



Optimized Transfer Station Recycling Feasibility Study

Task 6: Strategy Evaluation and Recommendations

Prepared for
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Executive Summary

Background

King County has long been a national environmental leader. Since its inception in the 1960s, the core mission of the King County Solid Waste Division has been to ensure that citizens in the county have access to safe, reliable, efficient, and affordable solid waste handling and disposal services. That mission has expanded to include the principles of “Zero Waste of Resources” and environmental stewardship and the Division has developed and implemented a variety of programs designed to reduce, reuse, and recycle waste.

In June 2012, King County selected the project team of Herrera Environmental Consultants, HDR Engineering, and O’Brien & Company to evaluate methods to optimize County resources being dedicated to recycling activities at division transfer facilities. The major goals of the study included:

- Looking at other municipalities to get a fresh perspective on “state of the art” practices, labor, staffing, equipment, etc.
- Understanding what private partners are doing
- Developing a report with input from across the Solid Waste Division
- Thinking system-wide to truly consider all options.

Drawing on the project team’s waste management experience, familiarity with King County’s system, and its research capabilities, this study consisted of five tasks: Background Document Review; Stakeholder Outreach; Regional and National Research; Strategy Identification and Evaluation; and Recommendations and Final Report

Existing Conditions

Existing Older Stations

For the purposes of this report, existing older stations are assumed to be Algona, Renton, Houghton, and Factoria. These stations were designed and constructed in the 1960s. All facilities are staffed as necessary to carry out daily operations and at a minimum one TSO is required to be present during hours that waste is accepted. As directed by a TSO, commercial and self-haul customers dump directly into the refuse trailers located in the trailer tunnel, under the chutes, from the tipping floor above.

- Renton and Houghton have traditional recyclables collection (Metals, Glass, Plastics, and Paper) prior to the scale-house.
- Factoria and Algona do not have space available for any recyclables collection.

- Traditional recyclable collection service resumed in 2013 at Houghton and Renton after just over a year absence. Collected recyclables are hauled off-site by a contractor for processing.
- There are not opportunities for trailers to be located for collection of organics or C&D at these facilities due to space constraints. Space is not available for bins to collect bulky items due to space constraints, except for special events on the weekends.

Updated / Retrofitted Stations

For the purposes of this report, updated and retrofitted stations are assumed to be Bow Lake, Shoreline, Vashon, and Enumclaw. These stations fall into two categories, recently remodeled with a grade separated floor (Bow Lake and Shoreline) and newer pit styles (Vashon and Enumclaw). These stations all have adequate space available for diversion activities. All facilities are staffed as necessary to carry out daily operations and at a minimum one TSO is required to be present during hours that waste is accepted.

At the grade separated stations, a loading vehicle on the tipping floor is used to move, mix, and push MSW into a compactor chute. The chute feeds a compactor located below the tipping floor. At Enumclaw and Vashon, TSOs direct commercial and self-haul customers to dump directly into the refuse pit from the tipping floor above.

At Enumclaw, Shoreline, and Vashon, traditional recyclables are collected within the designated area of the transfer facility. Shoreline and Enumclaw have collection of clean wood and organics. Vashon has an area designated for the collection of household appliances. Shoreline, Enumclaw, and Bow Lake have collection of scrap metal, bicycles, and appliances.

Processing of collected materials for recycling is not currently completed at these stations. Processing is not feasible at Enumclaw and Vashon due to their pit designs. Processing at Bow Lake and Shoreline is possible but would require extensive operational changes.

All Stations

A number of system constraints affect all stations, though in general they are not physical or operational limitations. Much of the leverage for additional diversion at King County transfer facilities must come from the actions of its customers, with support from transfer station staff. This can be brought about with appropriate recycling policies and programs, and education and outreach.

Policies and programs in place include: product restrictions and bans, fees and incentives, product stewardship and market development programs, and private recycling partnerships.

Education and outreach primarily refers to the different ways of communicating to staff and the public about their role in increasing diversion of materials in the transfer system. Several constraints were identified:

- Staff culture that is inconsistent with a culture of diversion
- Ineffective Onsite Customer Information

- Challenges with Offsite Customer Education & Outreach

Opportunities

To optimize recycling at its transfer facilities, a range of strategy tools is available to King County. For our purposes, we have grouped them as follows:

- Policies and Programs
- Education and Outreach
- Facilities, including layout and design, operations, and processing

Generally speaking, the County does, and should continue to use measures in all of these areas. Together they provide a comprehensive and self-reinforcing strategy to maximize diversion at County facilities. Policies and programs set the overarching context for targeting accomplishments; education and outreach let all customers and staff know the most effective ways to participate; and the infrastructure facilitates execution and value creation.

Policies and Programs

The following policy and program initiatives resonated as the top opportunities from outside research that have real potential for King County, and address the primary constraints identified:

- Maximize the use of disposal bans where markets are in place in order to divert materials and products to the appropriate private reuse and recycling infrastructure
- Refine the use of recycling fees to emphasize curbside collection of traditional recyclables and to create more opportunity for other targeted materials.
- Enhance program initiatives in product stewardship and use public collection and processing infrastructure to leverage existing or developing private collection and processing infrastructure.
- Refine waste acceptance and handling policies that restrict more active involvement by County staff in facilitating diversion of materials to reuse and recycling.

Education and Outreach

Education and outreach as a strategy tool has broad applicability to support system wide policies and programs (particularly those undergoing change), and it can also pointedly support many of the other strategies addressed in the recommendations.

The following education and outreach themes resonated as the top opportunities from outside research that have potential for King County, and address the primary constraints identified:

- Create an internal culture that places a high value on reuse and recycling
- Make it easy for the customer to be part of this culture through improved information available onsite through a streamlined set of highly graphic, simply worded signage, and intuitive yet flexible placement of signage

- Engage customers in advance of their visit through offsite education and outreach with Informational materials sent out to customers; 'Take home' reference materials; and Digital resources

Facilities

New transfer stations are designed with flat floors creating versatile areas for waste collection and processing. Flat floors will allow TSOs to recover materials for reuse and recycling from customers. Due to the advantages provided by this design, new transfer stations designed for King County should be flat floor.

Diversion at King County Transfer Stations can be significantly increased through aligning staff resources to diversion goals. Facilities all need to be staffed to safely carry out daily operations. However, additional staff should be employed to assist customers with diverting materials for recovery, assist in unloading the vehicles and placing the materials to the proper bins or bunkers for recycling and reuse, and educating customers.

Additional infrastructure should be provided to facilitate source-separated drop-off and segregation by customers and/or staff; hand sorting of mixed materials, with targeted floor sorts; and to process self-hauler material on a pick-line. Larger projects with potential that require greater funding and planning include mechanized sorting, resource recovery parks, processing campus

Strategy Evaluation and Prioritization

The project team relied on the research and findings from the earlier phases of its work (i.e., background document review, stakeholder outreach, and regional and national research), and drew on its professional experience to identify discrete strategies to be considered in the King County system. Approximately 139 potential new strategies were identified. Once strategies were identified, the project team initiated a process to develop evaluation criteria, get feedback from King County staff, apply criteria, and develop strategy priorities.

Conclusions and Strategy Recommendations

The recommendations are based on the extensive background research, stakeholder outreach, and regional and national research conducted by the team. As such, the recommended strategies are data-driven, reflecting best practices from around the country, tempered with a full understanding of King County's unique circumstances and infrastructure (See Appendix A).

As the County proceeds to modernize its transfer system with the siting, design, and construction of new facilities, and the updating or moth-balling of others, choices exist:

- What is an appropriate level of recycling to accomplish at existing and new facilities?

- Should the County do material processing itself to accomplish its Zero Waste of Resources goals? At what level?
- What type of partnership should the County have with the private sector?
- What is the best mix of facilities (and where should they be) to maximize diversion efficiently?

This report provides the context to recommend the following principles:

1. Convert obsolete or underused facilities into recycling-only facilities and modify existing King County transfer facilities to focus on reuse, recycling, waste diversion, and/or processing of self-haul materials.
2. Site, design and build new King County solid waste facilities to align collection and processing in an advanced materials management system
3. Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities
4. Proceed in a manner that is internally consistent with the structure under which the County is currently working (i.e., source-separated private collection, private MRFs for collected recyclables, private processing for commercial C&D).
5. Align policies, fees, and regulations to emphasize, incentivize, and compel reuse and recycling of waste toward Zero Waste of Resources.

The project team has applied a high level of professional experience to make recommendations that if implemented through the most aggressive strategies on the following pages, will help create a transfer system that is “state of the art” for reuse and recycling in the industry.

The following strategies summarize a wide ranging menu of possible ways to implement the principles recommended above, organized by station generation (see Table 1). Plan page refers to the location of strategy descriptions in Section 5 in the context of base, less-, and more-aggressive alternatives. Appendix detail page refers to the location of detailed strategy descriptions in Appendix A.

Table 1. Summary of Strategies

	Strategies	Plan Page	Appendix Detail Page
Older	1. Modify unloading access to suit recyclable material delivery peaks in order to facilitate diversion	47	A-1
	2. Convert obsolete or underused facilities into recycling facilities	47 58	A-1 A-74
Updated/Retrofitted and Brand New	3. Develop, install and staff flexible material receiving/processing capability for reusable and recyclable Self-Haul materials	48	A-6
	4. Configure operations to support maximum customer exposure to on-site reuse and recycling opportunities, including material receiving/processing areas	49	A-18
	5. Institute selected material-specific actions to increase diversion at only Updated/Retrofitted or Brand New King County solid waste facilities	50	A-21
	6. Convert or modify existing King County solid waste facilities to focus on reuse, recycling, waste diversion, and/or processing	50 58	A-24 A-77
	7. Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities	50 59	A-26 A-79
Brand New	8. Site and design new King County solid waste facilities to allow maximum flexibility for reuse, recycling, diversion, and material processing.	51	A-29
	9. Develop and operate flexible material receiving/processing capability for all reusable and recyclable materials	51	A-31
	10. Site, design and build new King County solid waste facilities to align collection and processing in advanced materials management system	51 59	A-33 A-81
All	11. Formalize and foster an internal staff culture that places a high value on reuse and recycling	52	A-38
	12. Provide robust off-site community education and outreach materials that prepare customers for visiting King County solid waste facilities, and build the community's culture of reuse, recycling and diversion.	53	A-46
	13. Improve on-site information to motivate and direct proper placement of reusable and recyclable materials at the Transfer Station	54	A-52
	14. Institute or reinforce county-wide policies that support increased focus on reuse and recycling at King County solid waste facilities	55	A-55
	15. Enhance or re-direct staff activities to actively facilitate material diversion to reuse and recycling	56	A-61
	16. Institute selected material-specific actions to increase diversion at all King County solid waste facilities	56	A-67
	17. Evaluate partnering with private companies to operate some or all existing or new King County solid waste facilities	57 59	A-73 A-85

1. Introduction

Study Purpose and Background

King County has long been a national environmental leader. Since its inception in the 1960s, the core mission of the King County Solid Waste Division has been to ensure that citizens in the county have access to safe, reliable, efficient, and affordable solid waste handling and disposal services. That mission has expanded to include the principles of “Zero Waste of Resources” and environmental stewardship and the Division has developed and implemented a variety of programs designed to reduce, reuse, and recycle waste.

The current King County Solid Waste Comprehensive Plan provides a policy framework of sustainability and stewardship, and highlights the central position of the Division’s solid waste system in reaching its “Zero Waste of Resources” goals. The King County solid waste system is comprised of eight transfer stations and two drop boxes dispersed throughout the urban and rural areas of the county, and serve 37 cities in the County. In 2011, county transfer facilities received about 796,000 tons of garbage and recyclables (King County 2011); in 2012, about 780,000 tons of garbage and recyclables were received (King County 2012). Most of the solid waste generated in King County’s service area is disposed at the county-owned Cedar Hills Regional Landfill (Cedar Hills), which under current operating conditions and development plans will close in about 2025.

With a focus on Zero Waste of Resources, cost-effectiveness, and system efficiency, King County is seeking to recover the maximum potential resource value of materials passing through their system, as well as to extend the life of Cedar Hills landfill. Based on King County data, there is ample room to do so. In 2011, the latest year for which data is available, only about 9,700 tons (~1%) of the 796,000 tons of waste received at county facilities was diverted for reuse or recycling (King County 2011). In fact, according to the latest King County waste characterization report (King County 2011a) materials delivered for disposal - particularly those delivered by self-haul customers - are typically highly recoverable, including¹:

- Materials leftover from construction projects (dimensional lumber and wood 15.8%, gypsum wallboard 5.3%, construction and demolition (C&D) wastes 5.6%)
- Traditional recyclables (metal 10.7%, paper 6.5%, plastic 9.5%, glass 2.2%)
- Compostable materials (yard trimmings 10.3%, other organics 5.5%, and food 3.1%)
- Bulky items (furniture 5.0%, carpet 5.0% and mattresses 1.6%).

Figure 1 shows the relative percentage of these materials in the King County self-haul disposed materials stream.

¹ Percentages are by weight

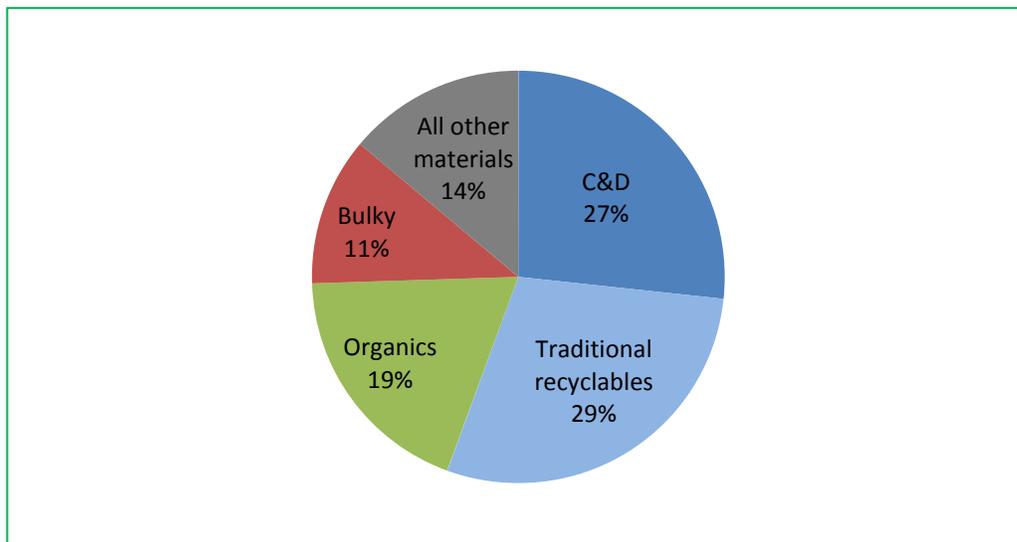


Figure 1. King County Self-Haul Recoverable Materials by Type

As shown, a large fraction of self-haul materials consist of materials left-over after construction projects (27%). The largest single fraction of materials delivered to transfer stations by self-haul customers is wood (15.8%). Traditional recyclable and organic materials account for nearly 50% of self-haul materials. Bulky items account for 11 percent of self-haul materials.

In June 2012, King County selected the project team of Herrera Environmental Consultants, HDR Engineering, and O'Brien & Company to evaluate methods to optimize County resources being dedicated to recycling activities at division transfer facilities. The major goals of the study were to:

- Help maximize diversion and improve services at transfer stations
- Look at other municipalities and get a fresh perspective on key issues: labor, staffing, equipment, etc.
- Understand what private partners are doing
- Developing a report with input from across the Solid Waste Division
- Think system-wide to truly consider all options.

Study Process

The "Optimized Transfer Station Recycling" evaluation was carried out through a collaborative effort of the project team and King County staff. While King County staff has given valuable input during the course of the study, they provided the project team with wide latitude to develop recommendations based on its collective expertise. As a result, this report is representative of outside expert opinion about potential strategies to optimize King County's transfer system for material diversion to reuse and recycling, rather than the Division's actual plan for doing so. Based on this report and subsequent analyses currently planned, King County will produce an implementation plan.

Drawing on the project team's waste management experience, familiarity with King County's system, and its research capabilities, this study focuses primarily on an evaluation of the flow of resources and waste through the County's solid waste system to identify opportunities for creating facilities that are enhanced or more efficient for waste reuse and recycling. The study process consisted of five tasks, each of which is summarized in the following sections:

1. Background Document Review
2. Stakeholder Outreach
3. Regional and National Research
4. Strategy Identification and Evaluation
5. Recommendations and Final Report

Background Document Review

In order to start with the most comprehensive knowledge of the current system conditions, the project team met with King County staff to collect available background data, identify issues, and to gather initial thoughts as to specific constraints and opportunities. During this time, the project team and King County identified a wider group of King County staff that would meet periodically to assess progress and provide feedback. The internal County group consisted of representatives of Recycling and Environmental Services, Planning and Communications, Solid Waste Operations including management and transfer station supervisors and operators, and Engineering.

The project team reviewed existing King County transfer station information and data, including: Level of Service (LOS) and LOS criteria, waste and diversion data, operations procedures and practices, eight transfer station facilities and site layouts, equipment, staffing, available training, rates, and signage, and other relevant information and background documents. The review focused on:

- Understanding how much recycled material is in the 'mineable' disposed waste stream at the transfer stations, and its potential market value.
- Assessing physical constraints and opportunities
- Assessing King County code and policies for constraints and opportunities
- Providing a list of potential skills necessary or job requirements to perform the desired work to increase diversion

The project team reviewed relevant King County education and outreach methods and materials oriented toward transfer station customer visits. The existing status of education and outreach in King County was generally looked at in terms of audience, including facility managers and operations staff, and customers using the transfer station, both business and residential. Current conditions reviewed included any kind of formal and informal communication (such as meetings as well as on the floor customer interactions), formal or on-the-job training, printed or digital informational materials (flyers, website), on-site signage or other educational or directional materials, and any other informational resources such as the hotline.

The project team also reviewed other local existing and planned public and private transfer and recycling facility information and data, including: waste and diversion data, operations procedures and practices, facility and site layouts, equipment, anticipated recycling upgrades, staffing, available training, rates, signage.

The summary of the Background Document review is contained in the Task 2 report, included in Appendix E.

Stakeholder Outreach

As part of its effort to gain a complete picture of the recycling opportunities and challenges inherent in the current King County Transfer System, the project team engaged King County transfer station stakeholders, who include:

- King County Operations, Engineering, Recycling and Environmental Services, and Planning & Communications staff
- Waste and recycling industry participants
- Construction and design professionals, and
- Station customers.

The project team conducted this outreach/facilitation in order to elicit honest and instructive feedback that reflects each group's unique perspective. The outreach/facilitation consisted of:

- Conducting representative site visits and interviews of King County operations, engineering, and program management staff to better frame constraints and identify opportunities.
- Facilitating an internal workshop with transfer station employees and members of the Transfer Station Communication Team to better frame constraints and identify opportunities.
- Conducting brief on-site surveys of station users including contractors, commercial businesses, and residents.
- Conducting interviews of a variety of waste and recycling industry participants, including Private Commingled Processors under Contract with the County or Individual Jurisdictions; Private Commingled Processors not under Contract with the County; Private Source Separated Processors; Construction and Design Professionals that are Green Building Customers or transfer station designers.

The summary of the Stakeholder Outreach is contained in the Task 3 report, included in Appendix D.

Regional and National Research

As part of its effort to gain a complete picture of the potential for additional recycling within the King County transfer system, the project team conducted research regionally and nationally to identify facilities, activities, partnerships, and methods being used to achieve high recovery rates and enhanced revenue. Research focused on:

- Best practices, standard equipment, new technologies, unique rate structures, staffing, and policies at transfers stations and material recovery facilities
- Activities and arrangements that support the successful integration of public and private infrastructure AND Partnerships between publicly-owned waste/recycling infrastructure and commercial waste generators, product and packaging manufacturers, and re-manufacturers
- Practices, equipment or technologies for targeted C&D materials, and
- Training/Education/public outreach strategies at public and private facilities.

The project team conducted the research by:

- Identifying and communicating in person or in writing with successful municipalities with diversion rates in excess of 50%
- Communicating with professional contacts experienced with innovative recycling programs and jurisdictions
- Conducting web and literature searches for documentation of best practices, innovative recycling approaches, and successful implementation of recycling efforts at transfer stations, material recycling facilities, and in programs in general.

