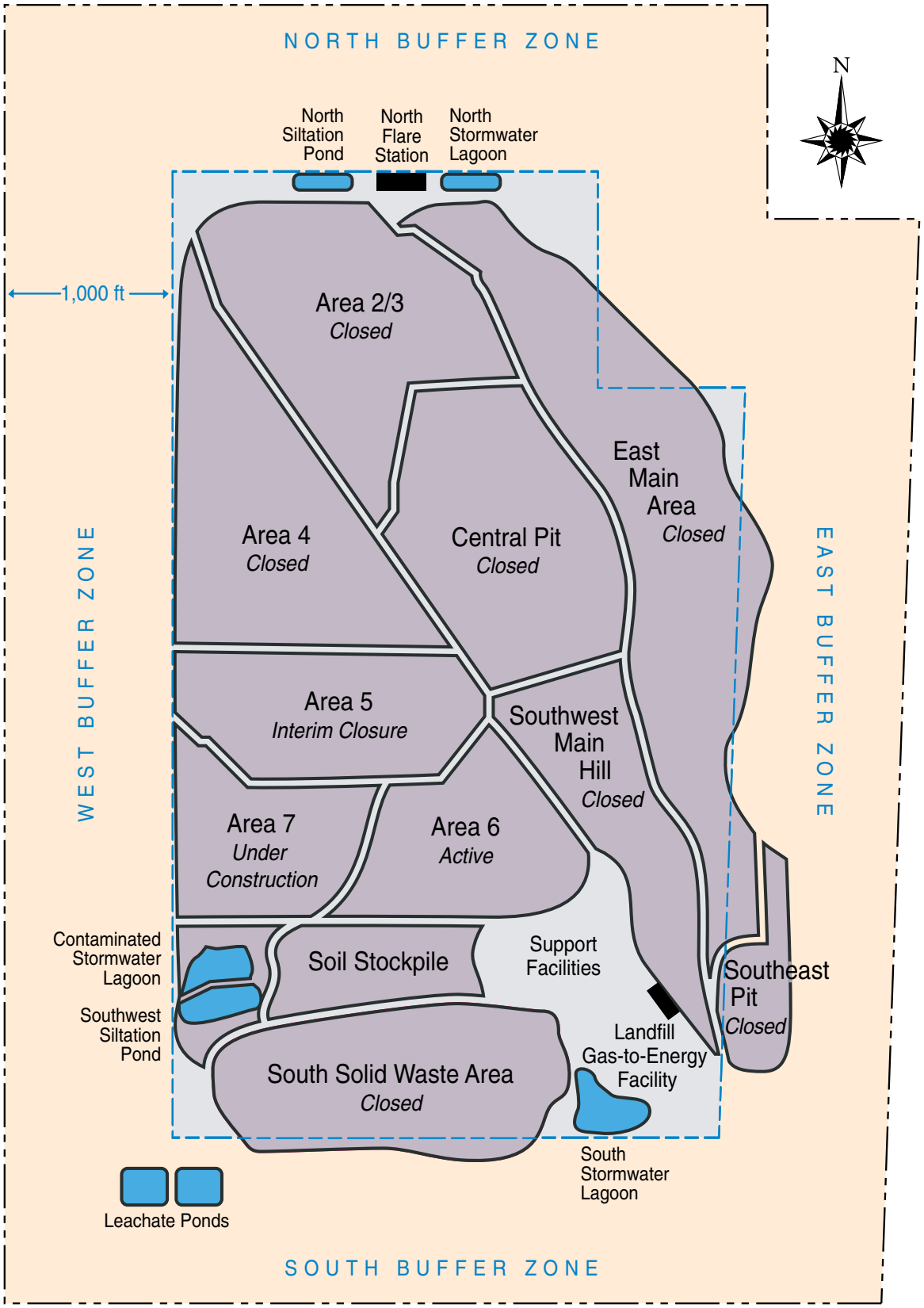
The landfill is bordered by residentially zoned property on the north, west, and east, and by property to the south that is zoned for mining, other resource extraction, and similar uses. State regulation WAC 173-351-140(3)(b) requires a 250-foot buffer between the active area and residentially zoned property, and a 100-foot buffer between the active area and non-residentially zoned property. However, a special use permit issued in 1960 specified that a 1,000-foot buffer be established around the landfill and left in its natural condition. Use of this buffer zone is currently limited to site access and approved uses not directly related to landfilling operations, such as environmental monitoring.

In the last 10 years, the landfill has received national recognition for its operations. The landfill's environmental control systems, for both older and newly developed areas, are operated and maintained to meet or exceed the highest federal, state, and local standards for protection of public health and the environment. This complex network of environmental controls consists of collection pipes, culverts, and holding ponds to manage water and landfill gas.

Leachate from the landfill is pretreated in an aeration pond before being sent to a wastewater treatment plant.

Rainwater and other water at the landfill is separated into two categories for treatment – contaminated stormwater, which includes leachate and other water that has potentially come into contact with garbage, and clean stormwater. Leachate is produced when water percolates through the garbage; it is collected in pipes within the landfill and diverted to on-site ponds. In the ponds, the leachate is aerated as a preliminary treatment before being sent to a wastewater treatment plant. The bottom liner and clay barrier beneath the landfill prevent leachate from seeping into the soil or groundwater. Stormwater that runs off the surface of active landfill areas is also potentially contaminated; therefore, it is collected in lined ponds before moving on to the treatment system. Clean stormwater is diverted to detention or siltation ponds to control flow and remove sediment, and is then discharged to surface water off-site.

Figure 6-1. Current layout of the Cedar Hills Regional Landfill



An extraction well collects gas from the landfill and routes it to the new landfill gas-to-energy facility for conversion to marketable natural gas

Landfill gas is generated through the decomposition of waste buried in the landfill. The gas consists of about 50 to 60 percent methane and about 40 to 50 percent carbon dioxide, with less than 1 percent hydrogen, oxygen, nitrogen, and other trace gases. Prior to 2009, the landfill gas from Cedar Hills was collected in a series of pipes and routed to high-temperature flares, where it was burned to safely destroy any harmful emissions. Now, the gas is routed to a new landfill gas-to-energy facility where it is run through a series of processors that remove and destroy the harmful components and convert the methane portion of the gas into pipeline-quality natural gas. The clean gas is routed to a nearby gas line and into the Puget Sound Energy grid. With the new energy facility in operation, the landfill gas flare system is no longer in regular operation, but is kept in standby mode for use during maintenance of the energy facility or in the event of an emergency. Air emissions from the flare system have been tested regularly and meet or exceed all applicable environmental regulations.

Conversion of Landfill Gas to Green Energy

In May 2009, a landfill gas-to-energy facility began operations at the Cedar Hills landfill to convert methane gas into pipeline-quality natural gas. The gas-to-energy facility, owned and operated by the private firm Bio Energy Washington, is expected to generate enough natural gas to supply about 24,000 homes with energy. The facility will also contribute energy to support plant operations.

Because the converted methane gas from the landfill replaces an equal amount of natural gas from a non-renewable source, the landfill gas-to-energy project results in an overall reduction of emissions, including greenhouse gas emissions. The estimated annual reduction in carbon dioxide from converting the landfill gas to natural gas is roughly equal to the annual carbon dioxide emissions from 22,000 average passenger cars. This translates into an estimated 63 percent reduction in the carbon footprint of the landfill. The landfill gas-to-energy project also reduces nitrogen oxide and sulfur dioxide emissions.

EXTENDING THE LIFE OF THE LANDFILL

Portions of Area 6 are being prepared for closure with the placement of a soil and geosynthetic layer over the garbage.

The Cedar Hills landfill is a valuable asset to King County. Continuing to use the landfill for as long as reasonably possible will keep rates lower until the county transitions to another disposal option in the future. To maximize the benefit of the landfill, the division is pursuing three primary strategies:

- Operational efficiencies
- New area development
- Diversion of waste

These three strategies seek to extend the life by increasing landfill capacity and density, which are defined as follows:

- **Landfill capacity** – the amount of space available in which to place waste. Landfill capacity is the amount of space, often referred to as airspace, which is permitted and available for disposal of waste. It is calculated based on the height, footprint, and slopes of the landfill.

- **Density** – how tightly materials are packed together, in this case solid waste in the landfill. A higher density means more waste packed in a designated space. The density of solid waste within the landfill is a function of both natural processes and operational practices. Density is increased as waste is compacted by heavy machinery on the face of the landfill and by the natural settling that occurs over time as solid waste decomposes.

Operational Efficiencies

During the last six years, the division has made a series of operational changes to increase landfill capacity and density. These changes include reducing the amount of soil and rock buried in the landfill, using more efficient unloading and compaction equipment, and taking advantage of natural settlement. Some of the key efficiencies are described below:

- In the past, six inches of compacted soil was used to cover the entire surface of the active solid waste disposal area at the end of each working day. Daily cover serves to control litter and discourage foraging by animals, such as rodents and birds; however, the use of soil can consume valuable landfill space. Therefore, in 2005, the division began using retractable tarps to cover most of the waste at the end of each day to reduce the amount of soil buried in the landfill; the tarps serve the same function as the daily soil cover. At the start of each day's operations, the tarps are rolled up, and more solid waste is placed directly on top of the previous day's waste. Soil is still used to cover side slope areas; however,

as much of this soil as possible is removed before more waste is placed, and the soil is then reused. Together, these practices have resulted in a reduction of the volume of soil buried in the landfill.

The Tarp-O-Matic covers the working face of the landfill at the end of each day.

- In December 2008 the division began using tippers to empty trailers rather than the walking floor trailers previously used. Walking floor trailers require a large, rock-covered surface for the trucks to drive on as the walking floor rolls the garbage out the back of the trailer. However, these large rock surfaces are not required with the tippers. Instead, the garbage trailers are backed onto the tipper, which tilts the trailer, allowing the garbage to slide out of the back and into the refuse area. The use of tippers not only reduces the use of rock, it decreases unloading time for each trailer by as much as half and reduces equipment and tire damage.

Side-by-side tippers greatly reduce the time required for unloading garbage trailers at the landfill.

- Over the last several years, the division has also begun using heavier equipment and improved methods to increase waste compaction. Packing the waste to a greater density allows more airspace for additional solid waste in each landfill area.

- Another strategy for increasing landfill capacity is taking advantage of the natural settlement that occurs as waste placed in each area decomposes. As this natural settling occurs, the level of the landfill drops below the permitted height, allowing more waste to be added to bring the height of a previously filled area back up to its planned level. To take advantage of this natural settlement, the division has delayed final closure of Area 5, and will delay final closure of Areas 6 and 7, to allow settling to occur so that additional waste can be added before final cover is applied.

With these operational changes, more solid waste can be placed within the already designed and permitted refuse areas, without further expansion of the landfill. The division will continue to pursue these and other best management practices that preserve airspace and add capacity to the landfill.

New Area Development – Updating the Site Development Plan

The Site Development Plan is the blueprint for managing the landfill. For the update to the 1998 plan, five development alternatives were selected for evaluation that would extend the life of the landfill an additional 3 to 13 years beyond the currently projected closure date of 2018. The draft EIS, with results of the environmental review under SEPA, will be issued in fall 2009. Updates on the current status of the Site Development Plan can be found at http://*your.kingcounty.gov/solidwaste/facilities/cedar-hills-development.asp*.

Before selecting the five alternatives examined in the draft EIS, a wide range of options to add capacity to the landfill was reviewed, including recommendations made by a private consultant, Gershman, Brickner & Bratton, Inc. (GBB). The GBB recommendations came from a study that was initiated by the King County Council to obtain an independent third-party review of the Transfer Plan (GBB 2007). GBB recommended 1) exploring the construction of berms or walls to increase the space available for filling and 2) reducing the surrounding buffer to the statutory minimum (250 feet between the landfill and residentially zoned property and 100 feet between the landfill and non-residentially zoned property) instead of the 1,000-foot buffer maintained currently.

The division's evaluation of GBB's recommendations indicated that adding walls or berms to previously filled areas would not be cost effective at this time. Areas built prior to Area 5 were constructed under less stringent regulations; therefore, adding waste to these areas would require the addition of a new liner over the previously filled area, at a cost much higher than the added value. Additionally, construction of walls or berms around already developed areas of the landfill would have substantial impacts on the environmental control and monitoring systems that are in place, adding even more to the cost. One alternative considered in the Site Development Plan update includes a mechanically stabilized earthen wall (a soil wall constructed with artificial reinforcement), which would allow more waste to be placed in that area.

Previous Site Development Plans evaluated use of the buffer for landfilling and other purposes, but those alternatives were rejected because of the potential for unavoidable adverse impacts, including noise, dust, and loss of wildlife habitat. A newer consideration in preserving the buffer zone is climate change; much of the buffer zone is heavily wooded, providing a carbon sink that offsets the effects of greenhouse gases in the environment. Other constraints to expansion in the buffer zone include steep slopes, wetlands, potential conflicts with easements for the natural gas pipeline and Bonneville Power Administration power lines, operational limitations, and cost.

After taking into account known environmental impacts, physical constraints such as wetlands and steep slopes, and the minimum space required to build an operationally feasible landfill area, two potential landfill areas within the buffer zone were identified. However, a preliminary evaluation indicated that development in these areas would result in unacceptable noise impacts for some residents. Therefore, development in the buffer zone was eliminated from consideration. Alternatives that were evaluated

included a number of non-landfilling activities that could be located within the buffer zone, particularly to the south, which is bordered by non-residentially zoned land.

Diversion of Waste

Reducing the amount of waste delivered to the landfill (waste diversion) is one of the more effective strategies for extending landfill life. The division will continue to practice current methods of waste diversion and may implement future strategies, as discussed below.

Current Strategies for Waste Diversion

Waste is currently diverted from Cedar Hills through two primary methods – waste prevention and recycling (WPR) and a ban on the acceptance of most construction and demolition debris (C&D).

WPR efforts have proven a successful strategy for extending the life of the landfill. Between 1988 and 2008, an estimated 10 million tons of materials that would otherwise have been disposed in the landfill were recycled, extending the landfill's life by approximately 10 years. Without the successful efforts of WPR, it is estimated that the Cedar Hills landfill would have reached capacity in December 2006. If the region achieves the goals established for WPR by 2015, as set forth in this plan (see discussion in Chapter 3, *Waste Prevention and Recycling*), these efforts would add approximately one more year to the life of the landfill between 2009 and 2015.

Banning most C&D debris from the Cedar Hills landfill has also contributed to extending landfill life. Since the disposal ban in 1994, an estimated 2,937,000 tons of C&D debris has been diverted from the landfill.

Future Strategies for Waste Diversion

As mentioned in the introduction to this chapter, the division will examine the feasibility of diverting a portion of the solid waste stream to another disposal option(s) while the landfill is still in operation. Possible options could include transporting waste to an out-of-county landfill or implementing waste-to-energy or other conversion technology. A cost/benefit analysis would precede any decision to pursue early diversion, followed by a thorough evaluation of environmental, social, and economic criteria for any proposed implementation strategies.

DISPOSAL OPTIONS ONCE CEDAR HILLS CLOSES

When the Cedar Hills landfill reaches capacity and closes, the county will no longer own or operate a disposal facility. The county is not considering the development of a replacement landfill either in King County or in another county. Conditions in King County – such as land availability, environmental considerations, public acceptance, cost, and other issues – would make siting a replacement landfill in

King County difficult. With the large amount of already developed landfill space in the Pacific Northwest, siting a landfill elsewhere in Washington is not practical.

With approximately one million tons of solid waste to dispose annually, there has been considerable interest from the private sector in handling the county's waste after the Cedar Hills landfill closes. There are three national disposal companies with competitive landfill capacity within one day's rail haul, and additional potential competitors farther away. In addition, a growing number of companies have shown interest in providing disposal service through a range of other options, including waste-to-energy and other conversion technologies.

In 2007, the division hired a private consulting firm, R.W. Beck, to study future waste disposal options for the county (Conversion Technology Report; R.W. Beck 2007). The report provides a preliminary look at a wide range of technologies, with an emphasis on three technologies that offer commercially proven systems – mass burn waste-to-energy, refuse derived fuel, and advanced thermal recycling, and compares them with waste export to an out-of-county landfill. Key conclusions of the report are as follows:

- The three conversion technologies and the waste export disposal option are each capable of handling the quantity and composition of the King County waste stream while meeting all applicable regulatory requirements.
- The conversion technologies are compatible with increased county recycling efforts up to a 70 percent recycling rate.
- The conversion technologies are slightly more expensive than the waste export disposal option.
- An informed decision on disposal options will require a more detailed analysis to refine conclusions and evaluate specific characteristics.

The Conversion Technology Report was not intended to provide a recommended disposal option once the landfill closes, but rather to provide a starting point for evaluating the wide range of alternatives. The technologies reviewed will need further monitoring, evaluation, and consideration, as they are rapidly changing and developing, the costs can fluctuate significantly over time, and the Cedar Hills landfill will be in operation through at least 2018. Given these conditions, a decision about which disposal alternative or alternatives will be the most efficient, environmentally sound, cost-effective, and publicly acceptable when

the Cedar Hills landfill closes will likely not be made during this six-year planning period. The division will continue to monitor existing and emerging technologies for consideration in the future.

What follows is a discussion of potential disposal options to consider once the Cedar Hills landfill closes and/or for diversion of a portion of the waste stream while the landfill is still operating. This list is likely to evolve over time as technologies emerge and are tested.

Export to an Out-of-County Landfill

Previous county policy established export to an out-of-county landfill as the choice for disposal after closure of the Cedar Hills landfill. While this plan recommends that other options be considered as well, export to an out-of-county landfill continues to be a viable alternative. A properly run landfill is an environmentally sound method of solid waste disposal. In the Pacific Northwest, existing landfill space is plentiful enough to handle the county's solid waste for many years to come, as shown in Table 6-1. There are at least four landfills currently available in the western U.S., with two additional landfills expected to be open around 2010.

Export to an out-of-county landfill would require contracting with a private disposal company. Rail transport is the most likely mode of transport, so an intermodal facility, where solid waste containers are transferred from trucks onto rail cars, would be needed. This service could be part of the contract and obtained by the disposal company, or the division could obtain intermodal capacity on its own or develop its own intermodal site. The ability to access both railroad lines that serve King County – Burlington Northern Santa Fe Railway and Union Pacific – would increase the potential for competition among the private landfills, and thus likely have a positive effect on rates.

To preserve the option to develop its own intermodal site, the county purchased property on Harbor Island in Seattle, which has access to both rail lines. The previously approved Transfer Plan recommended continuing to monitor local intermodal capacity and retaining the Harbor Island property as a potential option for an intermodal site.

The Harbor Island property has access to the region's two rail lines.

Table 6-1. Potential locations for out-of-county landfill disposal

Landfill Name	Location	Owner	Miles from Seattle	Total Permitted Capacity (tons)	Remaining Capacity (2009)	Opening Year	Estimated Closure
Active Landfills							
Columbia Ridge Landfill and Recycling Center	Gilliam County, OR	Waste Management	325	221,875,000	201,000,000	1990	2135+
Roosevelt Regional Landfill	Klickitat County, WA	Allied Waste Industries dba Regional Disposal Co.	330	244,600,000	205,000,000	1990	2075+
Finley Buttes Regional Landfill	Morrow County, OR	Waste Connections	352	124,000,000[a]	117,000,000	1990	2100+
Simco Road Regional Landfill	Elmore County, ID	Idaho Waste Systems	628	210,000,000[b]	200,000,000+	2000	2100+
Landfills Permitted, Not Operating							
Eagle Mountain Landfill	Riverside County, CA	L.A. County Sanitation Dist.	1,325	708,000,000	708,000,000	~2010	2125
Mesquite Regional Landfill	Imperial County, CA	L.A. County Sanitation Dist.	1,420	600,000,000	600,000,000	~2010	2110

[a] *Finley Buttes has the potential to expand to a permitted capacity of 400 million tons.*
[b] *Simco Road Regional Landfill is currently expanding to a permitted capacity of 420 million tons.*

Conversion Technologies

A conversion technology is defined in the Conversion Technology Report as "a process which converts solid waste from a waste product to a useful form of energy and/or useable byproduct, generally with some residual, unusable component that must be sent for disposal." For the purposes of the study conducted by R.W. Beck, it was assumed that the county would select a single facility with the ability to handle about 3,200 tons of waste per day. Since the report was produced, however, the county has concluded that a combination of disposal methods for specific components of the waste stream should also be further evaluated.

Conversion technologies have various requirements in terms of the size of materials (or feedstock) they can process, the amount of materials they can process per day, and, in some cases, the types of materials they process. With most technologies, for example, metals must be extracted from the feedstock prior to processing. Some processes require that materials be shredded or otherwise reduced in size to between 2 and 12 inches before processing.

The Conversion Technology Report identified three proven thermal conversion technologies that would produce energy and could manage the county's entire waste stream – mass burn waste-to-energy, refuse derived fuel, and advanced thermal recycling. Thermal technologies, also known as incineration, use high-temperature combustion systems to convert refuse to energy in a controlled environment. These three technologies were identified as having sufficient operating experience in handling the volume of solid waste generated in the county. In addition, each has the demonstrated ability to meet permit requirements for air quality and to produce a manageable amount of ash or residue that can be properly disposed of or potentially reused. More detailed information is contained in the Conversion Technology Report (R.W. Beck 2007).

In addition to the established thermal conversion technologies, the report identified a number of other thermal, biological, and chemical technologies, some established and some emerging, that could handle all or specific components of the county's waste stream. Below is a sampling of these types of technologies.

Anaerobic Digestion – Anaerobic digestion is a biological process that breaks down organic molecules into methane and carbon dioxide. A useful product of anaerobic digestion is biogas (methane and carbon dioxide), which can be burned to generate steam and electricity. In addition to generating gas, anaerobic digestion produces a residue that contains inorganics, non-degradable organics, and other materials. Following the digestion process, these solids may be cured in standard composting type processes to produce a usable compost product.

Catalytic Cracking – Catalytic cracking is a thermo-chemical conversion process that breaks down polymers, such as plastics, into their basic unit, called a monomer. The monomers can then be processed to produce fuels such as low-sulfur diesel and gasoline.

Gasification – Gasification is an emerging thermal technology. While there are a number of facilities operating worldwide, there are no facilities using gasification to process solid waste in the U.S. During gasification, chemical reactions can be controlled to produce different products. For example, the gases produced can be cleaned and used as fuel, or can be used to produce chemicals such as methanol, ethanol, and other fuel liquids.

Pyrolysis – Pyrolysis is a thermal process that produces oils and fuel gases from organic materials, which can be used directly as boiler fuel or refined for higher quality uses such as engine fuels, chemicals, adhesives, and other products.

Steam Classification/Autoclave Technology – Autoclave technology is currently used for the management of medical waste and has had limited use in the disposal of solid waste. Through exposure to a combination of temperature, moisture, pressure, and agitation, the waste is sterilized and its volume reduced. Once processed, some of the remaining waste can be separated and recovered. Specifically, pulp from paper and other fiber-based waste can potentially be reused by box-makers or combusted as refuse-derived fuel. Most non-recoverable waste is reduced in volume by 50 to 60 percent and is intended to be safe for landfilling.

Thermal Depolymerization – Thermal depolymerization is a process that reduces complex organic materials into crude oil. It is similar to the processes that occur in nature to create fossil fuels, but requires only hours to be completed. Also produced in the process are fatty acid oils used in various cleaners and pharmaceuticals, and minerals used in fertilizer products. This technology is currently being used to process agricultural and food-processing waste.

Waste-to-Ethanol – Waste-to-ethanol is a technology used to break down the organic portion of the waste (paper, food scraps, yard waste, etc.) into sugars, which are then distilled into ethanol.

The division is committed to the continued exploration of both emerging technologies and advancements in established disposal methods.

Screening and Evaluation Criteria for Disposal Options

The division has developed draft criteria by which disposal options may be screened and evaluated when making future decisions. The screening and evaluation criteria fall into six categories, each with a number of sub-categories. Specific requirements can be developed based on these criteria when it is time to make selections for partial waste diversion and disposal after Cedar Hills reaches capacity and closes.

- **Environmental**
  - Human health
  - Climate change
  - Air quality
  - Water quality
  - Energy production
  - Resource conservation
  - Compatibility with waste prevention and recycling

- **Social**
  - Environmental justice
  - Social justice/equity
  - Effects on livability and character of communities

- **Economic**
  - Capital cost
  - Financing
  - Operating cost
  - Revenue generated
  - Risk

- **Availability**
  - Capacity
  - Start date
  - Operating life of facility
  - Siting, design, permitting, and construction requirements
  - Operating and maintenance personnel
  - Financial assurance and insurability

- **Operating history**
  - Proven performance
    - Ability to handle amount of waste
    - Operator record
    - Safety record
    - Regulatory compliance
  - Regulatory requirements
  - Ability to respond after an emergency
  - Ability to provide performance guarantees

- **Contract and operational requirements**
  - Minimum level of waste required
  - Composition of waste required
  - Contract flexibility
    - Length of commitment required
    - Opportunity for contract reopeners
  - Waste not accepted/ability to handle special waste
  - Residue disposal requirements
  - Compatibility with waste prevention and recycling
  - Compatibility with current collection and transfer systems

RESTORATION OF CLOSED LANDFILLS

The division maintains responsibility for nine closed landfills located throughout King County (Figure 6-2). The landfills were operated by King County and closed at various times between the mid-1960s and 1999. All of the closed landfills were thoroughly investigated; all findings were reported to the proper county, state, and federal agencies; where necessary, remedial actions were taken; and the division has continued to monitor the sites to ensure that they do not pose a risk to human health or the environment. None has required listing under the state Model Toxics Control Act, or the federal Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund.

Post-Closure Monitoring and Maintenance

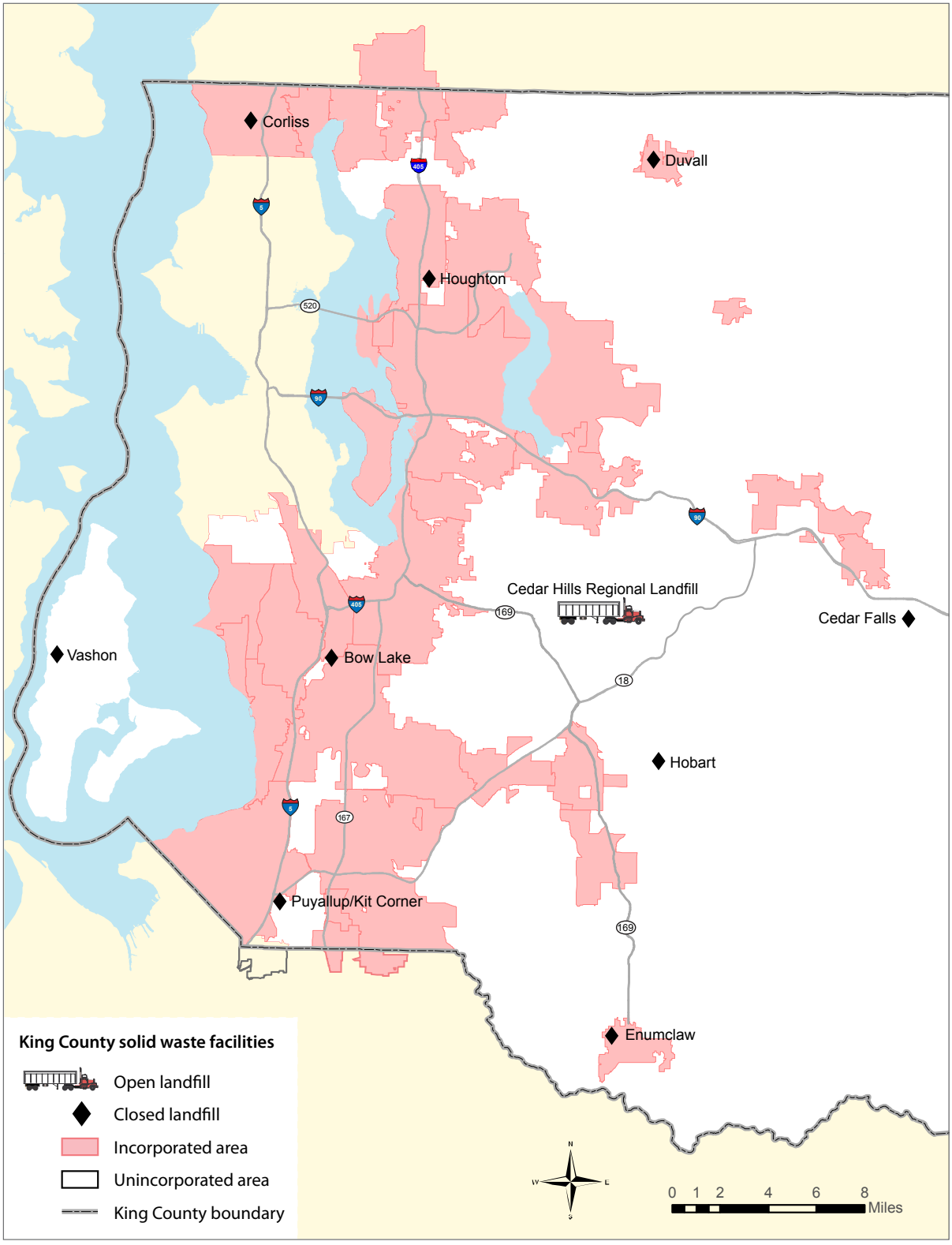
At seven of the nine closed landfills, the division routinely monitors groundwater, surface water, wastewater, and landfill gas; the Bow Lake and Corliss landfills have reached a stable state and no longer require monitoring. Under the current monitoring program, sampling data are collected from more than 180 groundwater, surface water, and wastewater monitoring stations, and approximately 100 landfill gas monitoring stations. These data are summarized in quarterly and annual reports submitted to the Washington State Department of Ecology and Public Health – Seattle & King County (the Health Department). The Health Department also routinely inspects all of the closed landfills.