Transfer Stations with High Diversion Rates for Self-Haul Materials

To evaluate potential options for increasing diversion of recoverable materials, the project team profiled best practices at transfer stations with high diversion rates, particularly those with high rates for self-haul materials, including:

- Berkeley Transfer Station, Berkeley, California - owned and operated by the City of Berkeley
- Center for Hard to Recycle Materials (CHaRM), Boulder, Colorado - owned and operated by Eco-Cycled
- Cold Canyon Resource Recovery Park, San Luis Obispo, California - owned and operated by Waste Connections
- Davis Street Transfer Station, San Leandro, California - owned and operated by Waste Management
- El Cerrito Recycling Center, El Cerrito, California - owned and operated by the City of El Cerrito

- Salisbury - Sharon Transfer Station, Salisbury, Connecticut - owned and operated by the Town of Salisbury
- SF Recycling & Disposal, San Francisco, California - owned and operated by Recology
- Portland Metro Central Transfer Station, Portland, Oregon - owned by City of Portland and operated by Allied Waste.

The summary of the Regional and National Research is contained in the Task 4 report, included in Appendix C.

Strategy Identification and Evaluation

The identification of strategies to increase the amount of waste diverted from the transfer stations, and ultimately disposal in the Cedar Hills landfill, was the primary focus of this study. The project team relied on the research and findings from the earlier phases of its work (i.e., background document review, stakeholder outreach, and regional and national research), and drew on its professional experience to identify discrete strategies to be considered in the King County system. Approximately 139 potential new strategies were identified.

The summary of the Strategy Identification and Evaluation is contained in Section 4 of this report.

Recommendations and Final Report

Ultimately, the project team was tasked with consolidating the results of research, and presenting findings and recommendations, resulting in this report. The base recommendations contained in Section 5 of this report present options applicable to King County's 1) older existing, 2) updated/retrofitted and, 3) brand new transfer facilities, and are structured by short term to long term options. Additional more- and less-aggressive options are also included for consideration.

The Recommendations are contained in Section 5 of this report.

2. Existing Conditions

Existing Older Stations

For the purposes of this report, existing older stations are assumed to be Algona, Renton, Houghton, and Factoria (old).

Layout and Design

These stations were designed and constructed in the 1960s and have limited space available for recyclables, C&D, and green waste collection service. The transfer buildings have two designated customer entrances to the partially enclosed transfer buildings, commercial customers and other large dump vehicles and self-haul customers use opposite sides of the refuse chutes. When commercial customers are not present, self-haul customers may use both sides of the transfer buildings.

Other areas of these sites are used for staging empty and full trailers.

Renton and Houghton have traditional recyclables collection (Metals, Glass, Plastics, and Paper) prior to the scale-house.

Factoria (old) and Algona do not have space available for any recyclables collection.

Staffing

These facilities are staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator (TSO) is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically three to four full time employees (FTEs) are providing for transfer station operations and one FTE is working in the scale house.

Pay scales at this, and all facilities, is governed by Labor contracts between King County and the Teamsters Locals 117P and 174, International Federation of Professional and Technical Employees Local 17A and International Union of Operating Engineers Local 302

Operations

Scale house management generally consists of completing transactions, answering customer questions, and checking for compliance with covered load requirements.

As directed by a TSO, commercial and self-haul customers dump directly into the refuse trailers located in the trailer tunnel, under the chutes, from the tipping floor above. Stationary packers with a knuckle-boom crane are used to distribute and tamp the material in the trailers. TSOs, using a yard goat, pull loaded trailers from the chutes (trailer tunnel) out of the transfer building, close the lids, and park them in the loaded trailer parking section of

the trailer parking areas. From there, they are hauled to CHRL for unloading and waste disposal.

Empty trailers, brought from the CHRL, are stored in the empty trailer parking section of the trailer parking areas. As an empty trailer is needed, a TSO using a yard goat pulls it into place in the chute (trailer tunnel) of the transfer building.

At Renton and Houghton TSOs monitor and maintain the recycling areas. Signage is provided regarding information about accepted materials.

In accordance with state law, the Solid Waste Division has assessed a fee to the drivers of vehicles with unsecured loads arriving at its transfer facilities. The County's unsecured-load fee is in addition to any penalties or fines by law enforcement officers. The fine for transporting an unsecured load is \$216. If an item falls off a vehicle and causes bodily harm, the driver faces gross misdemeanor charges and penalties of up to \$5,000 and/or up to a year in prison.

Processing

Processing of collected materials is not completed at these stations.

Materials

Curbside / Traditional Recyclables (Metals, Glass, Plastics, Paper)

Collection of recyclables at transfer stations began in the 1980s. The program started with the addition of collection containers for the standard curbside recyclables at those facilities with adequate space. At some facilities, textile and appliance collection was also later added.

Traditional recyclable collection service resumed in 2013 at Houghton and Renton after just over a year absence. Collected recyclables are hauled off-site by a contractor for processing.

Organics (Yard waste, Food Waste, and Clean Wood Waste)

There are not opportunities for trailers to be located for collection of organics at these facilities due to space constraints. King County does not limit refuse disposal to one chute on the weekends when the commercial traffic is at a minimum in order to collect organics from self-haul customers.

Bulky Items

Space is not available for bins to collect bulky items due to space constraints, except for special events on the weekends.

Construction and Demolition Debris (C&D)

There are not opportunities for trailers to be normally located for collection of C&D due to space constraints. King County does not limit refuse disposal to one chute on the weekends when the commercial traffic is at a minimum in order to collect C&D from self-haul customers.

Updated / Retrofitted Stations

For the purposes of this report, updated and retrofitted stations are assumed to be Bow Lake, Shoreline, Vashon, and Enumclaw.

Layout and Design

These stations fall into two categories, recently remodeled with a grade separated floor (Bow Lake and Shoreline) and newer pit styles (Vashon and Enumclaw). These stations all have adequate space available for diversion activities.

At the grade separated stations, there are two designated customer entrances into the enclosed transfer building, commercial customers and other large dump vehicles enter the building through a single door and self-haul customers use a door on the other side of the building. Commercial and self-haul customers dump directly onto the tipping floor. Self-haul customers must dump over a wall separating these customers from the commercial haulers and King County loading vehicles.

Enumclaw and Vashon have partially enclosed transfer buildings with a center pit. Commercial customers and other large dump vehicles dump on the opposite side of the pit from the self-haul customers. When commercial customers are not present, self-haul customers may use both sides of the transfer building.

Staffing

All facilities are staffed as necessary to carry out daily operations and at a minimum one TSO is required to be present during hours that waste is accepted. Other staff members working at the facilities may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager.

At Bow Lake and Shoreline, typically four FTEs are providing for transfer station operations and three FTEs are working in the scale house.

At Enumclaw and Vashon, typically two FTEs are providing for transfer station operations when the station is open to all customers. When only commercial haulers are allowed to use the facility, only one FTE is required. The scale house is manned with regular part-time employees.

Operations

At the grade separated stations, a track dozer or front loader on the tipping floor is used to move, mix, and push MSW into a compactor chute. The chute feeds a compactor located below the tipping floor. The TSO cycles the compactor to make the waste into a bale and push it into a docked transfer trailer. Using a yard goat, a TSO pulls the loaded trailer from the compactor, closes the rear door, and parks it in the full trailer parking area. Full trailers are hauled to CHRL for unloading and waste disposal.

At Enumclaw and Vashon, TSOs direct commercial and self-haul customers to dump directly into the refuse pit from the tipping floor above. A loader in the pit is used to mix the MSW for load consistency. The MSW is pushed into a compactor hopper/chute in the pit floor. The chute feeds a compactor located below the pit level. TSOs cycle the compactor to push a bale into a docked, fully-containerized transfer trailer. Using a yard goat, TSOs pull the loaded trailer from the compactor loading dock, close the rear door, and park it in the full trailer parking area. Full trailers are hauled to the CHRL for unloading and waste disposal.

At all these stations, empty trailers, brought from CHRL, are stored in the empty trailer parking area. As an empty trailer is needed, a TSO, using a yard goat, backs it to a compactor, via entrances used only by Solid Waste Division vehicles.

TSOs are also tasked to monitor and maintain the recycling areas. There may be confusion by staff and haulers about required documentation to designate contaminated loads. Vendors, haulers, and staff are not all clear on the standards and procedures.

Processing

The communities served by the King County transfers stations have implemented significant source-separated recycling and organics collection programs which rely on private sector operations for collection and processing. Most residents and businesses in the region receive on-premises collection of recyclables, organics and solid waste. The County and the municipalities within the County intend to increase source separation through outreach, technical assistance and mandatory requirements. Recyclables, organics, and commercial loads of C&D are processed at private sector operations in the County.

The transfer stations have been designed to efficiently transfer two streams of materials:

- **Commercially Collected** - Post source-separated residual waste delivered by municipal collectors or private collection companies through contracts with the municipalities. These materials are presumed to have been left-over after customers have separately diverted recyclables and organics. This represents about 76 percent of materials handled by transfer stations in the County (King County 2011a).
- **Self-Hauled** - Discarded materials from self-haul customers, much of which is reusable, recyclable and compostable. This represents about 24 percent of the materials handled by transfer stations in the County (King County 2011a).

Processing of delivered materials is not currently completed at these stations

Hand Sorting

Hand sorting of materials is not currently completed at these stations

Floor Sorting

Floor sorting of materials is not currently completed at these stations

Mechanized Sorting

Mechanized sorting of materials is not currently completed at these stations

Finally, none of the updated/retrofitted facilities operate as a mixed waste MRF, as a resource recovery park, except for the recycling described above, nor with any recycling or conversion technologies as a complementary function.

Materials

Curbside / Traditional Recyclables (Metals, Glass, Plastics, Paper)

At Enumclaw, Shoreline, and Vashon, traditional recyclables are collected within the designated area of the transfer facility. The area is accessible by customers only during regular operating hours. Signage provides information about materials accepted.

Currently curbside recyclables are not being collected at Bow Lake. Collection of traditional recyclables will start in late 2013 following completion of construction.

Organics (Yard waste, Food Waste, and Clean Wood Waste)

Shoreline, Enumclaw, and Bow Lake have collection of clean wood and organics. A fee for deposit of these items is assessed at the Scalehouse.

Bulky Items

Vashon has an area designated for the collection of household appliances. A fee for deposit of these items is assessed at the Scalehouse.

Shoreline, Enumclaw, and Bow Lake have collection of scrap metal, bicycles, and appliances. A fee for deposit of these items is assessed at the Scalehouse. Collection of these materials at Bow Lake will be changed following completion of construction.

Construction and Demolition Debris (C&D)

Stations that currently accept C&D (only clean wood) are as follows: Bow Lake; Enumclaw; and Shoreline

Brand New Stations

For the purposes of this report, brand new stations are assumed to be those that do not yet exist, Factoria, Northeast, and South.

Factoria RTS recycling area of approximately 7,500 square feet on the tipping floor is planning for acceptance of thirteen materials, as follows:

- Organics (yard debris and food)
- Clean wood
- Scrap metal
- Cardboard
- Appliances
- Plastic film and bags
- Carpet
- Textiles
- Asphalt shingles

- Mattresses
- Gypsum Wallboard
- Mixed paper
- Tires

The use of tipping floor space is flexible and expected to vary throughout Factoria’s service life. For example, the recycling area will vary depending on the amount of different materials received, material storage (i.e., bunker, roll-off, floor) and handling (i.e., loose, compacted, baled). If recyclables will only be managed in a loose manner (e.g., no densification) then more floor space or more frequent loadouts will be required.

All Stations

A number of system constraints affect all stations, though some are not physical or operational limitations. Much of the leverage for additional diversion at King County transfer facilities must come from the actions of its customers, with support from transfer station staff. Some appropriate recycling policies and programs, and education and outreach, help immensely. However, customer behavior and infrastructure are not fully in alignment.

Recycling Policies and Programs

The County has successfully used a variety of policies and programs to drive and enhance reuse and recycling. Chapter three of the King County Solid Waste Management Comprehensive Plan contains descriptions of policies and programs that support reuse and recycling in general and at transfer facilities in particular. However, a number of policy constraints exist that could warrant attention.

Product Restrictions and Bans

Chapter 10.30.020 King County Code and County Waste Acceptance Policies (PUT 7-1-5-PR) currently prohibit acceptance of construction, demolition and land clearing waste at County facilities if it is transported by vehicles with hydraulic or mechanized beds, with some exceptions.

In addition, many staff may be hesitant to divert recyclable or reusable materials once unloaded from vehicles out of concern that customers may report them as salvaging or scavenging material. Chapter 10.10.030 (I) King County Code indicates that salvaging and scavenging (defined as the removal of materials from a solid waste facility without the authorization of the division director and the health officer) are prohibited at all King County solid waste facilities.

Finally, the County may be constrained in its reuse and recycling at transfer facilities far more by the policies it does not have, as by the policies it does have. For example, while yard waste is prohibited in curbside garbage collection containers, it is still acceptable at transfer facilities for disposal. Disposal bans at transfer facilities for priority materials such as clean wood, scrap metal, yard (and land clearing) waste, mattresses, and cardboard are not being used to the maximum extent possible to advance Zero Waste of Resources goals.

Fees and Incentives

King County's standard per-ton disposal fee (\$129.40) is high enough that it creates a significant incentive to reuse and recycle. However in some cases, Snohomish County's lower per-ton disposal rate (\$105) and still lower rates east of the Cascades may be causing the movement of waste to those locations. These practices are not legal, and may end up diverting materials to disposal that could be recovered.

King County code (KCC 10.12.021.G) allows fees for recycling to be set lower than those for disposal to encourage recycling over disposal. The use of differential fees is an important tool for increasing reuse and recycling. King County uses some differential material-specific fees to incentivize recycling of priority materials (e.g., yard waste, clean wood) and to cover the additional costs of recycling certain items (e.g., CD, DVDs, & VCRs, fluorescent bulbs, and appliances).

There are currently no fees for standard curbside recyclables at transfer facilities and the County pays the cost to have the materials picked up for processing by recycling firms. King County receives revenue from the sale of recyclable materials taken from its facilities; however, ongoing issues with contamination often reduce or negate these revenues.

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 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.

In addition, 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 county code KCC 10.30.050 and required in the contracts. 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.

Product Stewardship

King County is using a product stewardship approach for a variety of reusable and recyclable materials, including paint, carpet, fluorescent bulbs and tubes, mercury thermostats, rechargeable batteries, pharmaceuticals, mattresses, junk mail, and telephone books. Thus far, the approach has been voluntary rather than mandatory. The County has set up a framework for addressing producer responsibility through efforts such as the Take It Back Network (King County 2011). As a matter of Division policy, most of these efforts do not utilize the County's transfer facilities to facilitate collection, with the exception of household hazardous waste drop-off services.

Private Recycling

Private recycling infrastructure is an integral part of the County's overall solid waste management system. The flow chart from King County Solid Waste Management's Milestone 4 Report (King County 2006) shows the mix of private and public resources used in all phases of the system:

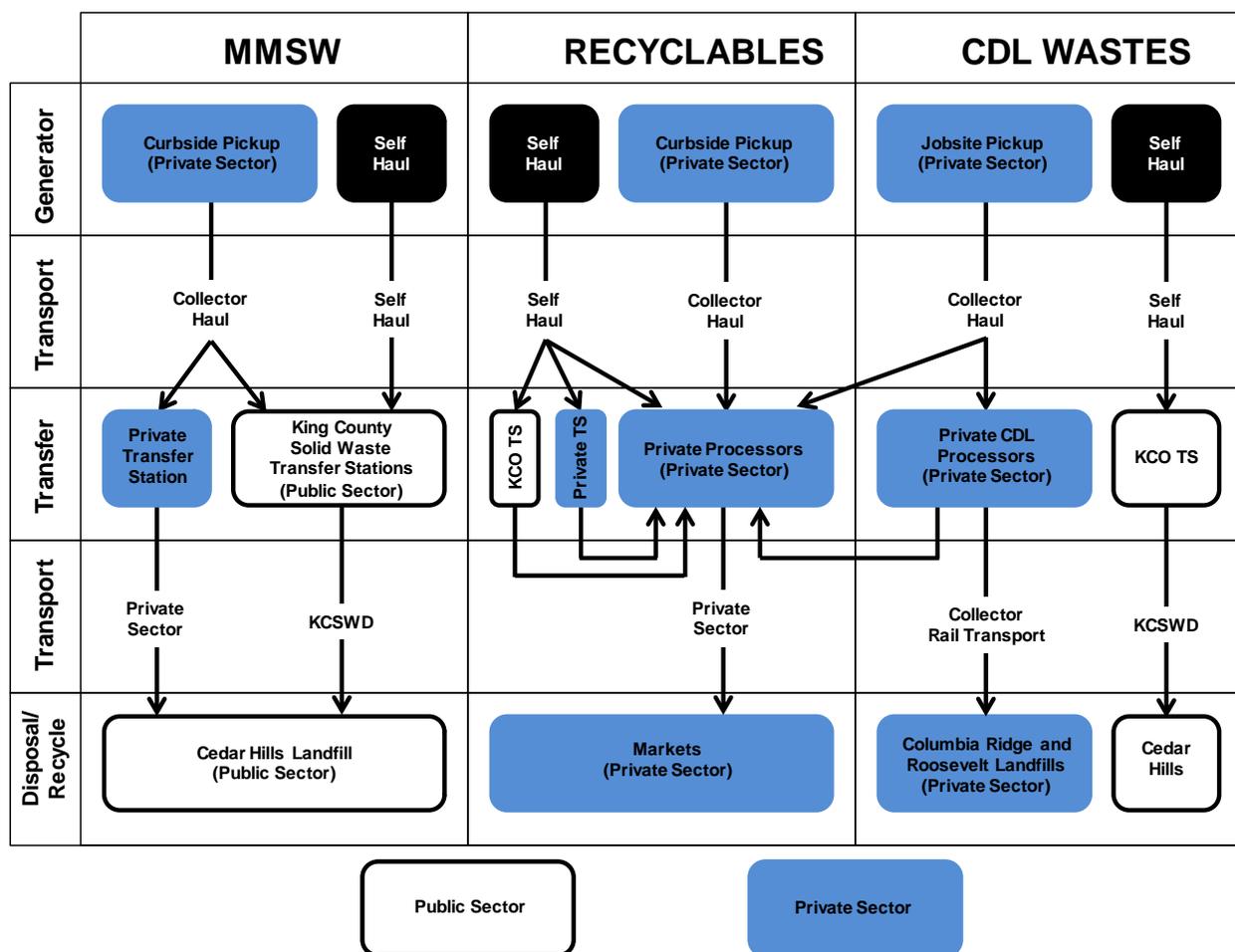


Figure 2. Mix of Public and Private Resources in King County Solid Waste System

Utilizing all of King County’s public and private assets together in cooperative ways to divert additional materials from disposal and into their highest and best uses may add substantially to overall economic and logistical efficiencies, and provide environmental benefits as well. There are a number of constraints to changing the current system, if desired:

- Policies, contracts, or union agreements that stipulate labor policies regarding contracted work.
 - ➔ *An existing King County Council labor policy says that when the county is contemplating contracting out work done by county employees, the employees will be given a chance to bid on providing the service.*
 - ➔ *In addition, in contracts between King County and the Teamsters Locals 117P and 174, International Federation of Professional and Technical Employees Local 17A and International Union of Operating Engineers Local 302, the county has agreed that no jobs will be eliminated due to*

contracting out, and that work currently performed by members of the bargaining units will not be contracted out.

- Flow control requirements for MSW, recyclables, CDL, or yardwaste.
 - ➔ *King County's Waste Acceptance Rule for King County Solid Waste Division Solid Waste Handling Facilities* stipulates a long list of wastes acceptable for disposal at KCSWD facilities. Section 6.12 addresses Construction, demolition and land clearing (CDL) waste. CDL is accepted as long as it is transported by vehicles that do not have hydraulic or otherwise mechanized dump beds. Incidental amounts of CDL contained in loads of mixed municipal solid waste, where the CDL waste does not exceed 10% of the load by volume, are also accepted. CDL waste in excess of these limitations may be accepted in particular cases at the County's sole discretion, providing formal or informal enforcement action is taken against the individual or entity transporting the CDL waste. In addition to these limits, waste delivered under this paragraph is subject to the general restrictions established by this Rule (including but not limited to burning and smoldering loads, dusty loads, overlength materials, highly odorous loads, and loads suspected of containing hazardous waste).

State law (RCW 70.95.020) mandates public oversight and authority for the planning and handling of solid waste. This currently precludes the possibility of a purely private solid waste system with no public sector involvement.