The closed landfills were constructed under different standards than those that guide landfill development today. With the exception of portions of the Vashon landfill constructed after 1989, they are unlined and do not, in most cases, incorporate all of the environmental control systems present in a modern landfill. Thus, the unique characteristics of each site – in particular the underlying geology, what lies downstream, and the waste that was originally placed in the landfill – play an important role in the post-closure needs of the site. These factors also influence the need for ongoing monitoring. As the closed landfills reach the end of their required post-closure periods, each will be evaluated to determine what level of ongoing monitoring is necessary. In some cases, there may be no need to continue monitoring; at other sites, monitoring may continue at a reduced frequency and for a reduced range of constituents.

Over the years, environmental controls have been added at many of the closed landfills as determined by monitoring results. Additionally, most sites have been capped, with either composite cover systems or vegetative cover. At the Hobart landfill a subsurface slurry wall was constructed, which effectively acts as a liner to keep contaminated water from leaving the site. At the Corliss landfill, waste was removed when the Shoreline Recycling and Transfer Station was built. Waste is being removed from the Bow Lake landfill now as the new station is being built.

When the Cedar Hills Regional Landfill reaches capacity and closes, the bottom liner, capped top, and extensive gas and water control systems will inhibit releases to the environment for many years. Applicable regulations will define the post-closure period (currently 30 years). Landfill closure is guided by the Resource Conservation and Recovery Act, Title 40, Subtitle D, Part 258, Subpart F – Closure and Post-Closure Care and Washington Administrative Code 173-351. It specifies that the post-closure period must be 30 years, although that period may be shortened or lengthened based on the necessity to protect human health and the environment. After the post-closure period, there is expected to be some reduced level of

Figure 6-2. Locations of closed landfills



monitoring and care to ensure the integrity of the cap and other environmental controls. A recent study by the Solid Waste Association of North America Applied Research Foundation (*The Long-Term Environmental Risks of Subtitle D Landfills*; SWANA 2008) concludes that, "For a closed landfill with a fully functional final cover system or one where only minor breaches have occurred, the environmental and public health threat is likely to be relatively minor."

Beneficial Reuse of Landfill Properties

The county continues to examine possibilities for the beneficial reuse of closed landfill properties. While the presence of monitoring equipment at these landfills can limit the types of beneficial reuse projects that can be implemented, the county has been successful in converting several properties wholly or in part to new purposes:

- **Houghton landfill** – Athletic fields were developed on the former Houghton landfill site. The division's environmental investigations, which were independently verified by the Health Department, the University of Washington, and the U.S. Environmental Protection Agency, found that no health or safety threat would be posed by using the covered landfill for recreation.
- **Hobart landfill** – Model airplane enthusiasts and an astronomy club use the open spaces of the Hobart landfill.
- **Duvall landfill** – The county installed an 800-MHz radio tower outside of the refuse boundary of the Duvall landfill as part of its Emergency Communications Project.

Trees and vegetative cover at the Duvall landfill help reduce carbon dioxide (a greenhouse gas) in the atmosphere through the natural process of photosynthesis.

In addition, the open spaces at closed landfills provide habitat for diverse species of plants and animals, often providing open grassy areas surrounded by woods. Closed landfills that currently provide homes to healthy populations of wildlife are Cedar Falls, Duvall, Hobart, Puyallup/Kit Corner, and Vashon. Vegetative covers have been placed over all the landfills, engineered to suit the naturally occurring features and areas of potential enhancement at the properties. Habitat enhancement at the Duvall and Puyallup/Kit Corner properties includes planted trees and other vegetation to improve ground cover and water quality, as well as perches and nesting boxes for hawks and owls. The Cedar Falls and Duvall landfills are near the headwaters of large streams and provide cover and a source of food for birds. Managing these properties as green space helps support the county's goals and policies for habitat preservation and increases carbon sequestration (i.e., reduces the total carbon emissions) at the properties.

The closed South Park landfill, formerly operated by the City of Seattle and owned by King County, is now one of the largest vacant parcels of industrial land left in south Seattle. In 2005, King County transferred ownership of the 19.4-acre landfill property to South Park Property Development. Development there is expected to bring new jobs to the South Park community.

The county will continue to explore beneficial reuse options for closed landfills, designing monitoring and environmental systems to facilitate reuse of the properties and provide continued benefit to the surrounding communities.

DISPOSAL OF SPECIAL WASTES

Most of the waste delivered to the division's facilities is municipal solid waste (garbage) from residential and non-residential sources. A portion of the waste stream, however, requires special handling and waste clearance before disposal because of legal, environmental, public health, or operational concerns. Of the approximately 1 million tons of solid waste disposed each year, between 6,000 and 9,000 tons is designated as special waste. These special items include industrial wastes, asbestos-containing materials, contaminated soil, treated biomedical wastes, treatment plant grit and vactor wastes, and other miscellaneous materials. It does not include household hazardous wastes.

Since 1993, the division has conducted a waste screening program to ensure that materials in the waste stream are handled in accordance with federal and state regulations (Resource Conservation and Recovery Act, Title 40, Subtitle D and WAC 173-351). Under this program, waste screening technicians, in cooperation with other staff, perform random manual and visual screening of incoming loads of waste at each transfer facility and the Cedar Hills landfill to identify and properly manage any potentially unacceptable wastes. More than 11,000 loads of waste are screened at division facilities each year. Waste screening technicians also educate customers on waste acceptance policies.

Under the county's Waste Clearance Policy (PUT 7-2-1[PR]), the Special Waste Unit provides a free service to customers to evaluate wastes and determine if they can be accepted for disposal and under what conditions. Special waste staff process and provide more than 400 waste clearances for disposal each year. Conditions for disposal could include bagging or wetting to control dust, direct haul to the Cedar Hills landfill, specific packaging and labeling requirements, separation from other waste in a special waste disposal area, or certification of disposal by authorized landfill staff. Procedures for disposal of special waste are often defined by local, state, or federal regulation.

The method for handling special wastes once the Cedar Hills landfill closes will be considered during the screening of alternative disposal options.

DISPOSAL SERVICES AFTER AN EMERGENCY

Relatively common emergencies, such as seasonal flooding and winter storms, as well as major events have the potential to create a significant amount of debris that must be properly managed or disposed. The debris generated by an emergency can threaten public health and hinder or complicate response and recovery work.

To minimize disruptions and provide for efficient management of emergency debris, the division is preparing a Debris Management Plan for unincorporated King County. The division is also collaborating with cities in the county to develop similar plans that will ensure a coordinated regional response to emergencies. The debris planning process is being conducted under the direction of the Seattle Urban Area Security Initiative, guided by the federal Homeland Security Department and the State of Washington's Emergency Management Division.

A regional approach to planning is essential for managing the multi-jurisdictional impacts of emergencies in the Puget Sound area and for coordinating the limited disposal capacity in western Washington. This disposal capacity is subject to two major constraints. First, most jurisdictions in the region export their solid waste to landfills east of the Cascade Mountains. Without local landfill space, disposal capacity relies on the region's transportation network, which could be compromised in a major emergency. Second, the only operational landfill in King County (Cedar Hills) does not accept materials other than municipal solid waste for disposal.

The coordinated regional Debris Management Plan emphasizes recycling to the extent possible. The plan calls for the use of temporary Debris Management Sites for storage of debris until it can be sorted for recycling or proper disposal. The division is working with the Regional Emergency Communication Center to coordinate public information and help cities and residents identify recycling options in preparation for and in response to emergency events of all types.

The division will consider the feasibility of a cost-sharing arrangement to secure long-term emergency capacity for the region as a whole after the closure of Cedar Hills. The update of the Site Development Plan will provide information with which to evaluate the feasibility of setting aside some portion of Cedar Hills for long-term emergency disposal. The ability to respond after a major regional emergency is one criterion that will be used to select a disposal option to be used once the Cedar Hills landfill closes.

7

Solid Waste System Finance

Solid Waste System Finance

Policies

FIN-1 Utilize the assets of the King County Solid Waste Division exclusively for the benefit of the solid waste system, and fully reimburse the solid waste system for the value associated with the use or transfer of its assets.

FIN-2 Maintain a Solid Waste Division financial forecast and cash-flow projection of three years or more.

FIN-3 Keep tipping fees as low as reasonable, while covering the costs of effectively managing the system and providing service to customers.

FIN-4 Assess fees for use of the solid waste transfer and disposal system at the point of service.

FIN-5 Determine the Basic Fee using a rate structure based on weight.

FIN-6 Charge the same Basic Fee at all transfer facilities.

FIN-7 Maintain the following reserve funds:

a. Landfill Reserve
b. Landfill Post-Closure Maintenance
c. Capital Equipment Recovery Program
d. Construction

FIN-8 Maintain the Landfill Post-Closure Maintenance Fund at a level to ensure that environmental monitoring and maintenance of the closed landfills for which the county has responsibility will be fully funded through the end of their post-closure maintenance periods, as defined by applicable law.

FIN-9 Routinely evaluate all reserve funds for long-term adequacy and set contributions to maintain reasonable rate stability.

Solid Waste System Finance

Summary of Recommendations

Responsibility		Action	Detailed Discussion
1	**County**	Continue to evaluate and implement operational changes that control costs.	Page 7-10
2	**County**	Study the advantages and disadvantages of alternatives to the current rate methodology, such as incorporating a transaction fee into the rate structure.	Page 7-10
3	**County, cities**	Continue to explore new revenue sources to help finance the solid waste system.	Page 7-11

SOLID WASTE SYSTEM FINANCE

Solid waste fees in King County are among the lowest in the region. Even as the division embarks on its most extensive capital program in 50 years, keeping fees low and stable remains a fundamental objective.

Due to the effects of the global economic downturn, since late 2007 the division has seen unanticipated reductions in garbage tonnage and corresponding revenues. The division is responding to this economic trend by adjusting expenditures accordingly. This recent, sudden drop in tonnage accentuates the importance of considering all of the elements that will influence both costs and revenues in the future.

This chapter provides a brief summary of the division's financial structure, including descriptions of funding sources, revenues, and expenditures. The remainder of the chapter describes a range of influences expected to have a financial impact on the division in the future.

FUNDING OF SOLID WASTE SERVICES AND PROGRAMS

King County's solid waste transfer and disposal system is a public-sector operation that is funded almost entirely by fees collected from its customers. The division is an enterprise fund, managing nearly all of its expenses with revenues earned through these fees.

Tipping fees are collected at the scalehouse at each transfer station.

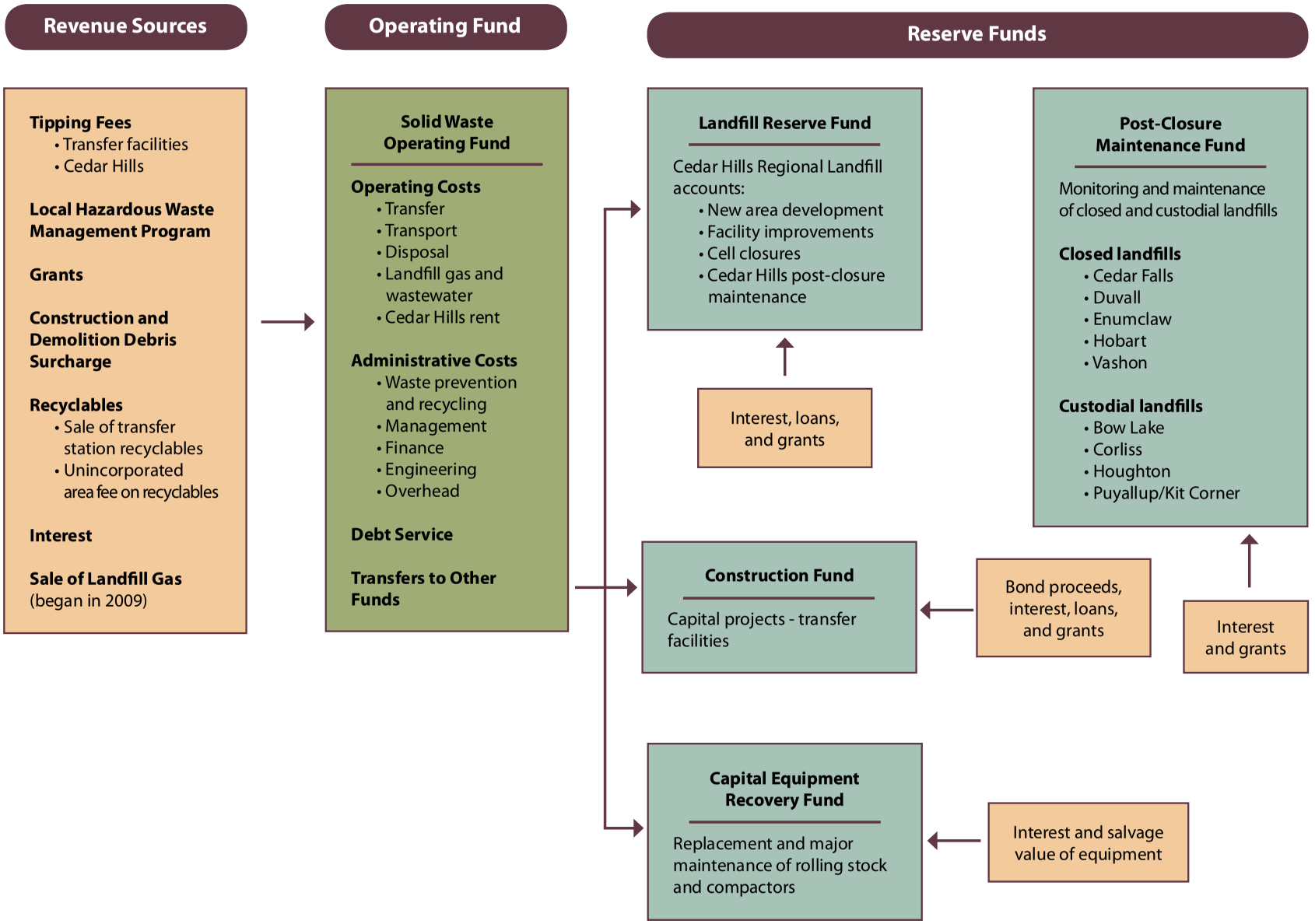
The fees charged at county facilities, called tipping fees, pay for the operation and maintenance of transfer and disposal facilities and equipment, education and promotion related to waste prevention and recycling (WPR), grants to cities to support WPR efforts, and administrative operating expenses and overhead.

Tipping fees also pay for the construction of transfer facilities. Bonds or loans may be used for large projects, but repayment of this debt is funded primarily by tipping fees.

As discussed later in this chapter, through transfers into reserve funds, the fee paid for each ton of waste entering the system today covers all expenses involved in disposal of that waste, even if the costs are incurred decades in the future. Using this financial structure ensures that the full cost of solid waste handling is paid by the users of the system.

A summary of the fund structure is illustrated in Figure 7-1 and discussed in the following sections.

Figure 7-1. Solid Waste Division fund structure



Solid Waste Division Revenues

As mentioned earlier, the solid waste system is funded primarily by the tipping fees charged at division facilities. The tipping fee is charged to the commercial collection companies that collect materials curbside and to residential and business self-haulers who bring wastes to the transfer facilities themselves. In accordance with KCC 10.12.021, the King County Council establishes the fees charged at county solid waste facilities.

There are four main types of tipping fees:

- **Basic Fee** – The per-ton fee charged to customers disposing of municipal solid waste at transfer facilities; the basic fee accounts for more than 95 percent of tipping fee revenues
- **Regional Direct Fee** – The fee charged to commercial collection companies that haul solid waste directly to the Cedar Hills landfill instead of to a transfer facility; the fee is based on the Basic Fee, less the marginal cost of transfer and transport
- **Organics Fee** – The fee for clean wood waste, yard waste, and food scraps and food-soiled paper
- **Special Waste Fee** – The fee charged for waste that requires special handling or clearance before disposal, such as industrial wastes, asbestos-containing materials, and contaminated soil

Funding for the Cities

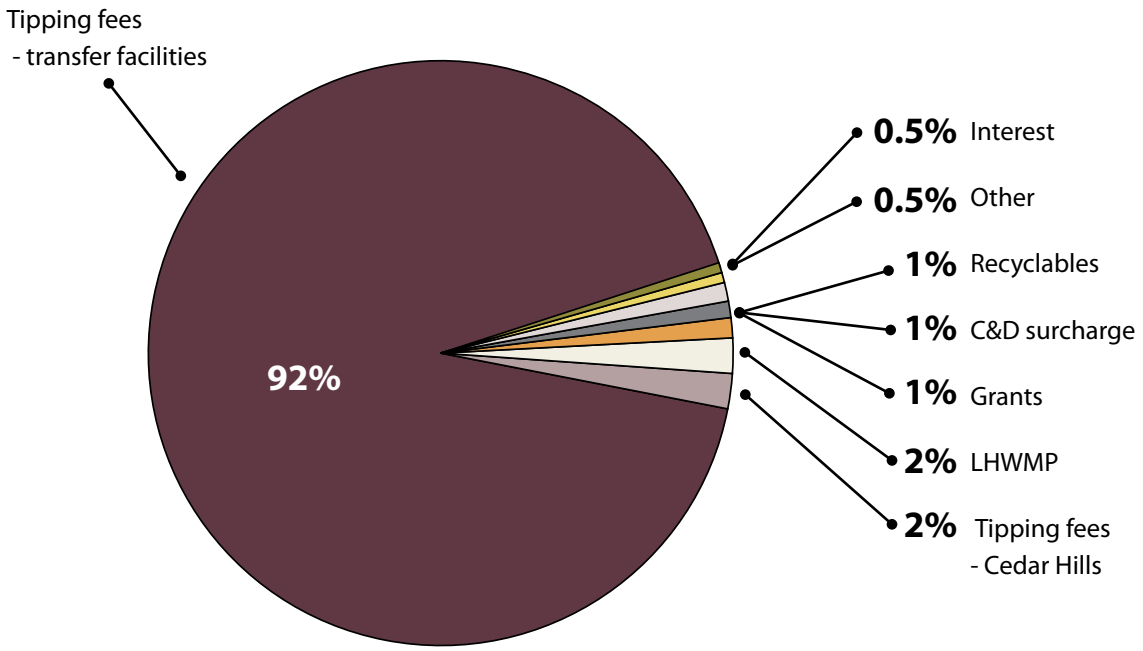
Cities fund their solid waste and WPR programs in a variety of ways, and the resources available to the 37 cities in the King County system vary widely. One potential funding source is the revenue that some cities receive from fees paid for solid waste collection services. These fees may be paid directly to the city or to the collection company depending on who provides the collection service – the city itself or a commercial collection company – and what contractual arrangements have been made. In some cases, the collection companies charge a fee that is passed on to the city to fund their programs. Some cities also charge a utility tax. Another funding source for cities is state and county grants (see Chapter 3, *Waste Prevention and Recycling*, for more information about grants). For cities that do not receive any revenue from collection, grants and the cities' general funds are the only revenue sources.

Other fees are charged for recyclables, such as appliances. KCC 10.12.021.G authorizes the division director to set fees for recyclable materials for which no fee has yet been established by ordinance; these fees may be set to encourage recycling and need not recover the full cost of handling and processing. In accordance with state law (RCW 70.93.097), the division also charges a fee to vehicles with unsecured loads arriving at any staffed transfer facility or landfill in the jurisdiction of King County.

Figure 7-2 shows the breakdown of revenues received by the division in 2008. As shown, more than 90 percent of the division's revenue comes from tipping fees charged at transfer facilities and

the Cedar Hills landfill, and the remainder comes from a few additional sources. The most significant source is the funding received from the Local Hazardous Waste Management Program (LHWMP). Other sources of revenue include interest earned on fund balances; the construction and demolition (C&D) surcharge (see page 7-5); revenue from the sale of recyclable materials received at division transfer facilities and from a fee on recyclables collected in unincorporated areas; and Washington State Department of Ecology grants to help clean up litter and illegal dumping throughout the county, and to support WPR. Based on economic and market conditions, revenues from the sale of recyclable materials and interest earned can vary considerably. Beginning in mid-2009, the division also began receiving revenue from the sale of landfill gas from the Cedar Hills landfill.

Figure 7-2. Sources of revenue in 2008 ($94,517,927)



In late 2007, the division began to see reductions in garbage tons delivered to the division's facilities, stemming primarily from reductions in consumer spending and overall business activity in the region. Tonnage in 2008 was down by about 8 percent overall, and the system has continued to experience declines into 2009. The division expects tonnage to remain at a lower level for several years. Expenditures have been adjusted accordingly to balance activities with revenues.

The division plans its solid waste rates based on the average costs and revenues anticipated over a three-year rate period; the revenues and expenditures are balanced across this period. In year one, revenues exceed costs, so the additional revenue is reserved in the division's operating fund. Typically during the second year, costs and revenues are about even. During the last year, however, costs typically exceed

revenues, so the reserved operating fund balance is used to make up the difference.

Solid Waste Division Expenditures

Division expenditures, paid through the Solid Waste Operating Fund, can be divided into four broad categories: operating costs, administrative costs, debt service, and transfers to other funds. Figure 7-3 uses 2008 data to illustrate the breakdown of the various division expenditures, which are described in the following sections.

Operating Costs

Operating costs include the day-to-day expenses for transfer, transport, and landfill operations, which includes the maintenance of equipment and facilities, and management of landfill gas and wastewater. It also includes rent the division pays to the county for use of the Cedar Hills landfill property.

Administrative Costs

This cost category includes administrative functions that support operations, such as engineering, finance, and management. It includes the WPR programs and services provided by the division, including grants to the cities. It also includes support to LHWMP activities, such as household hazardous waste collection.

Debt Service

Debt service is the payment of interest and principal on bonds and loans. General obligation bonds have been issued by the county to pay for development of major transfer facility capital projects. We are currently

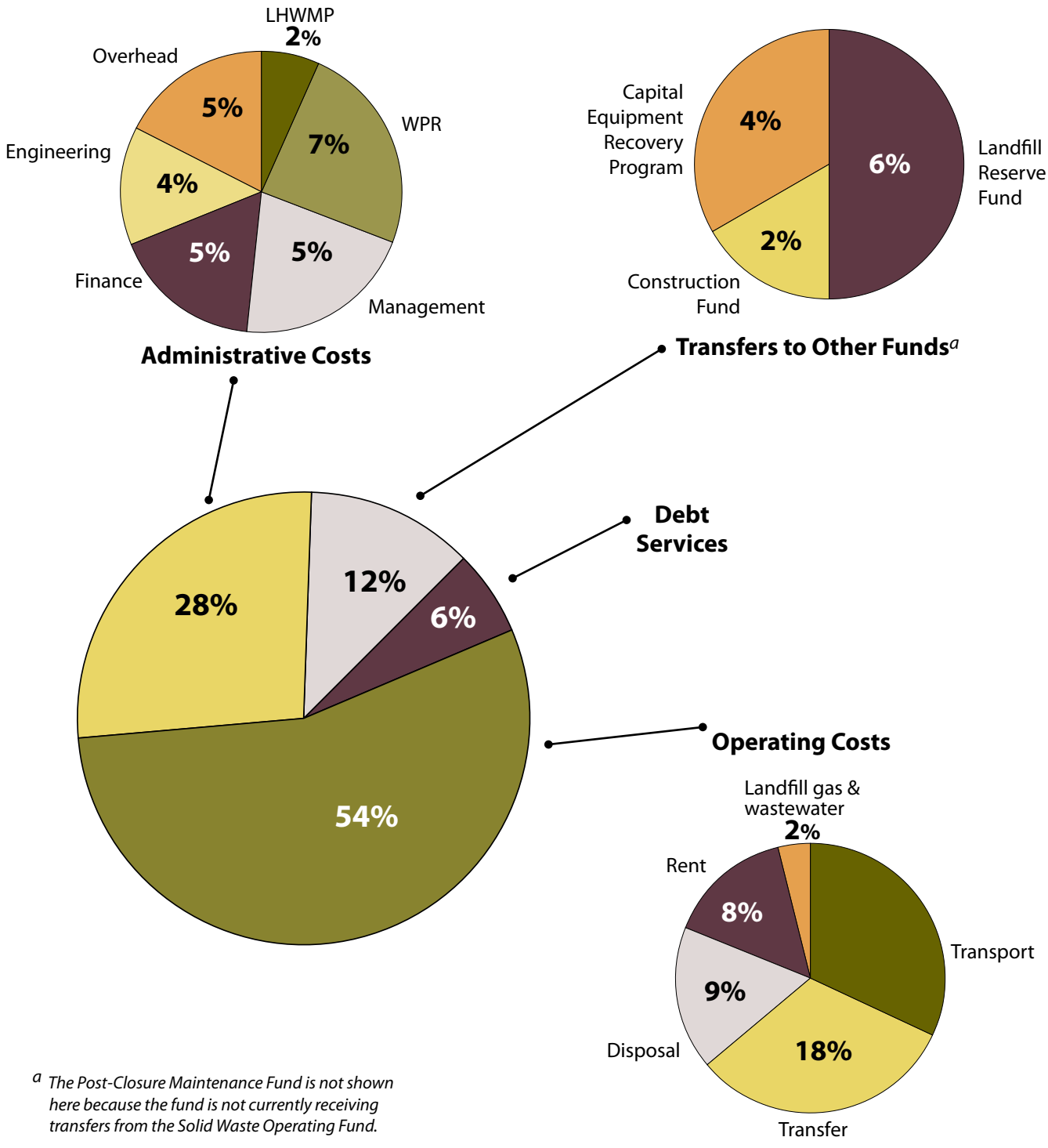
Construction and Demolition Debris Surcharge

King County has contracts with two private companies – Allied Waste and Waste Management – to manage the majority of the county's C&D. Customers disposing of C&D at any of the facilities operated by these companies pay a per-ton fee based on the type of material. Fees for recyclable C&D are lower than the fees for non-recyclable C&D or mixed loads.

Allied Waste and Waste Management pay the county a $4.25 per ton surcharge for all C&D debris generated in the county's jurisdiction; the surcharge is established by contract and by county code (KCC 10.30.050). The surcharge is used to pay incentives to these companies based on the amount of C&D material they recycle. To date, the total amount paid to the county has surpassed the amount paid back in incentives. The surcharge is set to expire in 2014 when the current C&D contracts expire.