Research conducted for King County's Waste Export System Plan (King County 2006) details many of the advantages and disadvantages, and potential legal challenges, of each type of contractual model. A private-only system where the public sector is not involved in service delivery, rate setting or long term planning, is not allowed under current state law (RCW 70.95.020). As shown in Figure 2, King County is currently using a combination of the public-only and private-only models for specific pieces of the waste handling network.

At the time of King County's Waste Export System Plan, representatives of Waste Management, Allied/Rabanco (now Republic), and Waste Connections all agreed that they preferred either an all public or all private transfer system. A mixed transfer system was viewed by the haulers as not being the most efficient system.

Education and Outreach

Education and outreach is currently used in a variety of ways to communicate to staff and the public about their role in increasing diversion of materials in the transfer system. Education and outreach is one of the broadest reaching conditions across all stations. With the exception of site-specific signage, most of the communication mechanisms apply across all stations.

Constraints Identified

Staff culture that is inconsistent with a culture of diversion

The most noticeable challenge across stations is the lack of a strong, internal staff culture focusing on diversion. For reference, a robust internal culture should be evident throughout the ranks, including leadership direction, management oversight and everyday operations. It should also be evident to the customers interacting with the system.

Current conditions that constrain the development of a robust culture of diversion included:

- Some elements of internal staffing structure make it difficult to convey to staff their role in increasing diversion, as an active participant in the system. For example, labor concerns about floor staff interaction with customers may mean a missed opportunity for staff to help divert more recyclables at the transfer stations. While numerous all-staff meetings have occurred, they have not been mandatory (which could be used for education purposes or to clarify what a culture of diversion means, for example). Mandatory meetings are not allowed under the current contract. For reference, some staff noted that it is rare that operators and scale house operators are in the same meeting. However, a temporary Transfer Station Communications Team began to address some of these challenges.
- Most staff do not have a strong sense of priority about the importance or benefits of diversion or a real understanding of their role in diversion. The main priority is focused on getting customers in and out of the station quickly. There isn't any kind of training that educates staff about recyclable materials, and no messaging to staff explaining that recycling is a revenue stream, not a threat to job security. This means limited worker pride in doing a good job regarding recycling.
- Though overall quality customer service is a primary focus of the Division, there is a lack of emphasis on providing customer service specifically related to recycling. There is little or no current training focused on customer service for recycling.

Ineffective Onsite Customer Information

Common feedback from staff and customers underscored the importance of convenience - the easier it is to recycle and the less time it takes, the more people will do so. Layout plays a role in this, but the way that information about recycling is presented at the transfer station can have a huge impact in how easy it is for customers to understand what to do onsite, and therefore what customers actually do once they arrive. Current constraints identified that relate to onsite customer information include:

- Because the stations have some differences in materials acceptance, it can cause confusion for customers. Furthermore, the current written materials describing what is accepted can be overwhelming for staff to manage, and for the reader trying to decipher what to take where.
- Current on-site signage is not as effective as it could be, and in some stations, either overwhelming (too many signs, too much information), placed poorly, or don't convey

helpful information. However, staff are enthusiastic about current efforts to move to easily moveable, flexible signage, with streamlined content (i.e., color coding and using more graphics than words).

- Regardless about how much effort is put into signage or other written forms of information, previous experience always seems to outweigh it unless there is a more involved staff effort to override the tendency for customers to do what they did the last time. That is, the way information is presented onsite will only go so far - at some point interaction with staff will be more helpful, and help build the 'new' experience that customers will relate back to on their next visit.

Challenges with Offsite Customer Education & Outreach

Offsite customer education and outreach can help prepare customers before they come to the transfer station, whether it be conveying information about what materials are accepted for recycling and where, or how to pack a car for the most efficient unloading once at the transfer station. Aside from targeted campaign efforts to educate customers (which were not reviewed), an inherent challenge is that most of these current ongoing customer communication materials require the customer to take the initiative to tap into these resources, such as visiting the website, downloading a brochure, or calling the hotline. The following are some of the current constraints with offsite customer education and outreach:

- Demographics likely play a role in how effective 'at home' outreach methods are. For example, those customers who are more likely to visit the transfer station on a regular basis (such as contractors or homeowners without curbside service) might be more likely to check in for updates (though at the same time, many probably rely heavily on past experience). Customers from different parts of the County may also be more committed to learning in advance about recycling options.
- There is some customer confusion about what the recycling symbol means - many assume that if a material has the symbol, that all stations will accept it as recycling. Current materials do not address this issue.
- Both the County website and the 'What do I do with' website have some challenges associated with them. Based on the amount of incorrect information that customers often cite from the website, staff noted that it is not an intuitive website to use. The 'What do I do with' site is a volunteer updated database, and therefore is sometimes outdated, as it is the business' responsibility to notify the County when their acceptance policies change.
- Brochures that are available for download on the website are outdated, though the Communication Team is working on a process to update them.
- When policies change regarding recycling, it can take a very long time for consumer behavior to catch up, regardless of the education and outreach efforts. Staff noted that past efforts to educate the public on recycling changes take several years before they have real impact on customer behavior - by which time the policy is often outdated and new practices are being developed.

3. Opportunities

Strategy Tools

To optimize recycling at its transfer facilities, a range of strategy tools is available to King County. For our purposes, we have grouped them as follows:

- Policies and Programs
- Education and Outreach
- Facilities, including layout and design, operations, and processing

Generally speaking, the County does, and should continue to use measures in all of these areas. Together they provide a comprehensive and self-reinforcing strategy to maximize diversion at County facilities. Policies and programs set the overarching context for targeting accomplishments; education and outreach let all customers and staff know the most effective ways to participate; and the infrastructure facilitates execution and value creation. The paragraphs below provide a short description of the opportunities in each area.

Recycling Policies and Programs

Recycling policy and program strategies have broad applicability to set the overarching context for optimizing diversion of recyclable materials system-wide, and at transfer facilities specifically. Refining policies and programs allows the County to match market conditions, create regional consistency for consumers and recycling businesses, target diversion of recyclables from the waste stream that are not easily recycled curbside, and enhance product stewardship programs.

The following policy and program initiatives resonated as the top research opportunities that have real potential for King County, and address the primary constraints identified earlier:

- Maximize the use of disposal bans where markets are in place in order to divert materials and products to the appropriate private reuse and recycling infrastructure
- Refine the use of recycling fees to emphasize curbside collection of traditional recyclables and to create more opportunity for other targeted materials.
- Enhance program initiatives in product stewardship and use public collection and processing infrastructure to leverage existing or developing private collection and processing infrastructure.
- Refine waste acceptance and handling policies that restrict more active involvement by County staff in facilitating diversion of materials to reuse and recycling.

Product Restrictions and Bans

Product restrictions and bans do not affect earlier product or material life-cycle impacts, but do implement requirements for end-of-life management that excludes disposal, and requires recycling or disposal in special waste landfills. These measures, even those restrictions that may be short of a full ban, require alternatives to disposal to be largely in place (e.g., reuse

or recycling) in order to function effectively and fairly. For example, Seattle Municipal Code (SMC) 21.36.082 mandates commercial recycling of corrugated cardboard and paper. The City of Seattle has also adopted through legislation additional disposal bans on many recyclable C&D commodities (i.e., concrete, asphalt paving, bricks, and wood), the certification of C&D processing facilities and reporting by contractors on where materials are delivered for reuse, recycling and disposal. These new recycling initiatives will be implemented in the 2013-2016 time period.

King County has an opportunity to create county-wide consistency on specific traditional and C&D recyclable materials, which should further engage the private recycling infrastructure to meet the requirements of the policy. This set of policies would also provide the impetus to strengthen internal operational and logistical requirements necessary to allow County facilities to handle these recyclables to meet the requirement of the policy, if it chooses. Depending on the level of participation by County facilities, additional capacity within the transfer system could be created to focus on other high priority materials, and at the very least, additional disposal capacity could be created at Cedar Hills.

Fees and Incentives

As stated in the Task 4 report, using differential tip fees has become common practice, as it is in King County, as an incentive for keeping various waste types separate, and with the objective of encouraging recycling participation and/or increasing transfer station operational efficiency.

From the operational perspective, re-locating traditional recyclables behind the scale house if space is available and requiring a fee for entry creates system-wide incentives that provide an overall benefit:

- A fee on traditional material recycling at transfer stations should compel customers to place them into the curbside collection system, if it is available, rather than travel to transfer facilities. This reduces vehicle travel overall, and produces fewer emissions
- Fewer self-haul trips to County facilities keeps costs down and eases facility logistics, while creating a new revenue stream that is able to fund new or enhanced recycling initiatives at the stations.
- Additional monitoring from staff behind the scale house will also potentially cut down on contamination of recyclables that are received.

Depending on how the County proceeds with the C&D contracts when they expire in 2014, fees for these materials will need to be configured to be in alignment with reuse and recycling goals. As an alternative to a material restriction, C&D could be accepted and charged at a reduced rate, compared with MSW, as long as it goes for processing to a private recycler. Some inherent difficulties in this approach are discussed in the Facilities section of Part 3.

To the maximum extent possible, the Division should be provided with flexibility in which materials are targeted and the rates set for them, based on market conditions. Instituting

fees for acceptance of traditional/curbside materials (or changing policy to emphasize curbside collection of these materials) could enhance the overall collection and diversion of all materials.

Product Stewardship

The County is actively seeking to grow the number of materials and/or products that are recovered through a Product Stewardship approach. The Take it Back Network currently focuses efforts on electronics, fluorescent bulbs and tubes, and mattresses. The County is also actively engaged in a product stewardship approach for carpet, along with development of carpet recycling infrastructure and end-market development.

For our purposes, the question of opportunity involves whether to use the transfer system to leverage the emerging “take-back” or producer responsibility infrastructure. As discussed in the Task 4 report, a Hybrid Collection/Producer Funded program combines municipal infrastructure with funding provided by product manufacturers. The funding mechanism would be subject to negotiation between King County and the product manufacturers targeted for responsibility. This type of approach offers some benefits:

- If a producer take-back programs uses a variety of collection mechanisms, including through retailers, private vendors or recyclers, mail programs, or public or private collection systems, chances for success increase.
- Acceptance of targeted wastes at King County facilities could be used to “jump start” material volumes required for new processing facilities in their infancy. Continuation of acceptance at transfer facilities could be gauged according to the development of the take-back participants.
- The central (and growing) role of County facilities as a resource recovery location could help to heighten awareness of other take-back locations as they develop.
- Product stewardship through County facilities can be complemented with other County actions, including positive incentives such as technical assistance, education for consumers, recognition programs, market development efforts (e.g., LinkUp), grants, and procurement policies.

While many the products may lend themselves to county product stewardship efforts, the jurisdictional issues concerning the management of wastes from imported products, or products that move across jurisdictional boundaries may require a regional, state-wide, or national approach. Regional and national collaborations are also opportunities that should be used effectively, such as the Northwest Product Stewardship Council (NWPS), of which the County is a founding and active member.

Waste Acceptance and Handling Policies

Waste Acceptance Policies and oversight of material placement at transfer facilities can and should reflect broader product or material restrictions the County chooses to put in place. If County facilities are to take a more active role in accepting and diverting C&D and/or landclearing from larger sources, particularly those for which active markets or uses exist

(i.e., dimensional lumber, structural metal, vegetation), applicable code and waste acceptance policies should be altered to reflect planned priorities.

Also, if County facilities are to take a more active role in diverting reusable products and materials from its waste stream, King County Code regarding salvaging and scavenging should be altered to reflect that priority.

There is also an opportunity for thinking differently about the flow of material, such as partnering with Cities for alternative spaces and drop box sites using City 'real estate.'

Private Recycling

The private recycling sector is extensive in King County, Seattle, and the region. Reliance on the private recycling system should continue, and can be accomplished with education, incentives, financial development, legislation, and contract operations.

The County is actively working to develop private end-market infrastructure to use materials recycled throughout the system, including at the transfer facilities. The LinkUp program works to create partnerships with businesses, agencies and other organizations in the Puget Sound area to help increase the collection and processing of recyclable materials, use of recycled materials in manufacturing/production and purchase of recycled-content products. LinkUp's current strategic plan focuses on technology validation, technical assistance, networking, supply chain facilitation, education and training, and strategy development projects aimed at asphalt shingles, carpet, mattresses, and textiles.

Education and Outreach

Education and outreach as a strategy tool has broad applicability to support system wide policies and programs (particularly those undergoing change), and it can also pointedly support many of the other strategies addressed in the recommendations. Education and outreach is unique to some of the other strategies in that it's generally more successful as a coordinated effort, using a variety of implementation methods to reach the different players in the system to create the behavior change desired - particularly for creating system wide change.

The following education and outreach themes resonated as the top opportunities from outside research that have real potential for King County, and address the primary constraints identified earlier:

- Create an internal culture that places a high value on reuse and recycling
- Make it easy for the customer to be part of this culture through improved information available onsite
- Engage customers in advance of their visit through offsite education and outreach

Create a culture that places a high value on reuse and recycling

The facilities profiled with high diversion rates all had a strong 'culture of diversion' where staff take pride in providing customer service that reflects this culture. A culture of diversion

means that throughout all levels of the system the players placed value on diversion as one of the top priorities (if not the top priority), had a clear understanding of their role in achieving high levels of diversion, and worked together to do so. This culture resonated with the customers using the facility.

The following are ideas that represent both best practices in inspiring and leading a culture shift with specific examples from those facilities that exhibit this culture.

Build on existing strengths

As with many of the successful facilities reviewed, King County has very low turnover in staffing at the Transfer Stations. In addition, most of the staff have worked on the same team for many years, creating a sense of commitment and loyalty to the job and coworkers. Staff can be a key component in creating a sense of ownership or stewardship of their station's recycling activities, particularly when considering augmenting recycling roles for staff.

King County also has in place some existing communication mechanisms that are working well and could be an opportunity for even stronger lines of communication. All staff have a radio, which means that they can communicate with each other and the scale house. Floor staff have the ability to get quick answers to recycling questions from the scale house staff, who might have more information at their fingertips, for example. Additionally, the Transfer Station Recycling Project Manager recognizes the value of in-person meetings and regularly spends time on-site, building relationships and sharing information. A temporary Communication Team was established, which allowed an opportunity for improvement of signage and general communication. The group no longer meets. Re-initiating the group may provide an ongoing opportunity to champion some of the recommendations outlined here.

Reframe the issue: create a unified message that diversion is a priority

County leadership and management have an opportunity (and responsibility) to take the lead in defining or redefining the message that diversion is a priority, and that we all have a role to play. The words are important - and mindset changes often start with the words we use. The message that diversion is a priority is evident from the entry gates of many of the successful facilities profiled - simply by how they were named (Recycling Center, Resource Recovery Park, etc.).

A uniform message with cohesive elements means that staff from one station to another have the same goal in mind and understand what they need to do to achieve it (and the benefits of it) and that the customers hear that same message at all of the stations they use. Some of the staff suggestions for what a tangible manifestation of this could look like included making sure that customer brochures have the same information as what staff use for reference guides (or are even the same brochure), and reducing the clutter of multiple brochures for individual stations and replacing with a system wide brochure.

Set tangible, attainable targets that staff can get behind

Creating targets that reinforce the message that diversion is important gives a concrete purpose to education and outreach efforts (as well as any other strategy tools used), and can be successful even when they aren't backed by a jurisdictional recycling mandate. Linking

targets to profitability or job security can also reinforce the value of the message to staff members at an individual level, in addition to the system wide level. Making the horizon of the targets attainable also means that staff won't lose sight of them being too far out, and also can help to instill a sense of individual and team pride as they are achieved. Tapping into positive attitudes in the workplace - pride, sense of accomplishment, recognition of workmanship - is a basic tenant of team building, especially when it's around a paradigm shift such as this.

Script the critical moves for on-the-job changes, and make them easy to do

Most of the successful facilities relied more on on-the-job training over specific training (this is true for King County as well). Identifying and addressing mission-critical motivators or barriers that staff encounters on a daily basis, and habits that do or don't support the culture, will be an important step in translating the message of diversion to everyday behavior early on.

Particularly with such strong staff retention rates, new habits should be easy to understand and embrace. An example of this is developing a clear set of do's and don'ts that all staff could easily articulate. Understanding the appropriate roles in any habit changes is also important - for example, floor staff could have familiarity with the background information about why recycling is important and what other resources are available, but the scale house operator would be the primary point of contact for this information (accessible to floor staff through their radio). Simple tools could help make it easier, such as a pocket 'cheat sheet' or a visual poster in the shack.

Strengthen and rally the most valuable asset: staff

Reinforcing that most of the training does happen on the job, most of the formalized training efforts elsewhere focused on developing a better understanding of staff roles and resources available on the job. It becomes particularly important for everyone to know how all the players work together in the system if the scope of staff responsibilities changes, such as bringing floor staff into a more active role of directing customers to recycling areas, or helping to unload. The most robust example of what this looks like is Portland Metro's 'role swapping day' for floor staff, scale house operators and call center staff to better understand customer needs and how staff can work together to achieve goals and clearly communicate with each other and the customer.

Other areas of opportunity include bringing all staff together to focus on joint issues and goals, and to present and reinforce the new messaging of diversion as a priority. This could be particularly important given the low turnover rates in the County - mindset changes can be slower for staff who are well accustomed to how things are and have to learn a new normal. King County operations staff who participated in the consultant team's outreach were enthusiastic about this idea as a way to build a more cohesive team and a larger team spirit broader than their specific coworkers. If staff are to play a more active role in helping customers, customer service training becomes critical.

Finally, many successful facilities use a model of public private partnerships that can increase on the job staff education (in addition to added capacity and more diversion outlets concentrated in one area). An on-site example is the City of Berkeley, where three Urban Ore

staff assist City staff in identifying recyclable materials that Urban Ore would take. An off-site example is the co-location of a partner salvage outlet near a County facility in Charlotte County, which provides a much more direct connection for staff to refer to a neighboring resource for customers.

Make recycling easier for the customer through improved information onsite

Transfer stations are part of a larger system, and customers are obviously a key component of this system. Customers may or may not share the same ethic of diversion, and will generally want to get in and out of the station as quickly as possible, so making recycling easy and convenient at the station is paramount. Ideally, good layout (discussed earlier) and clearly presented information on site can achieve this, such that the customer would have to go out of their way to not recycle at the transfer station.

The following best practices resonated as opportunities that also address the constraint of ineffective onsite information:

- Streamlined set of highly graphic, simply worded signage
- Intuitive yet flexible placement of signage

Streamlined set of highly graphic, simply worded signage

The best examples of signage are those that don't require the customer to spend a lot of time reading information to understand it. This means reducing the amount of signs that a customer encounters (which can overwhelm, or have conflicting messages), and reducing the density of text on the signs. Simple graphics and color coding (which are already being explored by King County) help to streamline content and also make the message accessible to non-English speakers. Depending on the demographics of the transfer station location, other predominant languages may need to be considered.

Intuitive yet flexible placement of signage

The other element of success to well-designed signage is that they are placed intuitively (signs don't work if customers don't see them or have to look for them), and that there is some flexibility in moving them around to accommodate changes in layout, or materials accepted. An example of what this could look like includes placing signage for the material directly above the collection area as a visual cue, particularly if there is no staff assistance in helping to unload or directing customers.

Using moveable signs on stands (a shift already being instituted in some stations) allows stations to change drop off locations in response to seasonal demands, changes in volume of materials incoming, or other market changes that may impact volume/frequency of materials. They are also a good fit for materials collected only temporarily. There are low tech options (rolling signs) and high tech options (electronic reader boards) to achieve this.

Engage customers in advance through offsite education and outreach

Offsite outreach materials can better prepare customers for their next visit. Some of opportunities for this offsite education and outreach can focus more on creating that same 'culture of diversion' shift within the community, and usually involve more robust community

education programming. Examples of this include Portland Metro's Master Recycler's Program to create recycling ambassadors in the community, or Phoenix's weeklong in-house K-12 school program targeting kids.

The other key opportunity for offsite materials that are more focused on specifically improving customer recycling at the transfer station include:

- Informational materials sent out to customers
- 'Take home' reference materials
- Digital resources

Informational materials sent out to customers

High diversion facilities had numerous examples of different kinds of materials sent out to customers to keep them informed about recycling options. Examples include newsletters, an annual recycling guide and a 'welcome pack' that went out to all new residents.

'Take home' reference materials

'Take home' materials are intended to provide a handy reference for a customer's next visit. Brochures available at the station are commonly used for this purpose, though creative alternatives such as the City of Phoenix's refrigerator magnets with materials recycling and acceptance reminders are a more visual alternative.