Equipment repair and maintenance is included in the division's operating costs.

Figure 7-3. Expenditures in 2008 ($94,517,927)



[a] *The Post-Closure Maintenance Fund is not shown here because the fund is not currently receiving transfers from the Solid Waste Operating Fund.*

paying interest and principal on debt from bonds that helped finance construction of the Vashon and Enumclaw transfer stations in the 1990s, and on recently acquired new debt from construction of the Shoreline Recycling and Transfer Station, which opened in 2008.

Construction of new transfer stations, such as the Bow Lake station, is financed using general obligation bonds.

The county will continue to finance transfer station capital projects using primarily general obligation bonds backed by the full faith and credit of the county's General Fund, with approval of the King County Council. The county may consider using double-barrel or revenue bonds for large capital investments should it become advantageous to do so. The county will also investigate the feasibility of loans from the Washington State Public Works Trust Fund when they are available. Landfill capital projects are not funded through debt financing, but through the Landfill Reserve Fund discussed later in this section.

Transfers to Other Funds

A portion of the division's costs is transfers from the Solid Waste Operating Fund to reserve funds. These funds were established to ensure that the division can meet future obligations, or expenses, some of which are mandated by law. Contributions to reserve funds are routinely evaluated to ensure they are adequate to meet short- and long-term needs. Paying into reserve funds stabilizes the impact on rates for certain expenses by spreading the costs over a longer time period, and ensures that customers who use the system pay the entire cost of disposal. The four reserve funds are discussed below.

Contributions to the **Construction Fund** are used to help finance new construction and major maintenance of division transfer facilities. Use of the Construction Fund means less borrowing and consequently a lower level of debt service.

The **Capital Equipment Recovery Program Fund** (CERP) is codified in KCC 4.08.280. The purpose of the CERP is to provide adequate resources for replacement and major maintenance of solid waste rolling stock and compactors. New equipment is purchased from the Operating Fund, but after the initial purchase, replacements are funded from the CERP.

By accumulating resources in the CERP, the division ensures that it is able to replace needed equipment even with fluctuations in revenue. Annual contributions to the CERP are calculated by projecting future replacement costs and salvage values based on equipment life and maintenence costs. Contributions are further adjusted to reflect changes in facilities and operations that affect equipment needs. The contributions are held in an account, earning interest, until needed.

The **Landfill Reserve Fund** (LRF), codified in KCC 4.08.045, covers the costs of four major accounts maintained for the Cedar Hills landfill, shown below. The cell closure and post-closure maintenance accounts are mandated by federal and state law.

The CERP fund helps the division maintain a fleet of long-haul tractors and trailers to transport solid waste to the landfill.

- **New area development account** – Covers the costs for planning, designing, permitting, and building new refuse cells.
- **Facility improvements account** – Covers a wide range of capital investments required to sustain the infrastructure and operations at the landfill, such as enhancements to the landfill gas and wastewater systems.
- **Cell closures account** – Covers the cost of closing refuse cells, or operating areas, within the landfill that have reached capacity. These contributions help the division prepare incrementally for the cost of final closure of the entire landfill.
- **Post-closure maintenance account** – Accumulates funds to pay for post-closure maintenance of the Cedar Hills landfill for at least 30 years.

The sum of all four accounts, based on projected cost obligations, makes up the LRF rate charged as part of the tipping fee. Projected cost obligations are based on the current Site Development Plan for the landfill; changes to the current plan (discussed in Chapter 6, *Landfill Management and Solid Waste Disposa*l) will necessitate an update of the LRF calculation. When Cedar Hills closes, the division will discontinue its contributions to the LRF. At closure, the balance of the LRF will be transferred to the Post-Closure Maintenance Fund.

Collecting landfill gas as the garbage decomposes over time is a crucial element of pre- and post-closure maintenance.

The **Post-Closure Maintenance Fund** is a separate fund that pays for the maintenance and environmental monitoring of nine closed and

custodial landfills in the county for which the division has responsibility (see Chapter 6). Federal and state laws require this fund for closed landfills; the county has included funding for custodial landfills as well. Once the Cedar Hills landfill closes, the balance of the LRF will be transferred to this fund to pay for Cedar Hills' post-closure expenses.

At this time, the balance on this fund is sufficient to cover anticipated post-closure expenses, thus no money is currently being transferred to the fund. The division periodically reviews the fund to ensure that it remains ample for future needs.

INFLUENCES ON FUTURE COSTS AND REVENUE

In addition to the unanticipated reductions in tonnage due to the economy, there are other factors that we expect to influence costs and revenues, which can be projected and budgeted for with varying degrees of certainty. Those influences are summarized briefly in this section.

Waste Prevention and Recycling

As discussed earlier, revenues from garbage tipping fees cover the costs of WPR services and programs. This financing structure requires the division to estimate the effects of WPR on garbage disposal to reasonably project future revenues.

While the revenue stream relies primarily on garbage tipping fees, the current priorities in solid waste management are waste prevention and recycling – which lead to reductions in the amount of solid waste disposed, and hence in revenues received. The reduction in the amount of waste received due to WPR has been gradual, and the system has adjusted to lower revenues. Further reductions through increasingly rigorous WPR efforts have or will continue to affect the revenues of King County and other jurisdictions across the state. The state's Beyond Waste group has taken note of this complex issue and has begun to seek "ways in which funding structures can reinforce rather than work against Beyond Waste goals" (*Financing Solid Waste for the Future*, *http://www.ecy.wa.gov/pubs/0407032.pdf*). The county is participating in these discussions with its regional planning partners.

Increased WPR efforts have had positive influences on the financial aspects of the system as well. As discussed in Chapters 3 and 6, WPR has contributed to extending the life of the Cedar Hills landfill, which will save money for ratepayers (see *Closure of the Cedar Hills Regional Landfill* on page 7-11). Another aspect of WPR that has had a positive financial effect is product stewardship. Product stewardship shifts the management of materials at the end of their life to the product manufacturer or retailer. This shift reduces the costs to cities and counties of managing products such as televisions, computers, and fluorescent bulbs and tubes, to name a few. The savings are most substantial for products that contain hazardous materials and are more difficult and expensive to manage within the public collection, transfer, and disposal system.

Operational Efficiencies

The division continues to search for ways to control costs through operational efficiencies. Examples of efficiencies that are producing significant and long-term results are discussed briefly below.

Landfill Tippers

In December 2008, the division began using tippers to empty garbage from transfer trailers at the landfill. The tippers replaced the use of older walking floor trailers (see Chapter 6, *Landfill Management and Solid Waste Disposal*, for more details). The new tippers are saving staff time and other resources, as well as reducing equipment and tire damage.

Solid Waste Compactors

As discussed in Chapter 5, the transfer system in King County is undergoing major renovations to update station technology and improve efficiencies. The installation of solid waste compactors at all transfer stations is one important component of that plan. The Enumclaw, Shoreline, and Vashon transfer stations currently have waste compactors. All newly constructed transfer stations will incorporate compactors as well.

Compacting solid waste at the stations reduces the number of trips necessary to transport the waste to the landfill or any other disposal alternative. In 2008, the division hauled approximately 46,000 loads of garbage from the Bow Lake, Factoria, Houghton, Algona, and Renton transfer stations to the Cedar Hills landfill. If those stations had had compactors, approximately 14,000, or about 30 percent, fewer trips would have been made. Fewer trips translate directly into lower costs for fuel, equipment, and staff.

Potential Changes in the Fee Structure

The 2001 comprehensive solid waste management plan proposed the possibility of adding a flat fee to customer transactions at the transfer facilities to cover the fixed costs associated with each transaction. This transaction fee would be based on the incremental costs of providing service that are constant regardless of the amount of waste disposed. The cost elements of the transaction fee would then be separated from the tonnage-based fee.

Before changes to the fee structure could be proposed, a number of factors would need to be studied, including the impact on revenue and cost, equity issues, and systemwide financing implications. These factors would be considered in a future rate study.

Closure of the Cedar Hills Regional Landfill

When the Cedar Hills landfill reaches capacity and closes, the division's solid waste tipping fee is expected to increase to cover the cost of using an alternate means of disposal. Whether it is waste export to an out-of-county landfill or disposal at a waste-to-energy or other conversion facility, a preliminary study indicates that the cost for disposal after Cedar Hills closes will be higher (R.W. Beck 2007).

The division estimates that its expenses for disposal at Cedar Hills in 2009 are about $36 per ton. According to a recent study by R.W. Beck (R.W. Beck 2008), in 2009 Snohomish County expects to spend about $53.75 per ton to transport and dispose of its waste at an out-of-county landfill. Using these costs for comparison, the savings to the division of maintaining Cedar Hills is about $16 million dollars per year. If these costs continue to hold over the remaining life of Cedar Hills, now estimated to be 2018, the cost savings to county ratepayers would be substantial.

Maintaining the Cedar Hills landfill benefits the ratepayers by delaying increases in the solid waste tipping fee that will occur with the transition to waste export or a waste conversion technology. For this reason, the division is exploring options to extend the life of the landfill as long as practicable (discussed in Chapter 6, *Landfill Management and Solid Waste Disposal*).

New Revenue Sources

The division is continually exploring new sources of revenue to help offset reductions in tonnage. Cities may also want to consider additional funding sources to support their solid waste and WPR programs.

Sales from the Landfill Gas-to-Energy Facility

In mid-2009, the newly built landfill gas-to-energy facility began operations at the Cedar Hills landfill, and the division began to receive revenues from the sale of landfill gas. The facility, which is privately owned and operated by Bio Energy Washington, converts methane collected from the landfill into pipeline-quality natural gas. The gas is routed to the Puget Sound Energy grid through an existing natural gas pipeline

adjacent to the landfill. The division will receive a minimum annual payment of about $1 million, with the potential for more revenue depending on the amount of gas delivered and its market price.

The landfill gas-to-energy facility produces revenue and environmental benefits for the division.

Greenhouse Gas Offsets

Greenhouse gas offsets from the new landfill gas-to-energy facility at Cedar Hills offer another promising source of revenue. The conversion of landfill gas to a renewable source of green energy will generate greenhouse gas offsets, which have value in the market. The division, rather than the owner of the landfill gas facility (Bio Energy Washington), has contractually retained the offset rights associated with the project and is evaluating a range of alternatives to maximize the value of those rights. The division will also be investigating the possibility of attaining greenhouse gas offsets from other sources related to solid waste operations or programs.

The Federal American Recovery and Reinvestment Act

On February 17, 2009, President Obama signed into law the American Recovery and Reinvestment Act (ARRA) of 2009. The ARRA provides $575 billion in new federal spending intended to stimulate the economy. Federal, state, and local governments will carry out implementation of the stimulus package. King County has been awarded $6.1 million in funding through the U.S. Department of Energy's Energy Efficiency and Conservation Block Grant Program (EECBG). The division received funding for two EECBG-eligible projects and initiatives – construction of the Leadership in Energy and Environmental Design elements of the new Bow Lake Recycling and Transfer Station and a market transformation project for fluorescent bulbs and tubes.

8

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Washington Utilities and Transportation Commission Cost Assessment

Appendix

A

Appendix A

Washington Utilities and Transportation Commission Cost Assessment

This plan is prepared for King County and its incorporated cities, excluding Seattle and Milton.

Prepared by: King County Solid Waste Division, Tom Karston, Economist

Contact: Thea Severn, Planning & Communications Manager, 206-296-4360

Date: October 8, 2009

DEFINITIONS

Throughout this document:

Year 1 refers to 2010
Year 3 refers to 2012
Year 6 refers to 2015

Year refers to calendar year January 1 - December 31

1. DEMOGRAPHICS

The King County solid waste system comprises 37 of the 39 cities in the county (including all but the cities of Seattle and Milton) and the unincorporated areas of King County. In all, the county's service area covers approximately 2,050 square miles. There are about 1.3 million residents and 690,000 people employed in the service area.

1.1. Population

1.1.1. Population for the entire King County

Year 1: 1,893,000
Year 3: 1,929,000
Year 6: 1,984,000

1.1.2. Population for the King County solid waste system

Year 1: 1,307,000
Year 3: 1,334,000
Year 6: 1,375,000

1.2. References and Assumptions

Projections for population are based on data developed by the Puget Sound Regional Council (PSRC; 2006). 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.

2. WASTE STREAM GENERATION

2.1. Tonnage Recycled

Year 1: 808,000
Year 3: 817,000
Year 6: 888,000

2.2. Tonnage Disposed

Year 1: 905,000
Year 3: 915,000
Year 6: 990,000

2.3. References and Assumptions

The division uses a planning forecast model to predict future waste generation, which is defined as *waste disposed + 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.

To predict future waste generation, the planning forecast model relies on established statistical relationships between waste generation and various economic and demographic variables that affect it, including:

- 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, from 2010 through 2030, 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 = more waste generated.

- Employment is expected to increase at an annual rate of 1.3 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 2030, 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, employment, and household size are based on data developed by the Puget Sound Regional Council (PSRC; 2006). 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 data are provided by the local economic forecasting firm of Dick Conway and Associates (July 2007). *Note:* These are pre-recession assumptions. New long-term projections have not yet been developed; therefore, growth may be less than expected in some years.

3. SYSTEM COMPONENT COSTS

This section addresses costs associated with current programs and those recommended in the draft plan.

3.1. Waste Reduction and Recycling Programs

Many programs address waste reduction and prevention as well as recycling; therefore, they are presented here together.

3.1.1. Programs

- Education and promotion campaigns, such as "Recycle More. It's easy to do." and "Recycle food. It's easy to do."
- EcoConsumer program offers resources and incentives to help citizens balance consuming and conserving
- Grants to cities to support waste prevention and recycling
- Product stewardship support and promotion – "Take it Back Network"
- Construction and demolition debris waste prevention and recycling education and promotion
- Sustainable building education and promotion – supporting residential and non-residential green building, deconstruction and salvage, and adoption of green building standards
- LinkUp program to expand markets for recyclable and reusable materials
- Organics management – "Northwest Natural Yard Days"
- Master Recycler composter program trains volunteers to serve as community educators
- School programs – "Green Schools" and education for grade, middle, and high school students

- Special recycling collection events
- Transfer facility recycling

Proposed waste prevention and recycling programs, primarily building on current efforts, are presented in the recommendations in Chapter 3 of the draft plan.