Digital resources

Websites and other web tools are a great place to keep the message of diversion front and center. Many of the high diversion facilities had websites that gave equal or greater web presence to reuse and recycling services over waste disposal services. Websites can also help prepare customers for how to pack their vehicle to efficiently unload recycling at the station, but also about what to expect when they get there. Beyond good content, digital resources can also help direct customers to the best reuse/recycling alternative through interactive maps.

Facilities

Layout and Design

New transfer stations are designed with flat floors creating versatile areas for waste collection and processing. Flat floors will allow TSOs to recover materials for reuse and recycling from customers. Due to the advantages provided by this design, new transfer stations designed for King County should be flat floor.

Additional advantages of a flat floor design include the following:

- Quicker and easier unloading opportunities for self-haul customers.
- More opportunities to safely remove material from commercial and self-haul loads.
- Easy movement of staff and materials between areas.
- Easy to make future operational changes.

Firms included on ENR's 2012 list of Solid Waste Design Firms were interviewed regarding transfer station design. Following are comments regarding transfer station from designers at these firms:

- HDR (rank 2) has designed about 16 transfer stations in the last ten years, all of them have been flat floor. The last pit style floor was in 2000 for Staten Island which was a specific customer request and any other pit style stations were completed at least 20 years ago.
- URS (rank 4) said that the efficiency, flexibility and safety of the flat floor far outweigh any storage capacity afforded by a pit and storage in a compacted trailer is far less costly per ton than in a building. In the last ten years they have designed all flat floor transfer stations with the exception of 4 drop box sites. URS staff added that of the 45 stations either designed, done improvements to, or provided operations plans for, the only modified pit designs the engineer knows of are Airport Road, Bow Lake, Enumclaw and Shoreline all done by a design team local to Seattle.
- CDM Smith (rank 7) said their nationwide transfer station design team has designed all flat floors stations in the past ten years.
- Morrison-Mairle (rank 17) only reported information for Montana. In the past ten years, the two stations designed in that state are flat floor.
- JR Miller & Associates (not ranked, but is an architectural and structural firm who works for many of the firms listed) said in the last ten years the firm has worked about 40 flat floor designs and no grade separated or pit type.

Operations

The scale operator must make the determination about the load contents, suitability for recycling, and whether a load is too contaminated for diversion. A challenge to this approach is dealing with the "cover your load" requirement. Careful interviewing, "under the cover" inspection by dedicated load spotters, overhead cameras, or both combined with specific written load acceptance policies that are communicated to businesses using their facilities are possible methods to work with the current requirement.

As materials are dumped onto the tipping floor, TSOs can assess the waste for divertible materials. If the material is small, a TSO can by hand remove it from the refuse and place it into the appropriate bin or bunker. If needed, a loader or other piece of equipment can be used to assist with materials sorting and diversion.

At flat floor stations, loaders on the tipping floor will move, mix, and push MSW into a compactor chute. The chute feeds a compactor located below the tipping floor. TSOs would cycle the compactor as needed to make the waste into a bale and push it into a docked transfer trailer. Using a yard goat, a TSO would pull the loaded trailer from the compactor, closes the rear door, and park it in the full trailer parking area. Full trailers would be hauled for unloading and waste disposal.

Similar to existing stations, trailers brought from CHRL, will be stored in the empty trailer parking area. As an empty trailer is needed, a TSO, using a yard goat, would back it to a compactor, via entrances used only by Solid Waste Division vehicles.

Staffing

Diversion at King County Transfer Stations can be significantly increased through aligning staff resources to diversion goals. Our research of high performing transfer stations indicates that high diversion levels can be achieved through minimal staff increases or reassignment of existing staff.

Facilities all need to be staffed to safely carry out daily operations. Specific staffing levels are determined based on the layout and operation of the facility. Staff members working at new facilities will likely include TSOs, Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional tasks for TSOs could include spotters and helpers to assist customers with diverting materials for recovery. The spotters and helpers could assist in unloading the vehicles and placing the materials to the proper bins or bunkers for recycling and reuse.

- **Serial Drop-off** - For facilities that allow for customer segregation of materials (such as the El Cerrito Recycling Center, the Cold Canyon, Resource Recovery Park, or the Salisbury - Sharon Transfer Station) only one or two spotters or helpers are needed to assist customers and direct them to the appropriate bunkers or bins for separating materials.
- **Personal Recyclers/Reuse Specialists** - For facilities where staff assist customers directly with unloading materials from their vehicles and placing the materials in the appropriate bunkers or bins, two to four staff are needed to efficiently unload the vehicles.
- **Mixed Materials Processing** - - For facilities where sorting crews process mixed loads, a loader operator and eight to twelve sorters (per shift) are needed process the materials and place them in the appropriate bunker or bin for recycling.

Staffing levels are determined by the recovery method employed. The selection of the recovery method is based on several factors:

- **Recovery for highest and best use.** Recovering materials for reuse requires that they be handled carefully to preserve their quality and to retain their resale value. Reuse could be one of the primary efforts of a transfer station adapted to a recovery operation.
- **Separating mixed loads of C&D.** Hand sorting of mixed materials may be required if a facility receives high volumes of mixed loads of primarily C&D materials. Some facilities also have a separate processing area for commercial loads of C&D.
- **Space and queuing.** For facilities that receive a high volume of self-haul materials, there may be an emphasis in having self-haulers unload quickly. Thus, there may not be time for adequate separation of materials (by either the customer or the personal

recycler). In this case, the facility may need to stage or stockpile materials for processing on a sorting line. If space is available and the facility can accommodate several customers unloading at once, this would potentially allow for fewer spotters and helpers.

With the room provided for diversion on a flat floor, additional tasks related to material handling could be added at transfer stations. TSOs could bale/compact paper, film plastic, and textiles and operate shredders/ grinders for wood.

Processing

Processing technologies to increase diversion exist to address the commercially collected and self-hauled material streams delivered to the County's facilities.

There are a limited number of commercially viable technologies for treating commercially collected residual waste:

- **Advanced Thermal Recycling/Waste-to-Energy** - a process of generating energy in the form of electricity and/or heat from the incineration of waste.
- **Mechanical Processing to Create Refuse Derived Fuel** - a fuel produced by shredding and dehydrating waste into fuel pellets. The pellets are then burned in a waste-to-energy facility or another industrial facility such as a cement kiln.
- **Mechanical Biological Treatment** - a type of waste processing facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion.

Each of these technologies requires a large amount of space (5 to 10 acres) which may be available at some updated / retrofitted stations, and at new transfer stations. Should the County elect to pursue processing technologies for treating residual waste, the County should engage in a stakeholder-driven planning process to identify the most appropriate technology and site for such a facility. A recent study conducted by Eco-Cycle, using data from the City of Seattle, concluded that the best technology for treating residual waste from high diversion communities was Mechanical Biological Treatment (Eco-Cycle 2012).

Since most residents and businesses in the County receive collection services on-premises, any processing options for self-hauled materials must focus on the most dominant: materials generated from landscaping or construction projects. The most prevalent materials in the self-haul materials stream are dimensional lumber (12.4%), yard waste (10.3%), C&D wastes (5.3%), gypsum wallboard (5.3%), carpet (5%), and furniture (5%) (King County 2011a).

Processing opportunities include:

- **Requiring Self-Halers to Separate** - These materials can be cost-effectively diverted by requiring self-haul customers to separate them into dedicated bunkers or bins at the transfer station. This is the method used at the Cold Canyon Resource Recovery Park and has been very effective, but requires space for staging and queuing. Minimal staffing is needed for monitoring the separation.

- **Processing Self-Haul Materials on a Picking Line** - Alternatively, the County could process mixed loads of self-haul materials on a processing line using sorters to pick out the targeted materials for diversion. This is the method used at the Davis Street Transfer Station and SF Recycling & Disposal and requires installation of a processing line and staffing of 10 to 12 sorters per shift.

At all older stations, processing of collected materials is not feasible due to space constraints. Processing is not feasible at Enumclaw and Vashon due to their pit designs. Processing at Bow Lake and Shoreline is possible but would require extensive operational changes. Other processing, such as a MRF would have to be completed at a new facility or off-site.

Hand Sorting

For certain targeted materials (traditional, appliances, bicycles, small pieces of metal) and as an option for motivated customers, it is advisable to provide bins, source separated containers, roll-off containers, or trailers into which customers hand sort and place materials. This keeps quality to a maximum and contamination to a minimum, particularly when combined with active assistance and/or monitoring.

At updated/retrofitted facilities and at new facilities, hand sorting of materials is possible. The likely materials for hand sorting are self-hauler materials prior to disposal over the grade separation wall.

Floor Sorting

While practiced at some transfer stations, floor sorting (dumping mixed loads onto a flat floor and picking off some materials, such as cardboard and metals) is of limited value for yard trimmings, organics, traditional recyclables, etc.

Some stations have floor operations in which laborers retrieve larger items (i.e., large pieces of metal, cardboard, furniture, building materials, fixtures, etc.) from the tip floor. Our assumption for floor sorts is for a modified approach at new stations with plenty of space. Staff would assist self-haulers to unload their materials carefully, and would segregate the recyclable and reusable materials and a loader would move the rest into the transfer area. This would be in contrast to a standard "floor sort" where material is unloaded, spread out by a loader operator, and staff rush over and remove a few things and the rest is disposed. With a goal of high diversion, the modified approach is best.

At updated/retrofitted facilities, floor sorting is possible but would require operators to work below the grade separation wall which is not ideal due to safety concerns. Therefore, to complete the sorting, materials would likely have to be pushed away from the chutes, sorted and then the loader could push materials towards the chute following sorting. Handling the materials with a loader on the tipping floor prior to sorting may cause contamination.

Mechanized Sorting

Fully mechanized sorting in the traditional sense is particularly suitable to separating flat paper from round containers, pulling off ferrous metals from a picking line, optically sorting glass, etc. But these are not the types of materials that are prevalent in the self-haul waste stream, and so any sort line focused on these materials should be a combination of manual

and mechanized systems. A C&D recovery line would likely have some mechanized aspects (such as a magnet), but they are mostly hand sorts.

Grapples or excavators can be used to target specific materials (like wood) from large loads of C&D. For smaller loads of C&D and other self-haul material, hand-sorting (described above) should be a priority, with a secondary emphasis on the use of a grapple or excavator.

Mechanical sorting is possible at Bow Lake and Shoreline but would result in a significant loss of tipping floor space. Due to the grade separation wall, there are minimal options for how to revise operations to accommodate the loss of tipping floor space.

Fully mechanized sorting is an option if the County is interested in owning and/or operating a single-stream material recovery facility (MRF) or a mixed waste processing facility. For King County, land available at the Cedar Hills Regional Landfill, Renton Transfer Station, or at a new site, could be used for mixed-waste processing functions.

Resource Recovery Park

Siting a resource recovery park where there is space (like at Cedar Hills or at closed facilities) is an option, along with those sites with space where customers already bring, or will bring, materials (such as new or updated/retrofitted facilities. In addition, there is enormous potential to have aspect of source-separation for the materials that are recoverable that are received in large quantities from self-haulers at all transfer stations (e.g., yard trimmings and wood - there should always be a separate box or bunker and all self-haulers should be required to separately divert these materials and not co-mingle them with other materials in their loads).

Processing Campus

The policy of the County and the municipalities within the County has been to encourage the development of processing capacity for source-separated materials in the private sector. Thus, the County has a vibrant private sector infrastructure for recyclables, organics and C&D. These private sector facilities have been developed off-site from the transfer stations at sites procured by the private operators.

As the County considers future sites for transfer stations, the County may wish to consider co-locating processing for source-separated materials, including recyclables, organics and C&D. These processing facilities could continue to be operated by the private sector on land leased from the County. There are several potential synergies associated with co-located source-separated processing facilities with other transfer station operations:

- Residual materials from processing operations can be transferred by the transfer operation.
- C&D materials brought to the transfer station by self-haul customers can be processed by the C&D operation.
- Recyclables and organics brought to the transfer station by self-haul customers can be processed by the recyclables and organics processing lines.

Much like an "eco-park", this could enhance environmental and economic performance of the operations by efficiently sharing transfer station resources (information, materials, water, energy, and infrastructure) to enhance economic viability and increase efficient material diversion.

While dedicating space at the transfer station for source-separation processing activities is desirable, it would not necessarily result in more diversion. However, through the public-private partnership, other benefits could be realized such as cooperative marketing and expanding outreach and education to visitors to the transfer station.

Materials

Different material types require different handling approaches in order to maximize diversion. This section describes the best practices for targeting these highly recoverable materials:

- Bulky items
- Traditional recyclables
- Compostable materials
- Other Materials.

These material types comprise over 86 percent of the materials discarded by self-haul customers at King County Transfer Stations. The Other Materials that new stations could be set up to collect the following materials for diversion are as follows, depending on priorities set by the Division:

- Bicycles
- Books and magazines
- Building materials
- Carpet
- Cartons and aseptic packaging
- Clothing
- Container glass
- Cooking oil
- Electronic scrap
- Expanded polystyrene
- Film plastics
- Mattresses
- Scrap Metals
- Plate glass
- Reusable items
- Rigid plastic
- Wood
- Yoga mats

Curbside / Traditional Recyclables (Metals, Glass, Plastics, Paper)

Traditional recyclables, including metal, paper, plastic, and glass make up nearly 29 percent of self-haul materials in King County and compostable materials, including yard trimmings,

food and other organics make up nearly 19 percent. Collection of these items at the transfer stations should be as convenient as disposal of refuse.

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.

Organics (Yard waste, Food Waste, and Clean Wood Waste)

All new stations should include an open top or bunkers for collection of organics.

During large storm debris events, King County has authorized a voucher program to enable storm debris to be delivered directly to area organics processors, while still tracking material and receiving normal fees typically incurred with use of King County transfer facilities. The program provides an efficient way to alleviate congestion at King County transfer stations - while emphasizing recycling and composting - in order to handle the large volume of trees, branches, and other debris during clean-up.

King County could limit refuse disposal to one chute on the weekends when the commercial traffic is at a minimum and collect organics from self-haul customers.

Bulky Items

In King County's system, over 11 percent of materials delivered to transfer stations by self-haul customers are bulky items, including furniture, mattresses and carpet. New stations should include space for bins and bunkers to collect these materials, provided any materials at risk for lead or asbestos contamination, including demolition and renovation materials, are carefully screened at the receiving station.

Mattresses

Mattresses represent a hard-to-handle constituent of King County's waste stream, and as such has been a focus of the LinkUp program for several years. King County estimated that its transfer stations and landfill received about 90,000 mattresses weighing more than 3000 tons for disposal in 2011.

The County views providing recycling services for mattresses at its transfer stations as problematic, mostly due to space, though it does accept certain quantities of mattresses there for disposal (i.e., up to 6 per day per customer). King County is actively working to build private infrastructure for mattress recycling in the northwest by working with a variety of mattress retail and manufacturing businesses, mattress recyclers, nonprofit organizations, and recyclers - a product stewardship approach. Mattresses also take up a lot of air space at landfills.

In engaging the private sector, LinkUp recruited three businesses to join the Take it Back Network to collect mattresses and recycle them through Correctional Industries: A Plus Removal and Recycling, Rubbish Works, and Republic Services - Black River. Correctional Industries, of the Washington Department of Corrections, was the only mattress recycler in Washington until 2013. R5 Systems, Inc., a private company, opened recently in Tukwila and

Spring Back Mattress Recycling NW, a nonprofit and division of NW Furniture Bank, is expected to open in Tacoma in July 2013. Including CDL Recycle, there are now five private locations in King County to have a mattress recycled. Some retailers are already recycling mattresses taken back from customers during new purchases (Sleep Country USA and Soaring Heart Natural Bed with Correctional Industries; R5 Systems said they are recycling Macys' and other retailers' mattresses) and more are expected to after planned outreach is conducted by LinkUp. Storage of collected mattresses prior to transport for disassembly and recycling is a challenge for most businesses and LinkUp provides assistance in solving this issue.

The Division proposed a fee on mattress disposal at its transfer stations (approved in 2012 but not implemented in the 2013-2014 rate schedule) to make it more expensive than recycling through one of the other channels. LinkUp is also working to strengthen end markets for mattress components (i.e., metal, foam, shoddy cloth, wood)

The Division may want to consider mattress collection at County facilities if, after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities. Private processing capacity and collection infrastructure has increased from one recycler and one collection location in King County in 2011 to three recyclers and five collection locations in King County in 2013.

Bicycles

Shoreline and Bow Lake accept bicycles as bicycles for reuse. King County should continue with its bicycle collection program, similar to Shoreline and Bow Lake, and accept bicycles as bicycles at new stations.

Appliances

King County should continue collection of appliances, similar to Shoreline and Enumclaw, at all new stations. Ideally, collection of these materials should be interior to the transfer station building in order for staff to better monitor collection of these materials.

Electronics

King County invested a tremendous amount of time and energy into the development of a comprehensive statewide system for the collection of used televisions and computers (e-waste) for recycling, called E-Cycle Washington.

For the E-Cycle Washington program, local governments do not need to set up collection sites or pay for the recycling program. Recycling plans must provide service throughout the state. This means having a collection service in each county and for each city or town with a population greater than 10,000. Local governments may provide collection sites at public facilities, and must register with Ecology if they wish to be compensated by a recycling plan for collecting electronics.

According to a 2010 evaluation of the E-Cycle Washington program, transfer stations in King County and Snohomish Counties decided not to participate because they are not a good fit for collection activities and private sector collectors are expected to operate more effectively and efficiently.

Textiles

Certain King County facilities (e.g., Shoreline, Enumclaw) accept textiles for recycling, through partnerships with non-profit recyclers using drop-off containers.

In addition, a very large infrastructure exists for handling used post-consumer textiles, mostly operated by the private and nonprofit sectors (e.g., US Again, Value Village, Goodwill, Salvation Army, etc.). Several other area nonprofit organizations also accept used textiles that are still in good condition for resale. Most recovered post-consumer textiles end up at these organizations, which sell the products themselves, or sell to other used clothing dealers, textile recyclers, exporters, wiping rag graders, and fiber recyclers.

Potential end markets for non-reusable textiles generally include commercial “wipers,” (i.e., shop rags), and fibers for re-processing (i.e., felt manufacturing, furniture filling, new clothing). Both chemical recycling and mechanical recycling methods can be used. There are several examples of private textile recycling efforts in Seattle and King County.

- Buffalo Industries, LLC is a local Seattle company manufactures and distributes cloth wiping rags from recycled textiles obtained locally, and from new materials (Buffalo 2009). The remainder of donated and collected textiles usually is disposed.

Construction and Demolition Debris (C&D)

C&D materials account for nearly 27 percent of the materials discarded by self-haul customers in King County. As King County advances (with the City of Seattle) toward certification of C&D processing facilities, its transfer stations could play a role in that infrastructure as initial consolidation of mixed C&D loads for processing by private processors. At older stations, King County could limit refuse disposal to one chute on the weekends when the commercial traffic is at a minimum and collect C&D from self-haul customers. Note that King County would have to choose between collection of organics and C&D since there are not adequate chutes to collect both materials and refuse.

However, there may be difficulty assuring lead paint- and asbestos-free loads to secondary processors without the same level of assurance from residents and contractors upon entry to the transfer station - which may be problematic. Processors receiving trans-loaded materials from demolition or renovation would likely require some sort of assurance from the County about the absence of asbestos. The challenge is that compliance with obtaining required asbestos surveys is highly variable among contractors and do-it-yourselfers, though the building owner is the responsible party. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials (ACM)². However, these would need to be developed at County facilities.

Carpet and carpet pad

Carpet represents a major constituent of King County’s waste stream, and as such has been a focus of the LinkUp program for several years.

² Friable asbestos-containing material (ACM), is defined by the Asbestos NESHAP, as any material containing more than one percent (1%) asbestos.

The County does not currently provide recycling services for carpet at its transfer stations, though it does accept carpet there for disposal. Instead, King County is actively working to build private infrastructure for carpet recycling in the northwest by working with a variety of industry representatives, flooring sellers, installers, builders, and recyclers. The County has identified private collection sites and carpet processors serving the region and has connected local carpet wholesalers and installers with those recycling options.

Several companies in the region collect carpet and carpet pad for consolidation and sorting. Some will pick up carpet onsite for free or for a fee, and some allow drop off at their facilities. Three companies in the Pacific Northwest currently process carpet for recycling and re-manufacturing, including one in King County, one in Pierce County, and one in Skagit County. Some examples of variations in the types of services available include:

- Recovery 1 in Tacoma accepts carpet for recycling, and tests incoming carpet to determine the type of materials and if it is contaminated with dangerous chemicals or asbestos-containing materials. Then they separate all the constituent materials, including the face fiber, backing and calcium carbonate. The higher grade fibers and the backing are shipped to end-markets where they are turned into new carpet or manufactured into other products such as automotive parts. The lower-grade fibers go to vendors for repurposing into other construction components such as insulation and fill. The calcium carbonate is used by one local manufacturer for use in an architectural tile product.

Recovery 1 continues to deal with contamination from asbestos-containing materials in inbound carpet that exceeds acceptable limits. This indicates a continued need for upstream controls, better compliance with asbestos regulations (asbestos surveys and abatement) by building owners and managers, and better enforcement of asbestos regulations.

- Again LLC, a Kent company, provides pick-up and drop-off service for post-consumer source-separated carpet and processes carpet separating the constituent materials of carpet and selling those materials in commodity markets. They take specific steps to avoid acceptance of wet, asbestos-contaminated, and painted or extremely soiled carpet.
- Pacific Urethane, based in Kent, accepts carpet pad for recycling.

According to LinkUp, each of these efforts is best accompanied by additional emphasis on developing recycling infrastructure capacity and diverse market outlets. The Division may want to consider carpet collection at County facilities if, after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities.

Preventing contamination of recovered carpet from asbestos from other building materials is an ongoing effort by carpet processors, and would need to be undertaken by the County should it initiate carpet recycling services at transfer stations. This indicates a continued need for upstream controls, better compliance with asbestos regulations (asbestos surveys

and abatement) by building owners and managers, and an agreed upon mechanism to assure asbestos-free materials that are trans-loaded to processors.

In addition, other common contaminants rolled up in carpet such as tack-strip, paint, moisture, utility knife blades, and other flooring complicate recycling. Receiving procedures and/or customer preparation requirements prior to delivery to the Division's facilities would be necessary if carper were to be accepted.

Asphalt Shingles

Recycled asphalt shingles has also been a focus of the LinkUp program for several years. As with carpet, the County does not currently provide recycling services for asphalt shingles at its transfer stations, though it does accept them there for disposal. Instead, King County is actively working to build private infrastructure to enable the use of recycled asphalt shingles (RAS) in value-added applications, most notably in paving projects. The County has conducted paving demonstration projects, developed model specifications for use of RAS in paving projects, used pavements containing RAS at its Bow Lake Recycling and Transfer Station and for maintenance paving at all of its facilities, and worked with private collection and processors serving the region.

Preventing contamination of recovered asphalt shingles from asbestos in other roofing materials is an ongoing effort by asphalt shingle processors, and would need to be undertaken by the County should it initiate asphalt shingle recycling services at transfer stations. This would be the case equally if shingles were received from self-haulers or commercial haulers. This indicates a continued need for upstream controls, better compliance with asbestos regulations (asbestos surveys and abatement) by building owners and managers, and an agreed upon mechanism to assure asbestos-free materials that are trans-loaded to processors.

Gypsum wallboard

Without some level of multi-material C&D processing at a King County transfer station, source-separation of clean gypsum wallboard scrap is the best method for recycling gypsum wallboard. This would require a dedicated container at the transfer station. Few loads that come to the transfer station contain material that conforms to the necessary quality specification, and so it would not make sense to sort strictly for gypsum. If loads did arrive at the facility, staff should be prepared to direct the customer to a facility set up to handle such loads.

Preventing contamination of recovered gypsum wallboard from asbestos in other building materials is an ongoing effort by gypsum wallboard processors, and would need to be undertaken by the County should it initiate recycling services at transfer stations. This would be the case equally if wallboard were received from self-haulers or commercial haulers. As with most demolition and renovation materials, this indicates a continued need for upstream controls, better compliance with asbestos regulations (asbestos surveys and abatement) by building owners and managers, and an agreed upon mechanism to assure asbestos-free materials that are trans-loaded to processors.

Reusable building materials

The County is also considering development of a Salvaged Lumber warehouse or similar facility to collect, grade, inventory, and sell reusable lumber and other salvaged building materials. Diversion at the transfer stations for such a facility could be incorporated into some operations.

4. Strategy Evaluation and Prioritization

Once strategies to increase the amount of waste diverted from the transfer stations, and ultimately disposal in the Cedar Hills landfill, were identified, the project team initiated a process to develop evaluation criteria, get feedback from King County staff, apply criteria, and develop strategy priorities.

Criteria Development

A preliminary set of criteria was developed by the project team to help determine “fit” with King County’s overarching recycling and facility goals, and to help determine if the County should further consider the strategy. The initial list of criteria included information from the project objectives, criteria used for the *Waste Export System Plan*, and general criteria used by the County in evaluating other possible program initiatives.

The project team met with the King County staff team to vet possible criteria through the group’s different perspectives to arrive at a refined, complete list of prioritized criteria. The process included:

1. A discussion of how the criteria would be used
2. A brief discussion to confirm or add any other goals for the project.
3. A review of the initial list of criteria to discuss (changes, additions) and whether to include the criteria
4. A facilitated discussion of criteria, including wording changes, deletions/additions, and high priority criteria

In order to make the listed criteria easier to apply during the project team’s assessment, and to reflect the importance assigned to them, criteria were split into “top priority” and standard criteria. After further refinement by the project team, the list of criteria included:

Tier I - Top Priority

- Demonstrates leadership
- Leverages existing or planned infrastructure
- Increases recycling of the County’s high priority material
- Meets facility safety goals
- Is acceptable to customers (accessibility, hours, activities, materials)
- Is consistent with market potential of targeted materials

Tier II

- Leverages resources through collaboration/partnership
- Increases high value end uses
- Leverages existing program staffing resources
- Has no negative social equity impacts

- Creates manageable negative environmental impact
- Is operationally and technically feasible today (Space, Roof height and tipping area, 3 days' storage area, Structural integrity)
- Is flexible for future station upgrades
- Is within 30 minutes for 90% of users (Estimated time to a transfer facility within the service area)
- Meets standard for time on site for 90% of trips (Queuing, Unloading, Transaction)
- Meets applicable regulatory requirements
- Achieves a desired high-volume diversion

Additional Information

Additional information was collected or described for each strategy that did not conform to a yes/no format. The information was also collected to help evaluate “fit” for King County and to be used to help prioritize strategies, and while forming and balancing recommendations. Additional information included:

- Cost
- Diversion Potential
- Timeframe for Implementation
- Station Generation [affected by strategy]
- [Level of] System Impact
- [Level of] Customer Impact

Cost

The project team assigned qualitative values to two categories of costs: “first” cost, or upfront capital or startup costs necessary for the strategy; and “operating” cost - the ongoing cost of executing the strategy. Qualitative values were low, medium, and high, though for purposes of initial strategy evaluation, only those strategies with low costs were identified. The project team also identified yes/no values for two categories of cost: if a strategy provided cost avoidance; and if a strategy generated revenue. All cost values were based on available research and professional experience.

Diversion Potential

The project team established ranges for diversion potential associated with each strategy. Qualitative values were assigned based on the following annual tonnage of potential diversion:

- High (over 10,000 tons)
- Medium (3,000-10,000 tons)
- Low (0- 3,000 tons)

All diversion values were based on available research (e.g., results from other jurisdictions with similar focus or method) and professional experience.

Diversion for take back programs is difficult to assess/calculate because some products are not disposed of routinely. However, if new laws mandate the development of permanent recovery programs and require that these programs be funded by producers, distributors, and/or retailers, it can be reasonably assumed that some portion of the existing waste stream will be diverted. It can similarly be assumed that regulatory prohibitions against disposal of certain materials will increase diversion, in many cases dramatically.

In that same regard, diversion associated with waste prevention, reuse, and recycling education is also hard to estimate. By themselves, education and outreach strategies may produce a “low” rate of diversion, but in concert with the policies and infrastructure that could or should also be applied, diversion would likely increase. The project team tried to take in to account the central role of customer and staff education and outreach when making recommendations.

Timeframe for Implementation

The project team established ranges for initiation of implementation associated with each strategy. Qualitative values were assigned based on the following timeframes:

- Short-Term (0-5 years)
- Long-Term (Over 5 years)

Timeframes refer to when a strategy could or should be initiated, relative to today. No assumption is made about how long it might take to complete implementation, though it was assumed that Policy and Education and Outreach categories would likely be short term; Operations and Processing strategies are a mix of short- and long-term, depending on numerous variables (e.g., complexity, design/construction requirements, funding requirements, degree of operational change, etc.). All timeframe values were based on available research (e.g., results from other jurisdictions with similar focus or method) and professional experience.

Station Generation

The project team determined to which generation of station each strategy may be applicable and/or appropriate. Station generations were defined as follows:

- Older - Algona, Houghton, Renton, (old) Factoria, drop box sites
- Updated/Retrofitted - Vashon, Shoreline, Enumclaw, Bow Lake
- New - (new) Factoria, new North, new South County

Shoreline and Bow Lake are included as retrofitted due to grade-separated floor design.

System Impact

The project team identified the extent to which each strategy would affect the solid waste system in King County. System impacts were defined as follows:

- Solid Waste system-wide - The strategy may have an impact on all aspects of the County solid waste system, including the use of other public infrastructure (e.g., City of Seattle) and private waste and recycling infrastructure.

- Transfer System-wide - The strategy may have an impact on the entire County transfer system, but likely not other public and private infrastructure.
- Single Generation - The strategy may have an impact on King County transfer facilities of a specific generation, or multiple generations, but likely not other public and private infrastructure.
- Single Site - The strategy may have an impact on a single King County transfer facility, or multiple facilities, but likely not other public and private infrastructure.

Customer Impact

The project team identified the extent to which each strategy would affect customers. Customers were defined as follows:

- Commercial - The strategy may have an impact on commercial haulers carrying residential or commercial loads.
- Self-Haulers - The strategy may have an impact on self-haulers carrying residential or commercial loads.
- Both - The strategy may have an impact on both commercial haulers and self-haulers carrying residential or commercial loads.

Risk Considerations

While the project team did not specifically establish a measure for the risk associated with implementation of each strategy, several of the criteria incorporate the perception of risk, where “yes” equates to lower risk:

- Whether a strategy leverages existing or planned infrastructure (lower risk), or not (higher risk)
- Whether customers would accept any changes prescribed by a strategy willingly (lower risk) or reluctantly (higher risk)
- Whether a strategy leverages existing program staffing resources (lower risk) or not (higher risk)
- Whether a strategy is operationally and technically feasible today (lower risk) or not (higher risk)

Certainly, all or most of the additional information relates to the risk of achieving a successful strategy outcome. Lower first and operating costs, higher diversion potential, minimized customer impact, and targeted system impact all would indicate a lower risk of implementation.

The project team considered all of the above in assessing the appropriateness of the strategies for the King County system, and used each category to inform if, and where, each strategy should be recommended.

Yes/no values assigned by the project team are shown in Appendix B. Additional information for each strategy is shown in Appendix A.

Strategy Prioritization

Once the criteria were finalized and additional information assigned, the project team proceeded to evaluate strategies for “fatal flaws” through a basic scoring system. Tier I criteria were weighted with two points and Tier II criteria were weighted with one point. “Yes” answers received 1 X (criteria points); “No” answers received 0 X (criteria points). This enabled the project team to develop one measure (%)³ with which to compare the strategies. Additional information added qualitative input to the overall assessment.

Station Generation

The strategies were categorized into the three station generation types (Older, Retrofitted/Updated, and New) and further organized by type (Policy and Programs, Education and Outreach, Operations, and Processing).

In cooperation with King County staff, the lowest scoring strategies in each category were considered for removal as base recommendations (i.e., less than 75%). Of the 139 initial strategies identified, the project team identified 36 strategies below 75%.

At this stage of the prioritization, however, a low score did not preclude a strategy from ultimate consideration by the project team since the direction given to the project team was to offer a wide range of possible strategies for consideration by the County, based on research and professional expertise. A low score did earmark a strategy for greater scrutiny by the project team when assembling recommendations.

The 139 strategies were allocated among station generations as follows:

- Sixty-four (64) strategies were applicable to all stations
- Seven (7) strategies were applicable to older stations only
- Forty-one (41) strategies were applicable to updated/retrofitted stations AND new stations
- Fifteen (15) strategies were applicable to new stations only

In addition, the project team identified and removed 12 strategies that were duplicative or that could be combined with others for a more meaningful approach.

³ A strategy that received “yes” for all criteria would receive 100%. A strategy that received “no” for all criteria would receive 0%.

Long vs. Short Term

Once the project team compiled strategies by station generation and identified those that should undergo scrutiny for possible removal due to lack of “fit” or that should be combined and removed, implementation timeframe was considered.

The project team considered a balance of short- and long-term strategies to make sure that the overall package of recommendations would stress a quick start and a sustainable progression of actions over time that would build on existing programs and infrastructure, and put in place the building blocks for longer term actions.

During this time, the project team also identified 17 additional strategies not specified earlier, based on review of specific feedback from County staff, stakeholders, and the professional experiences of team members.

Level of Recycling in System

One of the key markers the project team used to distinguish strategies became the level of recycling the strategy allowed (or compelled) the County to use to increase diversion at its facilities. Within the context of the opportunities described in Section 3 of this report, strategies fall somewhere on a continuum of aggressiveness toward recycling. Those on the left side of the scale are less aggressive and would not require action by the County much, if any, distance outside of its current approach. Those on the right side of the scale are more aggressive and represent larger choices the County must make (e.g., paradigm shifts in processing, material handling, operations, etc.) in order to achieve its Zero Waste of Resources goals.

In screening the numerous strategies documented, the project team also sought to highlight strategies that targeted the County’s priority (and most recoverable) materials, including organics, C&D debris, and bulky wastes, some of the largest components of the disposed waste stream (see Figure 1). At the same time, due consideration was given to the source of those materials (i.e., commercial haulers or self-haulers).

Following the initial groupings and prioritization of the strategies, the project team convened a series of meetings to review strategies and supporting information in order to create recommendation themes, to group strategies according to those themes, and to create a group of base recommendations for the County’s consideration. Base recommendations are generally in the center, and to the left and right of center, on the aggressiveness continuum and comprise a blend of policies, education and outreach, operations, and processing actions (see Figure 3).

The project team also sought to assemble alternatives to the base recommendations that were more and less aggressive options for the County’s consideration. Many of the more aggressive options will likely require detailed analysis in order to proceed, including estimated costs from designer and contractors where applicable, implementation costs, labor full-time equivalents (FTE), equipment capital, transportation, and educational materials production.

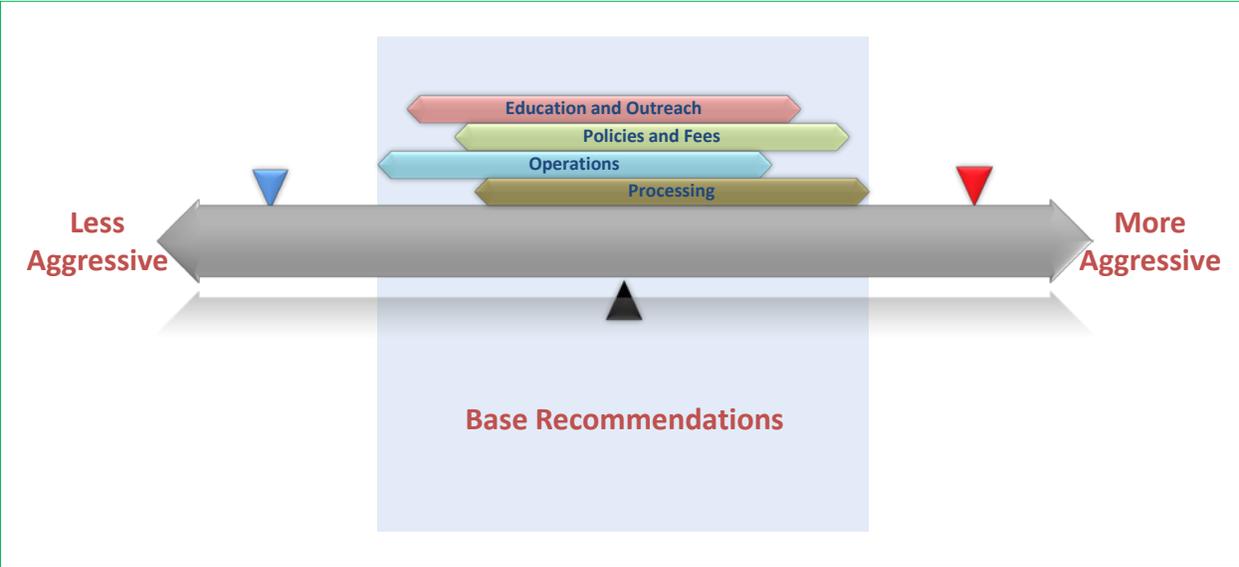


Figure 3. Continuum of Strategy Aggressiveness

5. Conclusions and Strategy Recommendations

This section identifies the project team's conclusions, and outlines our strategy recommendations. The recommendations contained herein are based on the extensive background research, stakeholder outreach, and regional and national research conducted by the team. As such, the recommended strategies are data-driven, reflecting best practices from around the country, tempered with a full understanding of King County's unique circumstances and infrastructure.

Conclusions

As the County proceeds to modernize its transfer system with the siting, design, and construction of new facilities, and the updating or moth-balling of others, stark choices exist:

- What is an appropriate level of recycling to accomplish at existing and new facilities?
- Should the County do material processing itself to accomplish its Zero Waste goals? At what level?
- What type of partnership should the County have with the private sector?
- What is the best mix of facilities (and where should they be) to maximize diversion efficiently?

We believe this report provides sufficient context to recommend the following principles at the highest level. We believe the County should:

1. Convert obsolete or underused facilities into recycling-only facilities and modify existing King County transfer facilities to focus on reuse, recycling, waste diversion, and/or processing of self-haul materials.
2. Site, design and build new King County solid waste facilities to align collection and processing in and advanced materials management system
3. Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities
4. Proceed in a manner that is internally consistent with the structure under which the County is currently working (i.e., source-separated private collection, private MRFs for collected recyclables, private processing for commercial C&D).
5. Align policies, fees, and regulations to emphasize, incentivize, and compel reuse and recycling of waste toward Zero Waste of Resources.

The project team has applied a high level of professional experience to make recommendations that if implemented through the most aggressive strategies on the following

pages, will help create a transfer system that is “state of the art” for reuse and recycling in the industry.

The following strategies present a wide ranging menu of possible ways to implement the principles recommended above - including base recommendations, and including less- and more-aggressive alternatives. A detailed listing of recommended strategies grouped by station generation and material focus, short and long term base strategies, and less- and more-aggressive alternatives is shown in Appendix A.

The background details presented in previous sections, and the additional details in Appendix A, present key assumptions concerning cost, feasibility, staffing, diversion potential, and impacts on customers and haulers that are important context for the recommendations. In many cases there are overlaps or subtle differences amongst strategies, but together, they will continue to drive additional diversion at facilities and the shift of the County’s culture to one of Zero Waste.

Key



Base Recommendation. A recommended strategy for implementation within 5 years (short term) or within 10 years (long term).



More Aggressive Option: A strategy related to the base recommendation that could serve as an alternative or complement, but may require a higher level of commitment, investment, or both.



Less Aggressive Option: A strategy related to the base recommendation that could serve as an alternative or complement, but may require a lower level of commitment, investment, or both.

Optimizing Station Recycling for Older Stations

1) Modify unloading access to suit recyclable material delivery peaks in order to facilitate diversion



Dedicate chute/trailer tunnel to one of the following in top-loading trailer (Short Term):

- Source-separated organics (landclearing and wood)
- Mixed C&D.

2) Convert obsolete or underused facilities into recycling facilities



Design and build a resource recovery park for multiple recyclable and compostable materials at Cedar Hills Regional Landfill (Long Term).