3.1.2. The costs of waste reduction and recycling programs implemented and proposed are estimated to be:

Year 1: $5,660,000
Year 3: $6,004,000
Year 6: $6,561,000

3.1.3. Funding mechanisms:

Year 1:

Disposal fees	$4,560,000
Unincorporated area recycle fees	225,000
Coordinated Prevention Grant	250,000
CDL surcharge fees	250,000
Sale of recyclables	375,000

Year 3:

Disposal fees	$5,054,000
Unincorporated area recycle fees	225,000
Coordinated Prevention Grant	250,000
CDL surcharge fees	100,000
Sale of recyclables	375,000

Year 6:

Disposal fees	$5,661,000
Unincorporated area recycle fees	225,000
Coordinated Prevention Grant	250,000
CDL surcharge fees	50,000
Sale of recyclables	375,000

3.2. See above – combined with 3.1

3.3. Solid Waste Collection Programs

3.3.1. WUTC Regulated Solid Waste Collection Programs

Data for 2007 and estimates for 2010, 2012, and 2015 are shown below.

WUTC Regulated Hauler Name: Rabanco LTD
G-permit #: G-12

	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	39,903	43,467	45,099	48,281
Tonnage (garbage,organics,recycling)	72,084	78,522	81,470	87,219
Commercial				
# of customers	948	1,033	1,071	1,147
Tonnage collected (garbage only)	22,644	23,535	23,118	24,052

WUTC Regulated Hauler Name: Fiorito Enterprises, Inc. & Rabanco Companies
G-permit #: G-60

	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	31,420	34,226	35,511	38,017
Tonnage (garbage,organics,recycling)	42,167	45,933	47,658	51,021
Commercial				
# of customers	693	755	783	839
Tonnage collected (garbage only)	13,315	13,839	13,594	14,143

WUTC Regulated Hauler Name: American Disposal Company, Inc.
G-permit #: G-87

	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	81	88	91	98
Tonnage (garbage,organics,recycling)	1,476	1,608	1,668	1,786
Commercial				
# of customers	143	156	162	173
Tonnage collected (garbage only)	2,589	2,691	2,643	2,750

WUTC Regulated Hauler Name: Waste Management of Washington, Inc.
G-permit #: G-237

	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	44,130	48,071	49,876	53,396
Tonnage (garbage,organics,recycling)	82,642	90,023	93,404	99,995
Commercial				
# of customers	1,467	1,598	1,658	1,775
Tonnage collected (garbage only)	37,930	39,423	38,724	40,288

3.3.2. Other (non-regulated) Solid Waste Collection Programs

Data for 2007 and estimates for 2010, 2012, and 2015 are shown below.

Hauler Name:	**Allied Waste Services**			
	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	57,128	62,230	64,567	69,123
Tonnage (garbage,organics,recycling)	107,329	116,915	121,305	129,865
Commercial				
# of customers	3,449	3,757	3,898	4,173
Tonnage collected (garbage only)	98,434	102,308	100,494	104,555

Hauler Name:	**Cleanscapes**			
	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	2,886	3,144	3,262	3,492
Tonnage (garbage,organics,recycling)	19,756	21,520	22,328	23,904
Commercial				
# of customers	535	583	605	647
Tonnage collected (garbage only)	9,486	9,859	9,684	10,075

Hauler Name:	**Kent-Meridian**			
	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	16,946	18,459	19,153	20,504
Tonnage (garbage,organics,recycling)	26,235	28,578	29,651	31,743
Commercial				
# of customers	3,449	3,757	3,898	4,173
Tonnage collected (garbage only)	98,434	106,314	109,258	116,405

Hauler Name:	**Waste Management of Washington, Inc.**			
	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	93,394	101,735	105,555	113,004
Tonnage (garbage,organics,recycling)	141,908	154,582	160,386	171,704
Commercial				
# of customers	8,537	9,299	9,649	10,329
Tonnage collected (garbage only)	187,042	194,403	190,956	198,672

Hauler Name: City of Enumclaw

	2007	Year 1 2010	Year 3 2012	Year 6 2015
Residential				
# of customers	606	661	685	734
Tonnage (garbage,organics,recycling)	4,490	4,891	5,075	5,433
Commercial				
# of customers	0	0	0	0
Tonnage collected (garbage only)	1,966	2,043	2,007	2,088

3.4. Energy Recovery & Incineration (ER&I) Programs

Not applicable – the Solid Waste Division has no such program.

3.5. Land Disposal Program

3.5.1. Landfill Name: Cedar Hills Regional Landfill
Owner: King County
Operator: King County Solid Waste Division

3.5.2. The approximate tonnage disposed at the landfill by WUTC regulated haulers is expected to be:

Year 1: 217,000
Year 3: 221,000
Year 6: 234,000

3.5.3. The approximate tonnage disposed at the landfill by other contributors is expected to be:

Year 1: 688,000
Year 3: 694,000
Year 6: 756,000

3.5.4. Landfill operating and capital costs are estimated to be:

Year 1: $21,468,000
Year 3: $22,807,000
Year 6: $25,543,000

3.5.5. Landfill funding

The major funding source for landfill operations is tipping fees. Capital costs are paid from the Landfill Reserve Fund (LRF). This fund has been built over time through annual transfers from the operating fund (tipping fees). The LRF finances new cell development, cell closure, facility improvements, and will fund 30 years of post-closure maintenance.

3.6. Administration Program

3.6.1. Budgeted cost and funding sources:

Year 1: $22,149,000
Year 3: $23,499,000
Year 6: $25,677,000

The major funding source is tipping fees.

3.6.2. Cost components

	Year 1 2010	Year 3 2012	Year 6 2015
Overhead	$4,293,000	$4,555,000	$4,977,000
SWD Admin	$4,660,000	$4,944,000	$5,402,000
Legal	$460,000	$488,000	$533,000
Strategic Planning	$1,576,000	$1,672,000	$1,827,000
Finance	$5,501,000	$5,836,000	$6,377,000
Recycling & Environmental Services	$5,659,000	$6,004,000	$6,561,000
	$22,149,000	**$23,499,000**	**$25,677,000**

3.6.3. Funding mechanisms:

More than 90 percent of the division's revenue comes from tipping fees charged at transfer facilities and the Cedar Hills landfill. The remainder comes from a few additional sources, including interest earned on fund balances, a surcharge on construction and demolition (C&D), revenue from the sale of recyclable materials received at division transfer facilities, a fee on recyclables collected in unincorporated areas, and grants to help clean up litter and illegal dumping throughout the county, and to support WPR. Other than grant funds, all revenue sources support all programs.

3.7. Other Programs

3.7.1. The Transfer Services System Program is described in Chapter 5 of the plan. It includes the division's recycling and transfer stations, private facilities that handle construction and demolition debris (C&D), and household hazardous waste (HHW) service, which is covered in detail by the Local Hazardous Waste Management Plan.

3.7.2. The division owns and operates eight transfer stations and two drop boxes. Allied Waste and Waste Management own and operate facilities that handle C&D. The division operates HHW service at its Factoria transfer station and provides Wastemobile service via a contractor.

3.7.3. The WUTC regulates the C&D facilities.

3.7.4. Solid Waste Division Costs

3.7.4.1. Transfer facility operating and capital costs are estimated to be:
Year 1: $52,085,000
Year 3: $94,204,000
Year 6: $72,987,000

Note: These costs are materially influenced by the transfer station renovation program, which will be ongoing through these years. The operating costs alone are expected to be: 2010: $29,371,000, 2012: $29,213,000, 2015: $32,131,000.

3.7.4.2. HHW service costs are estimated to be:
Year 1: $3,512,000
Year 3: $3,726,000
Year 6: $4,072,000

3.7.5. The major funding source for division transfer facility operations is tipping fees. Capital costs are paid from the construction fund; the construction has been built through contributions from the operating fund (tipping fees) and through the issuance of bonds. The cost of providing HHW service is funded by the LWHMP.

3.8. References and Assumptions

The estimate for year 1 costs is from the 2010 budget request; years 3 and 6 were increased to account for inflation, tonnage projections, increased efficiencies resulting from newly renovated transfer stations, and expected program additions. The collection program estimates were derived using hauler reports and a projected rate of population increase in King County. Numbers have been rounded in most instances.

4. FUNDING MECHANISMS

4.1. Tables

4.1.1. Facility Inventory

Facility name	Type of facility	Tip fee per ton	Transfer cost	Transfer station location	Final disposal location	Estimated tons disposed – 2010	Estimated revenue generated (tip fee x tons)
Bow Lake	Transfer Station	$95.00	3,206,104	Tukwila	CHRLF [1]	271,000	25,745,000
Houghton	Transfer Station	95.00	1,903,063	Kirkland	CHRLF	156,800	14,896,000
Algona	Transfer Station	95.00	1,552,479	Algona	CHRLF	150,200	14,269,000
Factoria	Transfer Station	95.00	1,943,983	Bellevue	CHRLF	146,000	13,870,000
Renton	Transfer Station	95.00	1,167,859	Renton	CHRLF	86,600	8,227,000
Shoreline	Transfer Station	95.00	1,894,741	Shoreline	CHRLF	40,000	3,800,000
Enumclaw	Transfer Station	95.00	841,615	Enumclaw	CHRLF	22,500	2,137,500
Vashon Island	Transfer Station	95.00	741,567	Vashon Island	CHRLF	7,800	741,000
Cedar Falls	Drop Box	95.00	230,689	North Bend	CHRLF	3,600	342,000
Skykomish	Drop Box	95.00	57,509	Skykomish	CHRLF	700	66,500
CHRLF [2]	Landfill	95.00				10,800	1,026,000
CHRLF – Special waste[3]	Landfill	145.00				3,000	435,000
CHRLF – Regional direct [4]	Landfill	80.00				6,000	480,000
Total						**905,000**	**86,035,000**

[1] Cedar Hills Regional Landfill
[2] Neighborhood commercial hauler collections allowed to deliver directly to CHRLF
[3] Waste requiring special handling, including asbestos, dead animals, and mattresses
[4] Waste brought from private transfer stations and MRFs

Basic Fee[1]	**102.05**	3.50	3.55	10.89	40.50[3]	18.22	3.10	22.28
Regional Direct	**80.00**				18.97	18.22	3.10	39.71
Special Waste	**150.22**		5.22		18.97	18.22	3.10	104.71[4]
Yard Waste	**82.50**				9.79	18.22		54.49[5]

Costs are provided on a per ton basis based on 2010 estimated tons.

[1] Most tons are charged at the Basic Fee
[2] Includes overhead, administration, finance, strategic planning, legal
[3] Operating costs less transport
[4] Includes costs associated with special handling required
[5] Includes vendor costs associated with hauling and processing

4.1.3. Funding Mechanism – Year 1: 2010

Name of Program	Bond Name	Total Bond Debt [1]	Bond Rate	Bond Due Date	Grant Name	Grant Amount	Tip Fee	Other	Total
Transfer Services	LTGO[2]	22,714,012	5 [3]	2030	CPG[4]		29,371,028		52,085,040
Disposal							29,055,458	770,800[5]	29,826,258
Recycling & Environmental Services						351,000	4,883,320	424,931[6]	5,659,251
Administration							22,289,274	154,856[7]	22,444,130
Moderate Risk Waste								3,512,295[8]	3,512,295
Other Costs [9]							532,832	6,730,280[10]	7,263,110
Total		22,714,012				**351,000**	**86,131,910**	**11,593,162**	**120,790,083**

[1] Bonds projected to be issued in 2010 for transfer station construction
[2] Long-term general obligation
[3] Assumed for planning purposes
[4] Coordinated Prevention Grant
[5] Source – sale of landfill gas
[6] Source – sale of recyclables and fee on recyclables collected in unincorporated areas
[7] Source – interest revenue
[8] Funded by LHWMP
[9] Includes B&O tax and transfers to reserve funds
[10] 2010 is the final year of the rate period and costs are expected to exceed revenue; therefore, funds built up earlier in the rate period will be drawn down

4.1.4. Tip Fee Forecast

Tip fee per ton by facility [1]	Year One	Year Three	Year Six
All Facilities	95.00	104.00	113.00

[1] Basic fee

4.2. Tables

4.2.1. Funding Mechanism By Percentage – Year 1

Component	Tip Fee %	Grant %	Bond %	Collection Tax Rates %	Other %	Total
Waste Reduction & Recycling	86	6			8	100
Transfer	56		44			100
Land Disposal	97				3	100
Administration	99				1	100
Other	7				93	100

4.2.2. Funding Mechanism By Percentage – Year 3

Component	Tip Fee %	Grant %	Bond %	Collection Tax Rates %	Other %	Total
Waste Reduction & Recycling	89	5			6	100
Transfer	31		69			100
Land Disposal	97				3	100
Administration	99				1	100
Other	57				43	100

4.2.3. Funding Mechanism By Percentage – Year 6

Component	Tip Fee %	Grant %	Bond %	Collection Tax Rates %	Other %	Total
Waste Reduction & Recycling	89	5			6	100
Transfer	44		56			100
Land Disposal	97				3	100
Administration	99				1	100
Other	61				39	100

4.3. References and Assumptions

Chapter 7 of the plan addresses solid waste system financing.

Revenue and operating cost projections for years 1, 3, and 6 are shown in Attachment 1.

4.4. Surplus Funds

The division develops its solid waste rates based on the average costs and revenues anticipated over a three-year rate period; the revenues and expenditures are balanced across this period. In year one, revenues exceed costs, so the additional revenue is reserved in the division's operating fund. Typically, during the second year, costs and revenues are about even. During the last year, however, costs typically exceed revenues, so the reserved operating fund balance is drawn down to make up the difference.