- *More Aggressive Option: Design and build a mixed Waste processing facility at Cedar Hills Regional Landfill.*
- *More Aggressive Option: Design and build a Single Stream MRF at Cedar Hills Regional Landfill.*
- ➡ Convert existing Renton Transfer Station to Resource Recovery Park (Long Term).
 - *More Aggressive Option: Demolish existing Renton Transfer Station and replace with a Resource Recovery Park.*
 - *More Aggressive Option: Demolish existing Renton Transfer Station and design and build a Single Stream MRF at Renton Transfer Station.*

Optimizing Station Recycling for Updated / Retrofitted Stations and Brand New Stations

3) Develop, install and staff flexible material receiving/processing capability for reusable and recyclable Self-Haul materials

- ➡ Dedicated bulky Item Drop-Off Area using staging areas, bunkers, bins, drop-boxes, or trailers (i.e., furniture, carpet, tires, other bulky items) (Short Term).
 - *More Aggressive Option: Include a retail thrift store, building materials yard, reuse and recycling center at transfer stations.*
 - *More Aggressive Option: Create a 'reuse zone' and employ staff to help the public unload items in the appropriate location.*
 - *More Aggressive Option: Host an appliance exchange for working items.*
 - *More Aggressive Option: Co-locate Salvage Lumber Warehouse at Transfer Station.*
 - *More Aggressive Option: On-site trailers for collection of reusable furniture and mattresses for off-site processing.*
- ➡ Establish carpet collection in drop-off area at County facilities for transfer to off-site processor only if, after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities (Long Term)
- ➡ Set up area to receive source-separated loads of clean wood
- ➡ Dedicated roll-off container for source-separated asphalt shingles
- ➡ Dedicated roll-off container for source-separated gypsum wallboard from new construction waste

- *More Aggressive Option: Self-Haul C&D loads must be source-separated to enter the transfer station or pay extra fee.*
- ➔ Separate mixed C&D into dedicated roll-off or top loading containers for transfer to C&D processor (Short Term).
 - *More Aggressive Option: Set up area to receive commingled loads of Self-Haul C&D; remove high value materials (e.g., metals, wood) and difficult to manage materials (e.g., carpet), and deliver the remaining material to a private C&D processing facility.*
 - *Less Aggressive Option: Establish a public/private partnership for C&D/reusable building material sortation and diversion.*
- ➔ Manually sort landclearing and wood waste from garbage and mixed C&D and deliver it to wood-only and landclearing only roll-off or top loading containers for transfer to processors (Short Term).
 - *More Aggressive Option: Provide shredder/grinder for woody wastes.*
 - *More Aggressive Option: Grind or ship wood on-site by a contractor.*
- ➔ Dedicated sort line for all self-haul materials (Long Term).

4) Configure operations to support maximum customer exposure to on-site reuse and recycling opportunities, including material receiving/processing areas

- ➔ Arrange for private salvage or reuse companies to train transfer station staff on how to identify materials for reuse (Short Term).
- ➔ Direct loads to specific areas based on load quality and processing requirements (Short Term).
- ➔ Direct vehicles to sorting area for recyclables as the default, rather than disposal area (Short Term).
 - *More Aggressive Option: Mandatory separation of recyclables at Transfer Stations with Recycling.*
- ➔ Locate recycling and reuse collection areas after the scale-house and charge a fee (Short Term).
- ➔ Make sure materials specific collection bins are adequately sized and spaced, easy to put materials into, and have clear signage (Short Term).

5) Institute selected material-specific actions to increase diversion at only Updated/Retrofitted or Brand New King County solid waste facilities

Curbside and Traditional Materials

- ➔ Provide compactor for paper, cardboard, plastic film, textiles (Short Term).

Bulky Materials

- ➔ Establish mattress collection in drop-off area at County facilities for transfer to off-site processor only if, after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities (Long Term)

Organic Materials

- ➔ Set aside area where haulers may deliver wood waste at a reduced tipping fee (Short Term).
 - ➔ *More Aggressive Option: Curbside Organics consolidation at Transfer Station and transfer to offsite processing*

6) Convert or modify existing King County solid waste facilities to focus on reuse, recycling, waste diversion, and/or processing

- ➔ Fill in Transfer Station pit at Enumclaw Transfer Station to create a flat floor area for receiving, storage and sorting/processing (Long Term).
 - ➔ *More Aggressive Option: Design and build a Hybrid mixed waste MRF/Transfer Station at existing updated / retrofitted facility.*
 - ➔ *More Aggressive Option: Co-locate single-stream MRF at existing updated / retrofitted facility.*

7) Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities

- ➔ Lease sections of Transfer Station property to private organization for end-use and/or energy recovery facilities (Long Term).
 - ➔ *More Aggressive Option: Curbside and SH Organics processing at Transfer Station co-located with anaerobic digestion and/or in-vessel composting.*
 - ➔ *More Aggressive Option: Co-locate recycling technology at existing updated / retrofitted or new facility.*
 - ➔ *More Aggressive Option: Co-locate MSW conversion technology at existing updated / retrofitted or new facility.*

Optimizing Station Recycling for Brand New Stations

8) Site and design new King County solid waste facilities to allow maximum flexibility for reuse, recycling, diversion, and material processing.

- ➔ Design transfer stations to have flat floors to increase customer ease in unloading materials, and operational flexibility in where materials are unloaded, stored, and sorted or processed (Short Term).
- ➔ Construct a regional resource recovery park for multiple recyclable and compostable materials at a new site (Long Term).
 - *Less Aggressive Option: At each new station, construct a “hard to recycle” items roundabout with bins and bunkers for reusable and recyclable materials placed on the outside of the circle.*
 - *Less Aggressive Option: Lease sections of Transfer Station property to private organization for sorting, processing, or both.*

9) Develop and operate flexible material receiving/processing capability for all reusable and recyclable materials

- ➔ Conduct floor sorts for bulky reusable and recyclable Items (Short Term).
- ➔ Hire additional staff for floor-sorts and/or pick-line (different job classification) (Short Term).
- ➔ Separate area for salvage materials exchange and donation (Long Term).
 - *Less Aggressive Option: Co-locate operations with a salvage retailer or processor to minimize transportation costs and increase visibility of salvage.*

10) Site, design and build new King County solid waste facilities to align collection and processing in advanced materials management system

- *More Aggressive Option: Establish Wet/Dry collection and dedicated processing to each waste stream (Long Term).*
- *More Aggressive Option: Design and build a Hybrid mixed waste MRF / Transfer Station at new site (Long Term).*
- *More Aggressive Option: Design and build a Single Stream MRF at New Site (Long Term).*
- *More Aggressive Option: Design and build a mixed waste processing facility at a new site (Long Term).*

- *More Aggressive Option: Design and build a campus that co-locates distinct processing facilities for organics, reusable and recyclable items, mixed materials (Long Term).*

Alternative Option: Separation of Self-Haul vehicles from Commercial vehicles (by building) (Long Term).

Optimizing Station Recycling for All Stations

11) Formalize and foster an internal staff culture that places a high value on reuse and recycling

Developing a culture of diversion among staff and customer service, and community outreach that reflects this culture, is a big factor in driving additional diversion and successful implementation of other recommendations. To be truly successful, these set of recommendations should be considered largely as a whole, and may need periodic review and updating to keep the culture active.

- ➔ Incorporate recycling responsibilities into all staff job descriptions (Short Term).

- *More Aggressive Option: Link increased diversion to job security.*

Consistent and frequent staff training and education, specifically for diverting reusable and recyclable materials, will help drive the culture, work ethic, and motivators among staff, and increase their confidence in meeting new recycling responsibilities outlined.

- ➔ Hold an All Staff meeting with customer service unit staff, transfer station operators (TSOs), scale operators and managers to recalibrate everyone to the mission of increased diversion (Short Term).

- ➔ Design and implement a robust and targeted training series, to include:
 - Operator training where TSOs, scale operators and customer service unit staff better understand each other's roles in order to provide consistent and accurate information regarding opportunities and procedures at the transfer stations. (Short Term)
 - Scale operators and customer service unit staff education on why recycling is important, how the system operates, and other resources to consult. (Short Term)
 - TSO training on the basic "do's", "don'ts", and "why's" for material specific diversion. (Short Term)
 - Basic customer service training that incorporates communication and customer education skills. (Short Term)

- Targeted training about any of the associated policy and operational changes instituted as part of this Optimized Transfer Station Recycling process, to ensure staff understand the changes and their role in making them effective. (Short Term)



Create and distribute resources that reinforce the culture and provide easily accessible references to training received, such as:

- a pocket 'cheat sheet' of do's, don'ts, and why's of recycling for TSOs, that is reviewed for consistency with the brochures customers use. (Short Term)
- a visual poster for the staff 'shack' on recycling do's, don'ts, and why's with lifecycle (closed loop) examples, and consistent color coding or graphics as used in any revamped signage. (Short Term)
- Use the same informational materials that customers receive for staff training to improve messaging consistency (Short Term).



Use and display language that highlights reuse, recycling, and diversion as a common community goal.

- Rename transfer stations to reflect reuse, recycling and diversion, such as "Bow Lake Resource Recovery Facility." (Short Term)
- Review and update all existing outreach messages to ensure the County's recycling target / Zero Waste of Resources goals are highly visible (Short Term).

12) Provide robust off-site community education and outreach materials that prepare customers for visiting King County solid waste facilities, and build the community's culture of reuse, recycling and diversion.

An overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion goals. Facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions, including at the scale-house.



Employ or partner with public outreach and education specialists to provide technical assistance, education campaigns and on the ground dissemination especially when policies or programs change (Short Term).



Review and update the County's website for customer usability, messaging consistent with the desired culture, and tips on what they can do to increase reuse, recycling and diversion, such as:

- Make sure County Transfer Station websites give as much or more visibility to recycling services at the transfer station as waste disposal services. (Short Term)

- Include information on the website about how to pack a vehicle to enhance reuse and recycling opportunities once at the station. (Short Term)
 - Create a video or photographic tour of how to prep and what to expect at the transfer station. (Short Term)
 - Create an interactive map component to the 'What do I do with...' web tool directing customers to other recycling/reuse resources (Short Term).
- ➔ Review and update existing customer materials, and create new materials as needed, to reinforce the culture message and increase awareness of the customer's role, such as:
- Cease the use of transfer station specific brochures which are confusing for staff to keep track of and can confuse customers, who may use more than one station. (Short Term)
 - Review fee sheet materials for user friendliness and ease in understanding. (Short Term)
 - Create a set of 'welcome packets' about transfer station recycling information that is sent to customers upon opening a new utility account, tailored for residential and business customers (Short Term).
- ➔ Deliver public education about the different recycling symbols on products and where to recycle products with the different symbols (Short Term).
- ➔ Use community art projects to increase awareness of transfer stations and recycling (Short Term).

13) Improve on-site information to motivate and direct proper placement of reusable and recyclable materials at the Transfer Station

Using simple signage that maintains flexibility in how information is relayed and to whom it is targeted will help drive behavior toward recycling and diversion once customers are on-site. Better information will also improve operational flow, and reduce the amount of re-sorting required by staff.

- ➔ Develop and implement a comprehensive signage program to increase flexibility with changing collection standards and material specific end markets, and create a more user-friendly and equitable experience for all transfer station customers.
- Color code the signage system for different materials, with consistent color coding in any print or online information or collateral. (Short Term)
 - Place easy to read material-specific signs with do's and don'ts right above the material's collection spot in the station. (Short Term)

- Use flexible and moveable signage particularly for materials with a changing end market. (Short Term)
 - Use electronic reader boards to relay information about materials with changing collection standards. (Short Term)
 - Include pictograms in signage, multilingual signage, websites and presentations to community groups to address language and cultural barriers. (Short Term)
- ➔ Develop and hand out recycling guides, magnets, or other materials at the scale-house, with information about accepted materials and recycling tips (Short Term).

14) Institute or reinforce county-wide policies that support increased focus on reuse and recycling at King County solid waste facilities

- ➔ Ban specific materials from disposal (Short Term)
- ➔ Identify additional target materials and retail outlet candidates who could participate in a Product Stewardship program initiated or jointly supported by the County (Short Term)
- ➔ *More Aggressive Option: Develop a Product Stewardship Program that provides for a municipal collection and recycling system with funding provided by product manufacturers*
- ➔ Adjust fees to further incentivize reuse and recycling, including:
- Different material-specific fees for targeted materials (Short Term)
 - Per-vehicle flat fee for using recycling area; additional facility use fee to access transfer station for disposal. (Long Term)
- ➔ *Less Aggressive Option: Pay an annual fee to drop off recyclable materials and trash at the transfer station*
- ➔ *More Aggressive Option: Tipping fee surcharges placed on every ton of solid waste disposed at landfills.*
- ➔ Review and update the 'no salvage policy' to allow TSOs to assist in diverting recyclables (Short Term)
- ➔ Eliminate traditional recyclables at transfer station (except Vashon, Cedar Falls, Skykomish) in favor of curbside collection (Long Term)
- ➔ *More Aggressive Option: Mandatory recycling laws which requires the recycling of designated items*

15) Enhance or re-direct staff activities to actively facilitate material diversion to reuse and recycling

- ➔ Enhance scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM, proper fee application, and to provide direction to recycling opportunities inside or outside of the transfers station; utilize visual inspection, camera, XRF, asbestos survey reports completed by accredited AHERA building inspectors to inform staff (Short Term).
- ➔ Direct existing staff to provide active instruction to direct vehicles to proper location for reuse and recycling (Short Term)
- ➔ Use magnetic color coded cones on vehicles at scale-house to enable staff direction inside Transfer Station to proper recycling or disposal areas. Color coding would be consistent with signage color coding scheme. (Short Term).
- ➔ Coordinate with local jurisdictions to offer recycling collection events at Transfer Stations, focusing on hard-to-recycle or other targeted materials. (Short Term)
 - *Less Aggressive Option: Off-site grading, inventory and retail of reusable goods.*
- ➔ Direct existing staff to provide active unloading and sorting assistance to customers once they are parked (Personal Sorters) (Short Term).
- ➔ Hire additional staff (different job classifications) to provide more direct customer assistance with active unloading, sorting of all materials, directing material placement, and answering questions (Personal Sorters) (Short Term).
 - *Less Aggressive Option: Hire additional Transfer Station staff (different job classification) for loading/unloading of bulky and reusable or recyclable drop-off and directing the diversion for recovery.*
 - *Less Aggressive Option: Hire additional Transfer Station staff (different job classification) to monitor recycling drop off areas, reuse areas.*
 - *Less Aggressive Option: Additional private/non-profit organization staff for loading/unloading of bulky and reusable or recyclable drop-off and directing the diversion for recovery*
 - *Less Aggressive Option: Identify partner salvage outlets and train Transfer Station staff to direct customers there with appropriate materials.*

16) Institute selected material-specific actions to increase diversion at all King County solid waste facilities

Curbside and Traditional Materials

- ➔ Seek a private partner to install beverage container recycling kiosks in public areas to divert self-haul customers off site (Traditional Materials) (Short Term).

- ➔ Establish free off-site drop-off centers (staffed) for reusable and recyclable materials (Short Term).
- ➔ Establish privately-operated recycling drop-off locations using City or County-owned property (Short Term).

Bulky Materials

- ➔ Place an extra fee on mattress disposal at transfer stations; combined with additional mattress recycling collection events at King County solid waste facilities (Short Term).

Construction & Demolition

- ➔ Focus significant effort on C&D diversion at the scale-house, carefully screening incoming loads and educating customers about on-site and off-site options (Short Term).
- ➔ Establish a partnership to divert small amounts of C&D waste curbside (see Bagster Program) (Short Term).
- ➔ Institute an ordinance requiring diversion of 100% of asphalt, concrete, soil, and land clearing debris and 50% of other C&D debris from landfill disposal (Long Term).
 - ➔ *More Aggressive Option: Require and enforce mandatory processing of mixed (Commercial) C&D waste at certified C&D processor.*

Organics

- ➔ Create a voucher program for yard and landclearing waste at private facilities to allow the County to collect appropriate tipping fees, but allow direct placement of materials at private facilities (Short Term).

17) Evaluate partnering with private companies to operate some or all existing or new King County solid waste facilities

Advanced System Configuration

All of the recommendations in this section reiterate recommendations listed previously (with previous numbering), but are included here as a summary of considerations for configuring an advanced system focused on the highest diversion. Most of these options must be in alignment with a complementary collection system (which may be different than the current one), and appropriate end uses.

Older Stations

2) Convert obsolete or underused facilities into recycling facilities

- ➔ Design and build a resource recovery park for multiple recyclable and compostable materials at Cedar Hills Regional Landfill (Long Term).
 - ➔ *More Aggressive Option: Design and build a mixed waste processing facility at Cedar Hills Regional Landfill.*
 - ➔ *More Aggressive Option: Design and build a Single Stream MRF at Cedar Hills Regional Landfill.*

- ➔ Convert existing Renton Transfer Station to Resource Recovery Park (Long Term).
 - ➔ *More Aggressive Option: Demolish existing Renton Transfer Station and replace with a Resource Recovery Park.*
 - ➔ *More Aggressive Option: Demolish existing Renton Transfer Station and design and build a Single Stream MRF at Renton Transfer Station.*

Updated/Retrofitted and Brand New Stations

6) Convert or modify existing King County solid waste facilities to focus on reuse, recycling, waste diversion, and/or processing

- ➔ Fill in Transfer Station pit at Enumclaw Transfer Station to create flat floor area for receiving, storage and sorting/processing (Long Term).
 - ➔ *More Aggressive Option: Design and build a Hybrid mixed waste MRF/Transfer Station at existing updated / retrofitted facility.*
 - ➔ *More Aggressive Option: Co-locate single-stream MRF at existing updated / retrofitted facility.*

7) Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities

- *More Aggressive Option: Curbside and SH Organics processing at Transfer Station co-located with anaerobic digestion and/or in-vessel composting (Long Term).*
- *More Aggressive Option: Co-locate recycling technology at existing updated / retrofitted facility (Long Term).*
- *More Aggressive Option: Co-locate MSW conversion technology at existing updated / retrofitted facility (Long Term).*

Brand New Stations

10) Site, design and build new King County solid waste facilities to align collection and processing in advanced materials management system

- *More Aggressive Option: Establish Wet/Dry collection and dedicated processing to each waste stream (Long Term).*
- *More Aggressive Option: Design and build a Hybrid mixed waste MRF / Transfer Station at new site (Long Term).*
- *More Aggressive Option: Design and build a Single Stream MRF at New Site (Long Term).*
- *More Aggressive Option: Design and build a mixed waste processing facility at a new site (Long Term).*
- *More Aggressive Option: Design and build a campus that co-locate distinct processing facilities for organics, reusable and recyclable items, mixed materials (Long Term).*
- *Alternative Option: Separation of Self-Haul vehicles from Commercial vehicles (by building) (Long Term).*

All Stations

17) Evaluate partnering with private companies to operate some or all existing or new King County solid waste facilities

References

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APPENDIX A

Detailed Listing of Recommended Strategies

Optimizing Station Recycling for Older Stations

1) Modify unloading access to suit recyclable material delivery peaks in order to facilitate diversion

➔ Dedicate chute/trailer tunnel to one of the following in top-loading trailer: Source-separated organics (landclearing and wood); Mixed C&D

Use of top load long-haul trailers allows materials to be easily transported offsite to a processor for further sorting.

Our assumption is that if the County chooses to handle these materials (or other C&D with similar issues), asbestos-free certification (or some level of assurance from self-haulers) would be required for materials delivered for recycling. Trans-loading to processors would likely require some sort of assurance from the County about the absence of asbestos, though asbestos survey documentation is unlikely.

Station Gen:	Existing Older		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	High
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

2) Convert obsolete or underused facilities into recycling facilities

➔ Design and build a resource recovery park for multiple recyclable and compostable materials at Cedar Hills Regional Landfill

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities. Many of these resource recovery parks co-locate both MRFs and composting operations.

Organic wastes entering the tipping area is segregated and moved over to the composting area of the site. For those sites that do not have ample space, organics segregation is accomplished for off-site transfer to a composting facility located elsewhere.

This strategy calls for the design and construction of a new resource recovery park at the Cedar Hills Regional Landfill, once closed. Our assumption is that the focus would be on the full range of activities mentioned above, depending on space provided with a new master plan. County staff would continue to operate the facility, with proper training.

Station Gen:	Existing Older		Status:	Base Recommendation
System Impact:	CHRL		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 *Design and build a mixed Waste processing facility at Cedar Hills Regional Landfill*

As a more aggressive alternative to a County-owned resource recovery park at Cedar Hills Regional Landfill, the County would design, build, operate, and own a mixed waste processing facility at the Cedar Hills Regional Landfill, once closed. The effort to develop mixed waste MRFs, previously known as “dirty” MRFs, has seen a resurgence in the last 5-10 years due to high energy costs, aggressive waste diversion goals, favorable commodity values, rising tip fees, and technological advancements in separation equipment. While in the past, mixed waste MRFs recovered between 5% and 45% of the incoming material as recyclables with the remainder disposed, some newer mixed waste MRFs report achieving waste diversion rates of 25-75%. MRFs achieving higher waste diversion rates are recovering a significant percentage of materials in the form of biodegradable material that is sent for composting.

This strategy assumes County staff would be hired to operate the facility, and be given appropriate training. A full feasibility and economic analysis would be required prior to action. Also, if this strategy is chosen, additional work would be required to determine how much of the County's waste stream could be accommodated, and what to do with remaining system capacity.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No

	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 **Design and build a Single Stream MRF at Cedar Hills Regional Landfill**

As a more aggressive alternative to a County-owned resource recovery park at Cedar Hills Regional Landfill, the County would design, build, operate, and own a single-stream material recovery facility (MRF) at the Cedar Hills Regional Landfill, once closed. The facility would be configured to process all recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	
Category:	Processing		Implementation Time:	
Materials:	Curbside	No	Initial Cost:	High
	Traditionals	No	Operating Cost:	High
	Organics	No		
	C and D	No	Cost Avoidance:	No
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	No		
	Multi-Family	No		
	Commercial	No		
Affected Haulers:	Self-Haul	No		
	Commercial	No		

 **Convert existing Renton Transfer Station to Resource Recovery Park**

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities.

This strategy calls for the conversion of the Renton Transfer Station site and building to a resource recovery park. Our assumption is that the focus would be on reuse, recycling, with

minimal processing. Organics may be received, but not processed. County staff would continue to operate the facility, with proper training.

Station Gen:	Existing Older		Status:	Base Recommendation
System Impact:	Renton		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 *Demolish existing Renton Transfer Station and replace with a Resource Recovery Park*

As a more aggressive alternative to converting the existing Renton Transfer Station to Resource Recovery Park, this strategy calls for the demolition of the Renton Transfer Station building and designing and constructing a new resource recovery park.

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities. Many of these resource recovery parks co-locate both MRFs and composting operations. Organic wastes entering the tipping area is segregated and moved over to the composting area of the site. For those sites that do not have ample space, organics segregation is accomplished for off-site transfer to a composting facility located elsewhere.

Our assumption is that the focus would be on reuse, recycling, with some processing, depending on space provided with a new master plan. County staff would continue to operate the facility, with proper training.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		

	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 ***Demolish existing Renton Transfer Station and design and build a Single Stream MRF at Renton Transfer Station***

As a more aggressive alternative to converting the existing Renton Transfer Station to Resource Recovery Park, the County would design, build, operate, and own a single-stream material recovery facility (MRF) at the Renton Transfer Station site. The facility would be configured to process all recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Renton		Diversion Potential:	Low
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	No		
	Commercial	Yes		

Optimizing Station Recycling for Updated / Retrofitted Stations and Brand New Stations

3) Develop, install and staff flexible material receiving/processing capability for reusable and recyclable Self-Haul materials

- ➔ Dedicated bulky Item Drop-Off Area using staging areas, bunkers, bins, drop-boxes, or trailers (i.e., furniture, carpet, tires, other bulky items)

Bulky items are typically targeted for diversion using drop-off areas within facilities, and focus mostly on self-haul generators with loads rich in bulky and/or reusable materials. Materials are unloaded and sorted by the customer (some facilities include staff assistance, some do not). A dedicated area allows recovery of a targeted material with only the space necessary for bins, bunkers, drop-boxes, or trailers and the staff to monitor, assist (in some cases), and direct customers. Separation by generator requires fewer staff because the customer dropping off the waste at the transfer station is directed through signage or staff to pull out the salvageable materials and deposit them in a dedicated area or to unload directly into a dedicated container.

This recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. The scope of this project does not include research and analysis to identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

Our assumption is that sufficient markets for reusable and recyclable materials exist and that staff have been trained to distinguish the quality required by private and non-profit vendors. Our assumption is materials would be serviced by the same vendors.

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	Medium
Category:	Operations	Implementation Time:	Short
Materials:	Curbside No	Initial Cost:	Low
	Traditionals No	Operating Cost:	Low
	Organics No	Cost Avoidance:	Yes
	C and D No	Revenue Generation:	No
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

 *Include a retail thrift store, building materials yard, reuse and recycling center at transfer stations*

As a more aggressive alternative to a dedicated bulky Item Drop-Off Area, co-location of a retail thrift store, building materials yard, and reuse and recycling center at transfer facilities would create transportation efficiencies for both sources of products and customers, and diversion at the transfer stations for such a facility could be incorporated into some operations. We assume that the operation would be staffed by County employees, and that reusable building materials and fixtures, furniture, and other working items would be included in the retail component. The facility could also include a reuse and recycling center, and a café. The center could also form an environmental stewardship destination for the community, hosting events to further an education mission.

Station Gen:	Updated/Retrofitted & New	Status:	More Aggressive
System Impact:	Single Generation	Diversion Potential:	Medium
Category:	Operations	Implementation Time:	Short
Materials:	Curbside No	Initial Cost:	Low
	Traditionals No	Operating Cost:	Medium
	Organics No	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	Yes
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

 *Create a 'reuse zone' and employ staff to help the public unload items in the appropriate location*

As a more aggressive alternative to a dedicated bulky Item Drop-Off Area, the County would operate reuse zones at appropriate transfer facility sites; ideally, the sites would be distributed among the North, Central, and South County so as to provide convenient access from the County's unincorporated and interlocal City areas. The reuse sites would accept donations of low-value items such as clothing and furniture but would pay cash or issue trade credits on a case-by-case basis for high-value items such as selected building materials; trade credits could be used to purchase items from any reuse site. Our assumption is the County staff would be hired to staff the sites, and be provided proper training to reserve the right to refuse to accept items such as hazardous materials, items prohibited from resale due to local health department rules (e.g., used mattresses), and items which are determined to be too difficult to sell.

Station Gen:	Updated/Retrofitted & New	Status:	More Aggressive
System Impact:	Single Generation	Diversion Potential:	Medium
Category:	Processing	Implementation Time:	Short
Materials:	Curbside No	Initial Cost:	Low
	Traditionals No	Operating Cost:	Medium
	Organics No		

	C and D	No	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

 *Host an appliance exchange for working items*

As a more aggressive alternative to a dedicated bulky Item Drop-Off Area, providing a separate area for working appliance exchange can also prevent reusable items from entering the waste stream. Our assumption is that the County would provide staff to facilitate transactions, or contract with a private or non-profit recycler to accomplish the retail function. On the basic level, appliance donation would be the simplest form, with no money exchange and only training in quality specifications necessary.

Station Gen:	Updated/Retrofitted & New		Status: More Aggressive
System Impact:	Single Generation		Diversion Potential: Low
Category:	Operations		Implementation Time: Short
Materials:	Curbside	No	Initial Cost: Low
	Traditionals	No	Operating Cost: Medium
	Organics	No	
	C and D	No	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	No	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

 *Co-locate Salvage Lumber Warehouse at Transfer Station*

The County is considering development of a Salvaged Lumber warehouse or similar facility to collect, grade, inventory, and sell reusable lumber and other salvaged building materials. The concept of a warehouse model that collects, processes, grades, inventories and coordinates with retail and wholesale partners for resale is supported by industry. However an infrastructure solution alone will not solve the existing challenges associated with increased use of salvage lumber. Interventions that include training and education, outreach, incentives and policy will be more likely to create additional diversion of salvage lumber to reuse.

As a more aggressive alternative to a dedicated bulky Item Drop-Off Area, diversion at the transfer stations for such a facility could be incorporated into some operations, and co-location of the facility at transfer facilities would create transportation efficiencies for both sources of lumber and customers. We assume that the operation would be contracted to a private or non-profit contractor, and that other reusable building materials and fixtures

would be included if a retail component were also included. Economic modeling is still required to fully support the concept.

Station Gen:	Updated/Retrofitted & New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	No	Initial Cost:	Medium
	Traditionals	No	Operating Cost:	Medium
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 *On-site trailers for collection of reusable furniture and mattresses for off-site processing*

As a more aggressive addition to a dedicated bulky Item Drop-Off Area, dedicated trailers for collection of reusable furniture and mattresses allows recovery of additional valuable products and materials. Our assumption is that some staff would be required to assure quality is kept high and contamination is kept low; and that a secondary processing partner or would service the trailers and distribute reusable goods to appropriate retailers, or distribute commodities to appropriate commodity markets. We also assume that the Division would consider mattress collection at County facilities only if after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities. This could be considered a “last resort.”

Station Gen:	Updated/Retrofitted & New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	No		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

- ➔ Establish carpet collection in drop-off area at County facilities for transfer to off-site processor only if, after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities

Carpeting is difficult to manage once mixed in with other waste at the transfer station. The County currently seeks to recycle carpet through private infrastructure. In addition to continuing to support the private sector, allowing carpet collection for recycling (not disposal) at transfer stations would provide additional options for customers.

Processors receiving trans-loaded carpet would likely require AHERA documentation or some sort of assurance from the County about the absence of asbestos. However, compliance with regulations requiring asbestos surveys is highly variable among contractors and do-it-yourselfers.

Our assumption is that if the County chose to handle carpet, asbestos-free certification (or some level of assurance from commercial and self-haulers) would be required for materials delivered for recycling. Therefore, this recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials (ACM). The scope of this project does not include research and analysis to identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

We also assume that the Division would consider carpet collection at County facilities only if after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities. This could be considered a "last resort."

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	Low
Category:	Operations	Implementation Time:	Long
Materials:	Curbside No	Initial Cost:	Medium
	Traditionals No	Operating Cost:	Low
	Organics No	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	No
	Bulky No		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		

- ➔ Set up area to receive source-separated loads of clean wood

A dedicated roll-off container for source-separated clean wood allows recovery of a targeted material with only the space necessary for a container. Separation by generator requires fewer staff because the customer dropping off the waste at the transfer station is directed

through signage or staff to deposit them in a dedicated area or to unload directly into a dedicated container. Our assumption is that sufficient markets for recovered wood exist, which includes energy recovery, composting, and reuse as salvage lumber. Our assumption is that roll-off containers would be serviced by, and delivered to, private wood recyclers; or delivered directly to end-markets depending on quality.

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	High
Category:	Processing	Implementation Time:	Short
Materials:	Curbside No	Initial Cost:	Low
	Traditionals No	Operating Cost:	Low
	Organics No		
	C and D Yes	Cost Avoidance:	Yes
	Bulky No	Revenue Generation:	No
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

 **Dedicated roll-off container for source-separated asphalt shingles**

A dedicated roll-off container for source-separated shingles allows recovery of a targeted material with only the space necessary for a container. Separation by generator requires fewer staff because the customer dropping off the waste at the transfer station is directed through signage or staff to deposit them in a dedicated area or to unload directly into a dedicated container. This is more cost effective but there are disadvantages of lost tonnage and contamination. Our assumption is that sufficient markets for recovered asphalt shingles exist, which due in part to the efforts of the LinkUp program have demonstrated the efficacy of asphalt shingles used in pavement applications, among other applications. Our assumption is that roll-off containers would be serviced by, and delivered to, private C&D recyclers; or delivered directly to end-markets depending on quality.

Processors receiving trans-loaded demolition or renovation materials would likely require AHERA documentation or some sort of assurance from the County about the absence of asbestos. However, compliance with regulations requiring asbestos surveys is highly variable among contractors and do-it-yourselfers. The building owner is ultimately the responsible party.

Our assumption is that if the County chose to handle source-separated asphalt shingles, asbestos-free certification (or some level of assurance from commercial and self-haulers) would be required for materials delivered for recycling. Therefore, this recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials

(ACM). The scope of this project does not include research and analysis to identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

Station Gen:	Updated/Retrofitted & New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	No		
	Multi-Family	No		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 Dedicated roll-off container for source-separated gypsum wallboard new construction waste

A dedicated roll-off container for source-separated gypsum wallboard from new construction sites allows recovery of a targeted material with only the space necessary for a container. Separation by generator requires fewer staff because the customer dropping off the waste at the transfer station is directed through signage or staff to deposit them in a dedicated area or to unload directly into a dedicated container. This is more cost effective but there may be issues with contamination, if not monitored.

Our assumption is that sufficient markets for recovered gypsum exist locally. Our assumption is that roll-off containers would be serviced by, and delivered to, private C&D recyclers; or delivered directly to end-markets depending on quality.

Processors receiving trans-loaded demolition or renovation materials would likely require AHERA documentation or some sort of assurance from the County about the absence of asbestos. However, compliance with regulations requiring asbestos surveys is highly variable among contractors and do-it-yourselfers. The building owner is ultimately the responsible party.

Our assumption is that if the County chose to handle source-separated gypsum wallboard new construction waste, asbestos-free certification (or some level of assurance from commercial and self-haulers) would be required for materials delivered for recycling. Therefore, this recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials (ACM). The scope of this project does not include research and analysis to

identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation	
System Impact:	Single Generation	Diversion Potential:	Medium	
Category:	Operations	Implementation Time:	Short	
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	No		
	Multi-Family	No		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Self-Haul C&D loads must be source-separated to enter the transfer station or pay extra fee*

As a more aggressive alternative to an area to receive source-separated loads of Self-Haul C&D, with mandatory source-separation of self-hauled C&D, self-haul customers would be required to separate their C&D recyclable materials prior to disposal, with no mixed loads allowed. Loads for disposal would be monitored and must contain no more than 5 percent of recyclable materials. Enforcement at facilities would focus on education about reuse and recycling opportunities, including curbside availability. Signage would support the policy, and act as a disincentive to dispose of recyclable materials.

Processors receiving trans-loaded demolition or renovation materials would likely require AHERA documentation or some sort of assurance from the County about the absence of asbestos. However, compliance with regulations requiring asbestos surveys is highly variable among contractors and do-it-yourselfers. The building owner is ultimately the responsible party.

Our assumption is that if the County chose to handle any source-separated C&D, asbestos-free certification (or some level of assurance from commercial and self-haulers) would be required for materials delivered for recycling. Therefore, this recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials (ACM). The scope of this project does not include research and analysis to identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Waste System-Wide	Diversion Potential: High
Category:	Policies & Fees	Implementation Time: Long
Materials:	Curbside No	Initial Cost: Low
	Traditionals No	Operating Cost: Low
	Organics No	
	C and D Yes	Cost Avoidance: Yes
	Bulky No	Revenue Generation: No
Affected Generator:	Single-Family Yes	
	Multi-Family Yes	
	Commercial Yes	
Affected Haulers:	Self-Haul Yes	
	Commercial No	

 Separate mixed C&D into dedicated roll-off or top loading containers for transfer to C&D processor

Separating mixed C&D waste into top load long-haul trailers allows materials to be easily transported offsite to a processor for further sorting. A dedicated roll-off container for mixed C&D allows recovery of a targeted material with only the space necessary for a container. Material would be placed in the container by the customer dropping off the waste at the transfer station, as directed through signage or staff to them in a dedicated area or to unload directly into a dedicated container. Our assumption is that roll-off containers would be serviced by, and delivered to, private C&D recyclers for additional sorting.

Processors receiving trans-loaded demolition or renovation materials would likely require AHERA documentation or some sort of assurance from the County about the absence of asbestos. However, compliance with regulations requiring asbestos surveys is highly variable among contractors and do-it-yourselfers. The building owner is ultimately the responsible party.

Our assumption is that if the County chose to handle mixed C&D, asbestos-free certification (or some level of assurance from commercial and self-haulers) would be required for materials delivered for recycling. Therefore, this recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials (ACM). The scope of this project does not include research and analysis to identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

Station Gen:	Updated/Retrofitted & New	Status: Base Recommendation
System Impact:	Single Generation	Diversion Potential: High
Category:	Processing	Implementation Time: Short
Materials:	Curbside No	Initial Cost: Low

	Traditionals	No	Operating Cost: Low
	Organics	No	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	No	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 *Set up area to receive commingled loads of Self-Haul C&D; remove high value materials (e.g., metals, wood) and difficult to manage materials (e.g., carpet), and deliver the remaining material to a private C&D processing facility*

As a more aggressive alternative to separating mixed C&D into dedicated roll-off or top loading containers for transfer to C&D processor, an area to receive commingled loads of self-haul C&D allows recovery of high-value materials (e.g., metals and wood) within an area of the facility separate from the disposal area, and a dedicated container. Our assumption is that roll-off containers would be serviced by, and delivered to, private C&D recyclers. The option does not require much additional equipment for onsite handling. Labor costs will be a main driver is establishing economic feasibility.

Processors receiving trans-loaded demolition or renovation materials would likely require AHERA documentation or some sort of assurance from the County about the absence of asbestos. However, compliance with regulations requiring asbestos surveys is highly variable among contractors and do-it-yourselfers. The building owner is ultimately the responsible party.

Our assumption is that if the County chose to handle mixed C&D, asbestos-free certification (or some level of assurance from commercial and self-haulers) would be required for materials delivered for recycling. Therefore, this recommendation must be done in conjunction with enhanced scale-house screening of received loads and identification of materials including suspect lead-based paint and suspect ACM (#15). Our assumption is that the Division would develop and deploy resources and procedures to effectively address the risk of receiving asbestos containing materials that could be present in most demolition or renovation materials. Onsite asbestos identification is possible using new technologies and procedures that effectively prevent receiving asbestos containing materials (ACM). The scope of this project does not include research and analysis to identify what procedures would be necessary and what their impacts would be, but could include preparation requirements, visual inspection, camera, XRF, and mandatory asbestos survey reports completed by accredited AHERA building inspectors to inform staff.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Single Generation	Diversion Potential: High
Category:	Processing	Implementation Time: Short
Materials:	Curbside	Initial Cost: Low
	Traditionals	Operating Cost: Low
	Organics	
	C and D	Yes
		Cost Avoidance: Yes

	Bulky	No	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 *Establish a public/private partnership for C&D/reusable building material sortation and diversion*

As a less aggressive alternative to separating mixed C&D into dedicated roll-off or top loading containers for transfer to C&D processor, a public/private partnership for C&D/reusable building material sortation and diversion can increase diversion while alleviating the burden on the County.

Station Gen:	Updated/Retrofitted & New		Status: Less Aggressive
System Impact:	Transfer System-Wide		Diversion Potential: Low
Category:	Processing		Implementation Time: Short
Materials:	Curbside	No	Initial Cost: Low
	Traditionals	No	Operating Cost: Low
	Organics	No	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	No	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 **Manually sort landclearing and wood waste from garbage and mixed C&D and deliver it to wood-only and landclearing only roll-off or top loading containers for transfer to processors**

Many facilities direct self-haul residential customers and contractors to dump commingled loads of C&D on a tipping floor. Once materials are dumped onsite, all processors employ some level of manual sorting prior to any mechanical processing to remove garbage, non-targeted recyclables, high-value items - such as salvage timbers, or large items that are incompatible with processing equipment. Separating wood-only and landclearing only debris is done because they each require a different level of sorting and processing to reach end-market requirements. This also prevents cross-contamination. Is this recommending a manual sort before or after the tipping floor?

Station Gen:	Updated/Retrofitted & New		Status: Base Recommendation
System Impact:	Single Generation		Diversion Potential: Medium
Category:	Processing		Implementation Time: Short
Materials:	Curbside	No	Initial Cost: Medium
	Traditionals	No	Operating Cost: Low
	Organics	No	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	No	Revenue Generation: No

Affected Generator:	Single-Family	Yes
	Multi-Family	Yes
	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	Yes

 *Provide shredder/grinder for woody wastes*

As a more aggressive alternative to manually sorting landclearing and wood waste, the County would purchase and operate a wood waste shredder/grinder on a suitable existing transfer station site. We assume other wood wastes collected at the County's other transfer facilities could, with capacity, be sent to the shredder/grinder for processing. The strategy assumes that County staff would be trained to operate the equipment, and that the economics of equipment purchase, staff training, staff time, and transportation would eventually be offset by savings in both disposal, processor tip fees, and conserved air space at Cedar Hills. Material revenues would also contribute to the payback period.

Station Gen:	Updated/Retrofitted & New	Status:	More Aggressive	
System Impact:	Single Generation	Diversion Potential:	Medium	
Category:	Processing	Implementation Time:	Short	
Materials:	Curbside	No	Initial Cost:	Medium
	Traditionals	No	Operating Cost:	Medium
	Organics	No	Cost Avoidance:	Yes
	C and D	Yes	Revenue Generation:	Yes
	Bulky	No		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Grind or ship wood on-site by a contractor*

As a more aggressive alternative to manually sorting landclearing and wood waste, the County would purchase a wood waste shredder/grinder and contract operation to a private company on a suitable existing transfer station site. We assume other wood wastes collected at the County's other transfer facilities could, with capacity, be sent to the shredder/grinder for processing. The strategy assumes that contractor staff would be trained to operate the equipment, and that the economics of equipment purchase, contractor fees, and transportation would eventually be offset by savings in both disposal, processor tip fees, and conserved air space at Cedar Hills. Material revenues would also contribute to the payback period.