Attachment 1

King County Solid Waste Division
Financial Projections

Year	**1**	**3**	**6**
	2010	**2012**	**2015**
Projected tons	905,000	915,000	990,000
Basic per ton fee	95	104	113
Revenue			
Net disposal fees	86,131,910	95,450,715	112,639,879
MRW (LWHMP)	3,512,295	3,726,194	4,071,713
Interest earnings	154,856	259,605	166,516
Grants	351,000	300,000	300,000
LF gas	770,800	1,018,000	1,073,967
Recycling	239,500	254,086	277,646
Other revenue	185,431	80,774	168,692
DNRP administration	5,472,210	5,805,468	6,343,791
Total revenue	**96,818,002**	**106,894,840**	**125,042,204**
Operating Costs			
Debt service	5,954,125	8,576,246	16,531,648
Cedar Hills rent	8,358,369	8,867,393	9,689,640
Landfill reserve fund	4,325,900	4,640,058	5,488,081
Capital equipment recovery fund	3,990,034	4,233,027	4,625,543
Construction fund	2,000,000	2,000,000	2,000,000
Overhead - county	4,293,215	4,554,672	4,977,013
Overhead - department	5,360,433	5,686,883	6,214,211
Administration	4,659,785	4,943,566	5,401,968
Legal	459,959	487,971	533,219
Strategic planning	1,576,091	1,672,075	1,827,121
Finance	5,500,955	5,835,963	6,377,115
Recycling & environmental services	5,659,251	6,003,899	6,560,623
Household hazardous waste	3,512,295	3,726,194	4,071,713
Variable Operating Costs			
(a) Disposal	2,142,416	2,253,838	2,665,753
(b) Transfer & transport	15,545,545	14,545,957	16,103,476
Fixed Operating Costs			
(a) Disposal	14,999,573	15,913,047	17,388,616
(b) Transfer & transport	13,825,482	14,667,454	16,027,523
B & O Tax	1,273,078	1,431,761	1,689,598
Total SWD Costs	**103,436,505**	**110,040,004**	**128,172,859**
Under expenditures	2,068,730	2,200,800	2,563,457
End Fund Balance	**8,747,473**	**10,198,197**	**6,367,621**

Template for the Interlocal Agreement

Appendix

B

SOLID WASTE INTERLOCAL AGREEMENT

This Agreement is entered into between King County, a political subdivision of the State of Washington and the City of_____, a municipal corporation of the State of Washington, hereinafter referred to as "County" and "City" respectively. This agreement has been authorized by the legislative body of each jurisdiction pursuant to formal action as designated below:

King County: Motion No. _____

City: _____

PREAMBLE

This Agreement is entered into pursuant to Chapter 39.34 RCW for the purpose of cooperative management of solid waste in King County. It is the intent of the parties to work cooperatively in establishing a solid waste management plan pursuant to Chapter 70.95 RCW and with emphasis on the established priorities for solid waste management of waste reduction, waste recycling, energy recovery or incineration, and landfilling. The parties particularly support waste reduction and recycling and shall cooperate to achieve the goals established by the comprehensive solid waste management plan.

The parties acknowledge their intent to meet or surpass applicable environmental standards with regard to the solid waste system. The parties agree that equivalent customer classes should receive equivalent basic services.

I. DEFINITIONS

For purposes of this Agreement the following definitions shall apply:

"Basic Services" means services provided by the King County Department of Natural Resources, Solid Waste Division, including the management and handling of solid waste.

"Comprehensive Solid Waste Management Plan" means the comprehensive plan for solid waste management as required by RCW 70.95.080.

"Designated Interlocal Forum" means a group formed pursuant to the Forum Interlocal Agreement comprised of representatives of unincorporated King County designated by the King County Council, representatives of the City of Seattle designated by the City of Seattle, and representatives of other incorporated cities and towns-within King County that are signators to the Forum Interlocal Agreement.

"Disposal" means the final treatment, utilization, processing, deposition, or incineration of solid waste but shall not include waste reduction or waste recycling as defined herein.

"Diversion" means the directing or permitting the directing of solid waste to disposal sites other than the disposal site designated by King County.

"Energy/Resource Recovery" means "the recovery of energy in a usable form from mass burning or refuse derived fuel incinerator, pyrolysis or any other means of using the heat of combustion of solid waste that involves high temperature (above 1,200 degrees F) processing." (WAC 173-304-100).

"Landfill" means "a disposal facility or part of a facility at which waste is placed in or on land and which is not a land treatment facility." (RCW 70.95.030)

"Moderate Risk Waste" means "(a) any waste that exhibits any of the characteristics of hazardous waste but is exempt from regulation under this chapter solely because the waste is generated in quantities below the threshold for regulation and (b) any household wastes which are generated from the disposal of substances identified by the department as hazardous household substances." (RCW 70.105.010)

"Solid Waste" means all putrescible and nonputrescible solid and semisolid wastes, including but not limited to garbage, rubbish, ashes, industrial wastes, swill, demolition and construction

wastes, abandoned vehicles or parts thereof, and discarded commodities but shall not include dangerous, hazardous, or extremely hazardous waste.

"System" means King County's system of solid waste transfer stations, rural and regional landfills, energy/resource recovery, and processing facilities as authorized by RCW 36.58.040, and as established pursuant to the approved King County Comprehensive Solid Waste Management Plan.

"Waste Recycling" means "reusing waste materials and extracting valuable materials from a waste stream." (RCW 70.95.030)

"Waste Reduction" means reducing the amount or type of waste generated but shall not include reduction through energy recovery or incineration. "Landfill" means "a disposal facility or part of a facility at which waste is placed in or on land and which is not a land treatment facility." (RCW 70.95.030).

II. PURPOSE

The purpose of this Agreement is to establish the respective responsibilities the parties in a solid waste management system which includes but is not limited to: planning; waste reduction; recycling; and disposal of mixed municipal solid waste, industrial waste, demolition debris and all other waste defined as solid waste by RCW 70.95.030; and moderate risk waste as defined in RCW 70.105.010.

III DURATION

This Agreement shall become effective on _____ and shall remain in effect through June 30, 2028.

IV. APPROVAL

This Agreement shall be submitted to the Washington State Department of Ecology for its approval as to all matters within its jurisdiction. This Agreement shall be filed with the City Clerk, and with the Clerk of the King County Council.

V. REVIEW AND RENEGOTIATION

5.1 Either party may request review and/or renegotiation of any provision of this Agreement other than those specified in Section 5.2 below during the six-month period immediately preceding July 1, 2003, which is the fifteenth anniversary of the effective date of identical agreements executed by a majority of cities in King County with the County and during the six-month period immediately preceding each succeeding fifth anniversary thereafter. Such request must be in writing and must specify the provision(s) of the Agreement for which review/renegotiation is requested. Review and/or renegotiation pursuant to such written request shall be initiated within thirty days of said receipt.

5.2 Review and/or renegotiation shall not include the issues of system rates and charges, waste stream control or diversion unless agreed by both parties.

5.3 In the event the parties are not able to mutually and satisfactorily resolve the issues set forth in said request within six months from the date of receipt of said request, either party may unilaterally request the Forum to review the issues presented and issue a written recommendation within 90 days of receipt of said request by the Forum. Review of said request shall be pursuant to the procedures set forth in the Interlocal Agreement creating the Forum and pursuant to the Forum's bylaws. The written decision of the Forum shall be advisory to the parties.

5.4 Notwithstanding any other provision in this paragraph to the contrary, the parties may, pursuant to mutual agreement, modify or amend any provision of this Agreement at any time during the term of said Agreement.

VI. GENERAL OBLIGATION OF PARTIES

6.1 KING COUNTY

6.1.a. Management. King County agrees to provide county-wide solid waste management services for waste generated and collected within jurisdictions party to this Agreement. The County agrees to dispose of or designate disposal sites for all solid waste including moderate risk waste generated and/or collected within the corporate limits of the City which is delivered to King County in accordance with all applicable federal, state and local environmental health laws, rules, or regulations.

6.1.b. Planning. King County shall serve as the planning authority within King County for solid waste including moderate risk waste but shall not be responsible for planning for hazardous or dangerous waste or any other planning responsibility that is specifically designated by State or Federal statute.

6.1.c. Operation. King County shall be or shall designate or authorize the operating authority for transfer, processing and disposal facilities, including public landfills, waste reduction or recycling facilities, and energy/resource recovery facilities as well as closure and post-closure responsibilities for landfills which are or were operated by King County.

6.1.d. Collection Service. King County shall not provide solid waste collection services within the corporate limits of the City, unless permitted by law and agreed to by both parties.

6.1.e. Support and Assistance. King County shall provide support and technical assistance to the City if the City seeks to establish a waste reduction and recycling program compatible with the County waste reduction and recycling plan. The County shall develop educational materials related to waste reduction and recycling and strategies for maximizing the usefulness of the materials and will make these available to the City for its use. Although the County will not be required to provide a particular level of support or fund any City activities related to waste reduction and recycling, King County intends to move forward aggressively to establish waste reduction and recycling programs.

6.1.f. Forecast. The County shall develop waste stream forecasts as part of the comprehensive planning process and assumes all risks related to facility sizing based upon such forecasts.

6.1.g. Facilities and Services. County facilities and services including waste reduction and recycling shall be provided pursuant to the comprehensive solid waste plan. All personal and real property acquired by King County for solid waste management system purposes shall be the property of King County.

6.2 CITY

6.2.a. Collection. The City, an entity designated by the City or such other entity as is authorized by state law shall serve as operating authority for solid waste collection services provided within the City's corporate limits.

6.2.b. Disposal. The City shall by ordinance designate the County disposal system for the disposal of all solid waste including moderate risk waste generated and/or collected within the corporate limits of the City and shall authorize the County to designate disposal sites for the disposal of all solid waste including moderate risk waste generated or collected within the corporate limits of the City, except for solid waste which is eliminated through waste reduction or waste recycling activities consistent with the Comprehensive Solid Waste Management Plan. No solid waste generated or collected within the City may be diverted from the designated disposal sites without County approval.

VII. COUNTY SHALL SET DISPOSAL RATES AND OPERATING RULES FOR DISPOSAL

In establishing or amending disposal rates for system users, the County may adopt and amend by ordinance rates necessary to recover all costs of operation including the costs of handling, processing, disposal, defense and payment of claims, capital improvements, operational improvements, and the closure of landfills which are or were operated by King County. King County shall establish classes of service for basic solid waste management services and by ordinance shall establish rates for users of each class.

VIII. LIABILITY

8.1 Except as provided herein, the County shall indemnify and hold harmless the City and shall have the right and duty to defend the City through the County's attorneys against any and all claims arising out the County's operations and settle such claims, recognizing that all costs incurred by the County thereby are system costs which must be satisfied from disposal rates as provided in Section VII herein. In providing such defense of the City, the County shall exercise good faith in such defense or settlement so as to protect the City's interest. For purposes of this section "claims arising out of the county's operations" shall include claims arising out of the ownership, control, or maintenance of the system, but shall not include claims arising out of the City's operation of motor vehicles in connection with the system or other activities under the control of the City which may be incidental to the County's operation.

8.2 If the County is not negligent, the City shall hold harmless, indemnify and defend the County for any property damages or personal injury solely caused by the City's negligent failure to comply with the provisions of Section 8.5.a.

8.3 In the event the County acts to defend the City against a claim, the City shall cooperate with the County. In the event the City acts to defend the County, the County shall cooperate with the City.

8.4 For purposes of this section, references to City or County shall be deemed to include the officers, employees and agents of either party, acting within the scope of their authority.

8.5.a. All waste generated or collected from within the corporate limits of the City which is delivered to the system for disposal shall be in compliance with the resource conservation and recovery act, as amended (42 U.S.C. § 6901 et seq.), RCW 70.95, King County Board of Health Rules and Regulations No. 8, and all other applicable federal, state and local environmental health laws, rules or regulations. The City shall be deemed to have complied with the requirements of Section 8.5.a. if it has adopted an ordinance requiring solid waste delivered to the system for disposal to meet such laws, rules, or regulations and by written agreement has authorized King County to enforce these within the corporate limits of the City.

8.5.b. The County shall provide the City with written notice of any violation of this provision. Upon such notice, the City shall take immediate steps to remedy the violation and prevent similar future violations to the reasonable satisfaction of King County which may include but not be limited to removing the waste and disposing of it in an approved facility. If, in good faith, the City disagrees with the County regarding the violation, such dispute shall be resolved between the parties in Superior Court. Each party shall be responsible for its attorney's fees and costs. Failure of the City to take the steps requested by the County pending Superior Court resolution shall not be deemed a violation of this agreement; provided, however, that this shall not release the City for damages or loss to the County arising out of the failure to take such steps if the Court finds that the City violated the requirements to comply with applicable laws set forth in this section.

8.6 City is not held harmless or indemnified with regard to any liability arising under 42 U.S.C. § 9601-9675 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) or as hereafter amended or pursuant to any state legislation imposing liability for cleanup of contaminated property, pollutants or hazardous or dangerous substances.

IX. FORUM

By entering into this Agreement, the County and City agree to enter into and execute a Forum Interlocal Agreement. Such agreement shall provide for the establishment of a representative Forum for consideration and/or determination of issues of policy regarding the term and conditions of this Solid Waste Interlocal Agreement.

X. COMPREHENSIVE PLAN

10.1 King County is designated to prepare the comprehensive solid waste management plan and this plan shall include the City's Solid Waste Management Comprehensive Plan pursuant to RCW 70.95.080(3).

10.2 An initial comprehensive plan, which was prepared under the terms of this Agreement as executed by a majority of cities in the County, was adopted in 1989 and approved by the Department of Ecology in 1991. The plan shall be reviewed and any necessary revisions proposed at least once every three years following the approval of the Comprehensive Plan by the State Department of Ecology. King County shall provide services and build facilities in accordance with the adopted Comprehensive Plan.

10.3 Comprehensive Plans will promote waste reduction and recycling in accordance with Washington State solid waste management priorities pursuant to Chapter 70.95 RCW, at a minimum.

10.4 Comprehensive solid waste management plans will be prepared in accordance with Chapter 70.95 RCW and solid waste planning guidelines developed by the Department of Ecology. The plan shall include, but not be limited to:

10.4.a. Descriptions of and policies regarding management practices and facilities required for handling all waste types;

10.4.b. Schedules and responsibilities for implementing policies;

10.4.c. Policies concerning waste reduction, recycling, energy and resource recovery, collection, transfer, long-haul transport, disposal, enforcement and administration;

10.4.d. Operational plan for the elements discussed in Item c above.

10..5 The cost of preparation by King County of the Comprehensive Plan will be considered a cost of the system and financed out of the rate base.

10.6 Comprehensive Plans will be adopted when the following has occurred:

10.6.a. The Comprehensive Plan is approved by the King County Council; and

10.6.b. The Comprehensive Plan is approved by Cities representing three-quarters of the population of the incorporated population of jurisdictions that are parties to the Forum Interlocal Agreement. In calculating the three-quarters, the calculations shall consider only those incorporated jurisdictions taking formal action to approve or disapprove the Plan within 120 days of receipt of the Plan. The 120-day time period shall begin to run from receipt by an incorporated jurisdiction of the Forum's recommendation on the Plan, or, if the Forum is unable to make a recommendation, upon receipt of the Comprehensive Plan from the Forum without recommendation.

10.7 Should the Comprehensive Plan be approved by the King County Council, but not receive approval of three-quarters of the Cities acting on the Plan, and should King County and the Cities be unable to resolve their disagreement, then the Comprehensive Plan shall be referred to the State Department of Ecology and the State Department of Ecology will resolve any disputes regarding Plan adoption and adequacy by approving or disapproving the Comprehensive Plan or any part thereof.

10.8 King County shall determine which cities are affected by any proposed amendment to the Comprehensive Plan. If any City disagrees with such determination, then the City can request that the Forum determine whether or not the City is affected. Such determination shall be made by a two-thirds majority vote of all representative members of the Forum.

10.9 Should King County and the affected jurisdictions be unable to agree on amendments to the Comprehensive Plan, then the proposed amendments shall be referred to the Department of Ecology to resolve any disputes regarding such amendments.

10.10 Should there be any impasse between the parties regarding Plan adoption, adequacy, or consistency or inconsistency or whether any permits or programs adopted or proposed are consistent with the Comprehensive Plan, then the Department of Ecology shall resolve said disputes.

XI. FORCE MAJEURE

The parties are not liable for failure to perform pursuant to the terms of this Agreement when failure to perform was due to an unforeseeable event beyond the control of either party to this Agreement.

XII. MERGER

This Agreement merges and supersedes all prior negotiations, representation and/or agreements between the parties relating to the subject matter of this Agreement and constitutes the entire contract between the parties except with regard to the provisions of the Forum Interlocal Agreement.

X111. WAIVER

No waiver by either party of any term or condition of this Agreement shall be deemed or construed to constitute a waiver of any other term or condition or of any subsequent breach whether of the same or a different provision of this Agreement.

XIV. THIRD PARTY BENEFICIARY

This Agreement is not entered into with the intent that it shall benefit any other entity or person except those expressly described herein, and no other such person or entity shall be entitled to be treated as a third party beneficiary of this Agreement.

XV. SEVERABILITY

If any of the provisions contained in this Agreement are held illegal, invalid or unenforceable, the remaining provisions shall remain in full force and effect.

XVI. NOTICE

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY	KING COUNTY
_____	_____
Mayor	King County Executive
_____	_____
Date	Date
Pursuant to Resolution No. _____	Pursuant to Motion No. _____
_____	_____
Clerk-Attest	Clerk-Attest
Approved as to form and legality	Approved as to form and legality
_____	_____
City Attorney	King County Deputy Prosecuting Attorney
_____	_____
Date	Date

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FORUM INTERLOCAL AGREEMENT

This Agreement is entered into between King County, a political subdivision of the State of Washington, the City of Seattle, and the cities and towns set forth below, all municipal corporations located within the boundaries of King County, hereinafter referred to as "County" and "Cities." This Agreement has been authorized by the legislative body of each jurisdiction pursuant to formal action as designated on the signature pages.

PREAMBLE

This Agreement is entered into for the purposes of establishing a Forum composed of representatives from the Cities and the County that will consider issues of policy regarding terms and conditions of the Solid Waste Interlocal Agreement entered into individually between each City and the County.

I. PURPOSE

The purpose of this Agreement is to establish the Forum and the terms and conditions by which the parties shall discuss and/or determine policy and development of a Comprehensive Solid Waste Management Plan.

II. DURATION

This Agreement shall become effective on _____and shall remain in effect through June 30, 2028.

III. APPROVAL

This Agreement shall be submitted to the Washington State Department of Ecology for its approval as to all matters within the Department's statutory jurisdiction, if any. This Agreement shall be filed with each City Clerk and with the Clerk of the King County Council.

IV. SCOPE OF RESPONSIBILITIES

The scope of the responsibilities of the Forum is as follows:

4.1 Advise the King County Council, the King County Executive and other jurisdictions as appropriate, on all policy aspects of solid waste management and planning.

4.2 Consult with and advise the King County Solid Waste Division on technical issues related to solid waste management and planning.

4.3 Review and comment on alternatives and recommendations for the King County comprehensive solid waste management plan and facilitate a review and/or approval of the plan by each jurisdiction.

4.4 Review and subsequent proposed interlocal agreements between King County and Cities for planning, waste recycling and reduction, and waste stream control.

4.5 Review and comment on disposal rate proposals.

4.6 Review and comment on status reports on waste stream reduction, recycling, energy/resource recovery, and solid waste operations with interjurisdictional impact.

4.7 Promote information exchange and interaction between waste generators, local government with collection authority, recyclers, and County-planned and operated disposal systems.

4.8 Provide coordination opportunities between the King County Solid Waste Division, Cities, private operators, and recyclers

4.9 Aid Cities in recognizing municipal solid waste responsibilities, including collection and recycling, and effectively carrying out those responsibilities.

V. MEMBERSHIP

5.1 The Forum shall consist of a 12-member group of representatives of unincorporated King County designated by the King County Council, representatives of the City of Seattle designated by the City of Seattle, and representative of other incorporated cities and towns within King County that are signators to this agreement designated by the Suburban Cities Association. Members of the Forum shall be established on the most current population estimates as published by the Washington Office of Financial Management. Currently,

unincorporated King County composes 32.1 percent; Seattle, 33.6 percent; and Suburban Cities, 34.3 percent of the total population. The calculations are determined as follows:

					Members
Unincorporated King County	12	X	32.1%	= 3.85	4
Seattle	12	X	33.6%	= 4.03	4
Suburbs	12	X	34.3%	+ 4.12	4
Totals					12 + Chair

5.2 In calculating the number representatives on the Forum, all numbers .5 and greater are to be rounded up to the nearest whole number. Proportional representation of the Forum will be reviewed once every five years during the life of this agreement and necessary revisions shall be made to the proportional representation according to the formula set forth above based on population change as established by the most current census.

5.3 In addition to the 12 members of the Forum, a citizen chair shall be selected or removed by a majority vote of all members of the Forum. Each representative shall have an equal vote on all Forum decisions. The Chair shall vote only in the case of a tie on any vote of the Forum.

VI. MEETINGS

Unless otherwise provided, Roberts' Revised Rules of Order shall govern all procedural matters related to the business of the Forum. There shall be a minimum of two meetings each year and not less than 14 days' written notice shall be given to members prior to such meeting. Four or more members or the Chair may declare an emergency meeting with 24 hours written notice to the members. The time, date, and location shall be set by King County after consultation with the representatives of Seattle and the other cities and towns.

VII. BYLAWS

7.1 The Forum shall, within 60 days after its first meeting, adopt bylaws for the operation of the Forum. Such by laws shall recognize that this Forum shall function in the place of the Puget Sound Council of Governments Committee of Solid Waste and the Solid Waste Management Board of the King Sub-regional Council. This Interlocal Forum shall not report to nor have responsibilities to or for either committee or council. The King County Solid Waste

Advisory Committee formed pursuant to RCW 70.95.165 shall continue pursuant to its statutory functions and, in addition, shall advise the Forum on solid waste matters.

7.2 The bylaws shall provide, among other things, that the Forum shall make an annual written report to the public, and the parties to this Agreement on Forum activities and the status of the solid waste systems in King County. The bylaws may also provide for such other reports as seemed necessary.

7.3 The bylaws shall also provide for the manner in which the Forum will provide its consultative and participatory advice regarding the solid waste management plan.

VIII. STAFFING AND OTHER SUPPORT

Staffing, supplies and equipment for the Forum shall be supplied by and through the Puget Sound Council of Governments, its successor, or other entity. Reimbursement to the Puget Sound Council of Governments for such staffing, supplies, and equipment shall be agreed upon and paid by King County from monies collected from the solid waste rates and charges, after considering recommendations by the Forum to King County. The Forum shall submit an appropriation request to the County by May 31 of each year or such other mutually agreed-upon date. King County may, subject to approval by the two-thirds vote of all constituted representatives of the Forum, terminate the staffing with Puget Sound Council of Governments and provide such staffing, supplies and equipment by other means.

IX. FORCE MAJEURE

The parties are not liable for failure to perform pursuant to the terms of this Agreement when failure to perform was due to an unforeseeable event beyond the control of any party to this Agreement.

X. MERGER

This Agreement merges and supersedes all prior negotiation, representation and/or agreements between the parties relating to the subject matter of this Agreement and constitutes the entire contract between the parties except with regard to the provisions of the Solid Waste Interlocal Agreement.

XI WAIVER

No waiver by either party of any term or condition of this Agreement shall be deemed or construed to constitute a waiver of any other term or condition or any subsequent breach, whether of the same or a different provision of this Agreement.

XII. THIRD PARTY BENEFICIARY

This Agreement is not entered into with the intent that it shall benefit any other entity or person, except those expressly described herein, and no other such person or entity shall be entitled to be treated as a third party beneficiary of this Agreement.

XIII. SEVERABILITY

If any of the provisions contained in this Agreement are held illegal, invalid or unenforceable, the remaining provisions shall remain in full force and effect.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below, pursuant to the legislative action set forth below.

CITY	KING COUNTY
_____	_____ King County Executive
_____ Date	_____ Date
Pursuant to Resolution No _____	Pursuant to Motion No. _____
_____ Clerk-Attest	_____ Clerk-Attest
Approved as to form	Approved as to form
_____ City Attorney	_____ King County Deputy Prosecuting Attorney
_____ Date	_____ Date

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ADDENDUM
To
SOLID WASTE INTERLOCAL AGREEMENT
and
FORUM INTERLOCAL AGREEMENT

This Addendum is entered into between King County, a political subdivision of the State of Washington and the City of _____ a municipal corporation of the State of Washington, hereinafter referred to as "County" and "City" respectively, who have previously executed interlocal agreements for solid waste management and the Solid Waste Interlocal Forum. This Addendum has been authorized by the legislative body of each jurisdiction pursuant to formal action as designated on the signature pages.

PREAMBLE

The County and the City have executed interlocal agreements (hereinafter called "the Agreements") on July 1, 1988, and January 1, 1988, in which the respective responsibilities of the parties for solid waste management and establishment of a Solid Waste Interlocal Forum ("the Forum") have been designated. Since the date of execution of the Agreements, the Regional Governance Summit of elected officials representing the County and the cities proposed and the voters adopted King County Charter amendments which established a minimum of three regional policy committees of the King County Council. These committees, which were modeled after the Solid Waste Interlocal Forum, are comprised of a mix of representatives of suburban cities and Seattle as well as King County Councilmembers. One of the three, the Regional Policy Committee, has been deemed to meet the characteristics of membership, staffing, and relationships to the parties to the Agreements which were intended for the Forum. By Motion 9297, the King County Council has expressed its intent that the Regional Policy Committee of the King County Council be designated as the successor to the Solid Waste Interlocal Forum and serve the purposes of the Forum described in the Agreements to which this document is an Addendum. This intent was also expressed by the suburban cities in Resolution 1 adopted by the Suburban Cities Association on June 16, 1993.

I. PURPOSE

The purpose of this Addendum is to designate the Regional Policy Committee of the King County Council which was established by the King County Charter amendment approved by the voters on November 2, 1992 as the designated Forum pursuant to the Agreements.

II. DEFINITIONS

For purposes of this Addendum, the definitions established in the Agreements shall apply.

III. FORUM

The Regional Policy Committee of the King County Council shall be established as the designated Interlocal Forum pursuant to the Agreements. Effective immediately, the Regional Policy Committee shall assume the responsibilities for the designated Interlocal Forum which are defined in the Agreements. The terms and conditions specified in the Agreements by which the parties shall discuss and/or determine policy and development of a Comprehensive Solid Waste Management Plan as shall apply to the parties and to the Regional Policy Committee, except as specified below.

3.1 Section VI. MEMBERSHIP, of the Solid Waste Interlocal Forum Agreement is hereby repealed. Membership of the Regional Policy Committee shall be as specified in the King County Charter.

3.2 Section VII, MEETINGS, of the Solid Waste Interlocal Forum Agreement is hereby repealed. Unless otherwise provided, the rules and procedures of the Metropolitan King County Council adopted by ordinance shall govern all procedural matters related to the business of the Forum.

3.3 Section VIII, BYLAWS, of the Solid Waste Interlocal Forum Agreement is hereby repealed.

3.4. Section IX, STAFFING AND OTHER SUPPORT, of the Solid Waste Interlocal Forum Agreement is hereby repealed.

IV. SOLID WASTE ADVISORY COMMITTEE

The King County Solid Waste Advisory Committee formed pursuant to RCW 70.95.165 shall continue pursuant to its statutory functions and, in addition, shall advise the Forum on solid waste matters.

V. DURATION

This Addendum shall become effective on the date of execution and shall remain in effect through June 30, 2028.

VI. NOTICE

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY	KING COUNTY
_____	_____
Mayor	King County Executive
_____	_____
Date	Date
Pursuant to Resolution No. ____	Pursuant to Motion No. _____
_____	_____
Clerk – Attest	Clerk – Attest
Approved as to form and legality	Approved as to form and legality
_____	_____
City Attorney	King County Deputy Prosecuting Attorney
_____	_____
Date	Date

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© Carol dePelecyn, 2008, *Terre Firma*, Billboard, Steve McGehee, original photograph King County Art Collection, Photo by Steve McGehee

King County
Department of Natural Resources and Parks
Solid Waste Division
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Seattle, WA 98104-3855
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www.kingcounty.gov/solidwaste