Station Gen:	Updated/Retrofitted & New	Status:	More Aggressive	
System Impact:	Single Generation	Diversion Potential:	Medium	
Category:	Processing	Implementation Time:	Short	
Materials:	Curbside	No	Initial Cost:	Medium
	Traditionals	No	Operating Cost:	Medium
	Organics	No		

	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 Dedicated sort line for all self-haul materials

Davis Street, SF Recycling & Disposal, and Portland Metro Central Transfer Station have dedicated sort lines for self-haul materials. These facilities are able to divert 50 to 70 percent of self-haul materials, including cardboard, wood, metal, plastics, sheetrock, inerts, fines using the sort lines.

Station Gen:	Updated/Retrofitted & New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

4) Configure operations to support maximum customer exposure to on-site reuse and recycling opportunities, including material receiving/processing areas

 Arrange for private salvage or reuse companies to train transfer station staff on how to identify materials for reuse

Most reusable material outlets have specific product and/or quality standards they employ for accepting materials for later sale. Training TSOs and scale operators on which potentially reusable materials are resalable allows material diverted by staff to have ready outlets and increasing potential value of diversion.

This strategy assumes that transfer facility staff are engaged in assisting customers place reusable materials in designated areas for retrieval by private and non-profit contractors.

Station Gen:	Updated/Retrofitted & New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low

	Organics	No	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

➔ Direct loads to specific areas based on load quality and processing requirements

Source separating loads based on quality and processing requirements allows for materials to be efficiently processed and can also increase the value of the material by reducing cross contamination. This strategy assumes that some level of separation or processing occurs at the transfer facilities, and that load screening would work in concert with TSOs to direct material to appropriate locations. This includes simple customer source-separation into segregated containers, simple manual sortation, simple mechanized sortation, or pick-lines.

Station Gen:	Updated/Retrofitted & New		Status: Base Recommendation
System Impact:	Single Generation		Diversion Potential: Medium
Category:	Operations		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Low
	Traditionals	Yes	Operating Cost: Medium
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

➔ Direct vehicles to sorting area for recyclables as the default, rather than disposal area

It is important that the areas designated for reuse and recycling are located conveniently or more conveniently than the area for trash disposal. At many transfer stations, the trash disposal area is the prominent, default location for depositing materials and customers need to hunt around to find the proper location for sorting for reuse and recycling. Reversing this increases recycling.

Station Gen:	Updated/Retrofitted & New		Status: Base Recommendation
System Impact:	Single Generation		Diversion Potential: Medium
Category:	Operations		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Medium
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	

	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	No

 **Mandatory separation of recyclables at Transfer Stations with Recycling**

As a more aggressive alternative to directing vehicles to a sorting area for recyclables as the default, rather than disposal area, with mandatory separation of recyclables, Self-haul customers would be required to separate their traditional recyclable materials prior to disposal, with no mixed loads allowed. Loads for disposal would be monitored and must contain no more than 5 percent of recyclable materials. Enforcement at facilities would focus on education about reuse and recycling opportunities, including curbside availability. Signage would support the policy, and act as a disincentive to dispose of recyclable materials.

Station Gen:	Updated/Retrofitted & New	Status:	More Aggressive	
System Impact:	Single Generation	Diversion Potential:	Medium	
Category:	Operations	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes	Cost Avoidance:	Yes
	C and D	Yes	Revenue Generation:	Yes
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	No		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 **Locate recycling and reuse collection areas after the scale house and charge a fee**

Traditional recyclables such as metals, glass, plastics, and cardboard often end up in the garbage at the transfer station because self-haul customers bypass recycling centers when they are placed outside of the fee gate at transfer stations. Contamination is also a concern and reduces recyclability and revenue associated with these materials.

From the operational perspective, re-locating traditional recyclables behind the scale house if space is available and requiring a fee for entry creates system-wide incentives that provide an overall benefit:

- Creates a new revenue stream that is able to fund new or enhanced recycling initiatives at the stations
- A fee on traditional material recycling at transfer stations should compel customers to place them into the curbside collection system, if it is available, rather than travel to transfer facilities. This reduces vehicle travel overall, and produces fewer emissions
- Fewer self-haul trips to County facilities keeps costs down and eases facility logistics.

- Additional monitoring from staff behind the scale house will also potentially cut down on contamination of recyclables that are received.

Station Gen:	Updated/Retrofitted & New		Status: Base Recommendation
System Impact:	Single Generation		Diversion Potential: Medium
Category:	Operations		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: High
	Traditionals	Yes	Operating Cost: Low
	Organics	No	
	C and D	No	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

 Make sure materials specific collection bins are adequately sized and spaced, easy to put materials into, and have clear signage.

Having appropriately sized materials-specific collections bins, that are easy for customers to use and have clear signage aids in accurate self-sorting, increasing diversion.

Station Gen:	Updated/Retrofitted & New		Status: Base Recommendation
System Impact:	Single Generation		Diversion Potential: Medium
Category:	Operations		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Low
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

5) Institute selected material-specific actions to increase diversion at only Updated/Retrofitted or Brand New King County solid waste facilities

Curbside and Traditional Materials

 Provide compactor for paper, cardboard, plastic film, textiles

While many of the recoverable materials delivered to transfer stations by self-haul customers are bulky (wood, metals, rigid plastics, yard trimmings, furniture), some materials could be diverted from the waste stream and would benefit from densification, compaction, or baling, including cardboard, textiles, plastic film, and other paper. A compactor is space efficient and can be serviced directly by contractors. Since most materials would be brought to third-party organizations doing the material marketing and would likely require baling for

shipment, compactors are an appropriate step to condense storage space necessary at the transfer station to enhance diversion efficiency.

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	Low
Category:	Processing	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Low
	Traditionals Yes	Operating Cost:	Low
	Organics No	Cost Avoidance:	Yes
	C and D No	Revenue Generation:	Yes
	Bulky No		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

Bulky Materials

➔ Establish mattress collection in drop-off area at County facilities for transfer to off-site processor only if, after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities.

Mattresses are difficult to manage once mixed in with other waste at the transfer station. The County currently seeks to recycle mattresses through the "Take It Back Network". In addition to continuing to build the "Take it Back Network", allowing mattress collection for recycling (not disposal) at transfer stations would provide additional options for customers.

We also assume that the Division would consider mattress collection at County facilities only if after ongoing market development efforts, private facilities prove unable to provide comparable convenience to public facilities. This could be considered a "last resort."

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	Low
Category:	Operations	Implementation Time:	Long
Materials:	Curbside No	Initial Cost:	Medium
	Traditionals No	Operating Cost:	Low
	Organics No	Cost Avoidance:	Yes
	C and D No	Revenue Generation:	No
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial No		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

Organic Materials

 Set aside area where haulers may deliver wood waste at a reduced tipping fee

Allowing haulers to deliver wood waste at a reduced tipping fee encourages diversion. For example Ada County, Idaho diverts 25,000 tons of wood waste a year from its landfill using a two tiered diversion program. In Tier I, a special collection area is set aside where haulers, including residents, may deliver wood waste at a reduced tipping fee. The wood is chipped on-site by a contractor and sold for use in secondary markets as fuel, firewood, or landscaping. This program captures about 50% of all wood delivered to the landfill. In Tier II, mixed waste loads identified as carrying wood waste along with garbage are diverted to a separate area of the working face. At this site, workers manually sort wood waste from trash and deliver it to the wood waste collection area for chipping and sale. This program captures 20% more wood waste.

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	Medium
Category:	Operations	Implementation Time:	Short
Materials:	Curbside No	Initial Cost:	Low
	Traditionals No	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D No	Revenue Generation:	No
	Bulky No		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul No		
	Commercial Yes		

 *Curbside Organics consolidation at Transfer Station and transfer to off-site processing*

As a more aggressive alternative to setting aside an area where haulers may deliver wood waste at a reduced tipping fee, consolidation of commercially-collected curbside organics may provide for transportation efficiencies that could accrue to County and City ratepayers, rather than compelling haulers to bring collection trucks to company-owned facilities for ultimate transfer, or directly to organics processors. Double-handling of material may negate any transportation efficiencies, however, and an economic analysis should be completed before this more aggressive option is considered. Our assumption is that commercially-collected curbside organics would be commingled with organics separated from self-haul loads into larger (i.e., up to 100-cubic yard) top-loading trailers for transfer to organics processors. Minimal compaction would occur and efficiencies would accrue from larger payloads per trip. Only facilities equipped to handle top-loading trailers would be targeted.

Station Gen:	Updated/Retrofitted & New	Status:	More Aggressive
System Impact:	Single Generation	Diversion Potential:	Low
Category:	Operations	Implementation Time:	Short
Materials:	Curbside No	Initial Cost:	Low
	Traditionals No	Operating Cost:	Medium
	Organics Yes		

	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

6) Convert or modify existing King County solid waste facilities to focus on reuse, recycling, waste diversion, and/or processing

 Fill in Transfer Station pit at Enumclaw Transfer Station to create a flat floor area for receiving, storage and sorting/processing

Most current transfer stations are constructed and operated with a flat floor across the entire building. Operational changes at an existing transfer station with a flat, flexible floor design may enable King County to more highly utilize existing infrastructure and staff. For instance, source separation is effective in diverting certain waste stream portions, including C&D, green waste and food waste.

Station Gen:	Updated/Retrofitted & New	Status:	Base Recommendation	
System Impact:	Single Generation	Diversion Potential:	High	
Category:	Processing	Implementation Time:	Long	
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Design and build a Hybrid mixed waste MRF/Transfer Station at existing updated / retrofitted facility*

As a more aggressive alternative to filling in the Transfer Station pit at Enumclaw Transfer Station to create a flat floor area, the County would design, build, operate, and own a hybrid mixed waste material recovery facility (MRF)/transfer station at an existing updated/retrofitted facility site. The facility would be configured to target loads rich in recyclables, which would be directed to the MRF. While some argue this lacks an important public education element because action is no longer required on the part of the waste generator, it provides another avenue to divert additional recyclables from disposal. Other configurations could include a dual stream processing line used for residential recyclables, a transfer station, and a citizen drop-off.

Many of these facilities divert materials to multiple uses, including commodity markets, fuel and energy, and composting. The technologies used at these facilities include the use of

trammel screens and vibrating finger screens to make the initial separation of recyclable-rich waste from other MSW.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Waste System-Wide	Diversion Potential: High
Category:	Processing	Implementation Time: Long
Materials:	Curbside Yes	Initial Cost: High
	Traditionals Yes	Operating Cost: High
	Organics Yes	
	C and D Yes	Cost Avoidance: Yes
	Bulky Yes	Revenue Generation: Yes
Affected Generator:	Single-Family Yes	
	Multi-Family Yes	
	Commercial Yes	
Affected Haulers:	Self-Haul Yes	
	Commercial Yes	

 *Co-locate single-stream MRF at existing updated / retrofitted facility*

As a more aggressive alternative to filling in the Transfer Station pit at Enumclaw Transfer Station to create a flat floor area, co-location of this facility at transfer facilities would create transportation efficiencies for both sources of material and customers. The County would design, build, operate, and own a single-stream material recovery facility (MRF) at an existing updated/retrofitted facility. The facility would be configured to process some, but not all of the recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Single Generation	Diversion Potential: Low
Category:	Processing	Implementation Time: Long
Materials:	Curbside Yes	Initial Cost: High
	Traditionals Yes	Operating Cost: High
	Organics No	
	C and D No	Cost Avoidance: Yes
	Bulky No	Revenue Generation: Yes
Affected Generator:	Single-Family Yes	
	Multi-Family Yes	
	Commercial Yes	
Affected Haulers:	Self-Haul No	
	Commercial Yes	

7) Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities

➔ Lease sections of Transfer Station property to private organization for end-use and/or energy recovery facilities

Shared use of facilities allows the County to increase diversion without being responsible for the operations and to collect rent from the lessee. Combining transfer and diversion activities with end-use recycling or energy recovery enhances diversion economics and creates a continuous process from material receiving through beneficial use. Emerging thermal processing includes technologies such as gasification, plasma gasification, and pyrolysis, which use or produce heat, under controlled conditions, to convert waste into a synthesis gas (that can be used to produce a fuel, or cleaned and combusted to generate electricity) and other usable products (e.g., vitrified aggregate, carbon-based char, metal).

A mechanical biological treatment facility combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion. Anaerobic digestion of organics prior to composting produces biofuels for energy production and residual digestate suitable for beneficial soil amendment.

A recycling technology lessee would seek to enhance environmental and economic performance of a recycling end-market by efficiently sharing transfer station resources (information, materials, water, energy, and infrastructure) to enhance economic viability and increase efficient material diversion.

Our assumption is that any of these technologies would be provided by an appropriate private party working as a lease-holder for County property and with a materials agreement with the Division. Our assumption is also that significant stakeholder planning and outreach, and technical feasibility and economic analyses would be required to complete this strategy.

Station Gen:	New		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	High
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		



Curbside and SH Organics processing at Transfer Station co-located with anaerobic digestion and/or in-vessel composting

As a more aggressive alternative to leasing sections of Transfer Station property to private organization for end-use and/or energy recovery facilities, the County would accept, divert, and process both commercially-collected curbside organics and self-haul organics in a mechanical biological treatment facility - a type of waste processing facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion. Anaerobic digestion of organics prior to composting produces biofuels for energy production and residual digestate suitable for beneficial soil amendment.

The technologies require a large amount of space (5 to 10 acres) which may or may not be available at existing transfer stations. Should the County elect to pursue processing technologies for treating residual waste, the County should engage in a stakeholder-driven planning process to identify the most appropriate technology and site for such a facility. The strategy assumes portions of the processing and anaerobic digestion facility would be contracted to a private partner with suitably trained staff and experience. Directing the County's organics waste stream through an anaerobic digestion process would provide biogas for electricity generation, producing between 75 to 150 kWh per ton of waste input. On this basis, an AD facility could potentially turn the County's organic waste stream into revenue stream, assuming reasonable amortization of land and facilities costs.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Single Generation	Diversion Potential: Medium
Category:	Processing	Implementation Time: Long
Materials:	Curbside No	Initial Cost: High
	Traditionals No	Operating Cost: High
	Organics Yes	
	C and D No	Cost Avoidance: Yes
	Bulky No	Revenue Generation: Yes
Affected Generator:	Single-Family Yes	
	Multi-Family Yes	
	Commercial Yes	
Affected Haulers:	Self-Haul Yes	
	Commercial Yes	



Co-locate recycling technology at existing updated / retrofitted facility

As a more aggressive alternative, co-location of a recycling technology at an existing updated/retrofitted facility would create transportation efficiencies for both sources of material and customers. Much like an "eco-park", this option seeks to enhance environmental and economic performance of a recycling end-market by efficiently sharing transfer station resources (information, materials, water, energy, and infrastructure) to enhance economic viability and increase efficient material diversion. The goal of this type of arrangement is to improve the economic performance of the participating business while minimizing their environmental impact. The outcomes of this type of development could bolster economic profits, job creation, and environmental responsibility. Our assumption is that the recycling

technology would be provided by an appropriate private party working as a lease-holder for County property and with a materials agreement with the Division.

Station Gen:	Updated/Retrofitted & New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Co-locate MSW conversion technology at existing updated / retrofitted facility*

As a more aggressive alternative to leasing sections of Transfer Station property to private organization for end-use and/or energy recovery facilities, co-location of an MSW conversion technology at an existing update/retrofitted facility would create transportation efficiencies for both sources of material and customers. Emerging thermal processing includes technologies such as gasification, plasma gasification, and pyrolysis, which use or produce heat, under controlled conditions, to convert waste into a synthesis gas (that can be used to produce a fuel, or cleaned and combusted to generate electricity) and other usable products (e.g., vitrified aggregate, carbon-based char, metal). More traditional forms of thermal processing (i.e., mass-burn) involve combusting the waste in controlled conditions to generate electricity and industrial grade steam. Processing and combustion residuals would require landfilling. No gasification, plasma gasification, or pyrolysis facilities currently operate in the Northwest. Our assumption is that the conversion technology would be provided by an appropriate private party working as a lease-holder for County property and with a materials agreement with the Division. Our assumption is also that significant stakeholder planning and outreach, and technical feasibility and economic analyses would be required to complete this strategy.

Station Gen:	Updated/Retrofitted & New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

Optimizing Station Recycling for Brand New Stations

8) Site and design new King County solid waste facilities to allow maximum flexibility for reuse, recycling, diversion, and material processing.

- ➔ Design transfer stations to have flat floors to increase customer ease in unloading materials, and operational flexibility in where materials are unloaded, stored, and sorted or processed

Most current transfer stations are constructed and operated with a flat floor across the entire building. Operational changes at an existing transfer station with a flat, flexible floor design may enable the owner to more highly utilize existing infrastructure and staff. For instance, source separation is effective in diverting certain waste stream portions, including C&D, green waste and food waste.

Station Gen:	Brand New		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ Construct a regional resource recovery park for multiple recyclable and compostable materials at a new site

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities. Many of these resource recovery parks co-locate both MRFs and composting operations. Organic wastes entering the tipping area is segregated and moved over to the composting area of the site. For those sites that do not have ample space, organics segregation is accomplished for off-site transfer to a composting facility located elsewhere.

This strategy calls for the design and construction of a new resource recovery park at a new site. Our assumption is that the focus would be on the full range of activities mentioned above, depending on space provided within the master plan. County staff would continue to operate the facility, with proper training.

Station Gen:	Brand New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ *At each new station, construct a "hard to recycle" items roundabout with bins and bunkers for reusable and recyclable materials placed on the outside of the circle*

As a less aggressive alternative to constructing a regional resource recovery park for multiple recyclable and compostable materials at a new site, a "hard to recycle" facility is intended to enhance the user experience and expand the number of materials accepted for reuse and recycling. The facility would target all traditional recyclables in addition to hard-to-recycle items such as plate glass, expanded polystyrene, and other rigid plastics. The queuing area would be a roundabout with bins and bunkers for reusable and recyclable materials placed on the outside of the circle. Self-haul customers back in to marked parking spaces and then unload materials into the appropriate bins. A separate area for materials exchange and donation could also be located in front of the roundabout. A

We assume that final design and placement would depend on the specific site to be outfitted, but that the facility would retain many of the features described in order to highlight availability of reuse and recycling opportunities at a resource recovery-focused facility. We also assume that the facility would be staffed by County employees or contracted to a contractor. Two to three staff members would assist customers in unloading and processing collected materials.

Station Gen:	Brand New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	High
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		

Affected Haulers: Self-Haul Yes
Commercial No

➔ *Lease sections of Transfer Station property to private organization for sorting, processing, or both*

As a less aggressive alternative to constructing a regional resource recovery park for multiple recyclable and compostable materials at a new site, shared use of facilities allows the County to increase diversion without being responsible for the operations and to collect rent from the lessee. The Monterey Regional Waste Management District (MRWMD) uses a hybrid approach by contracting certain processing at their “Regional Environmental Park.” The District leases part of this publicly owned site to several local composting companies for a nominal fee. As part of the contract with these composters, the District requires them to use MRWMD organics as feedstock for their products. The District sells low-cost landscaping supplies made from recycled wood and yard waste at a retail facility onsite.

Station Gen:	Brand New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	Yes
	C and D	Yes	Revenue Generation:	Yes
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

9) Develop and operate flexible material receiving/processing capability for all reusable and recyclable materials

➔ Conduct floor sorts for bulky reusable and recyclable Items

Many facilities recover bulky and recyclable items through a floor sort operation. Materials are unloaded by the customer onto the tipping floor and diverted from disposal by transfer station staff.

Station Gen:	Brand New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Processing		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No	Cost Avoidance:	Yes
	C and D	No	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		

Affected Haulers: Self-Haul Yes
Commercial Yes

➔ Hire additional staff for floor-sorts and/or pick-line (different job classification)

Some stations have floor operations in which laborers retrieve larger items (i.e., large pieces of metal, cardboard, furniture, building materials, fixtures, etc.) from the tip floor. Our assumption for floor sorts is for a modified approach at new stations with plenty of space. Staff would assist self-haulers to unload their materials carefully, and would segregate the recyclable and reusable materials and a loader would move the rest into the transfer area. This would be in contracts to a standard “floor sort” where material is unloaded, spread out by a loader operator, and staff rush over and remove a few things and the rest is disposed. With a goal of high diversion, the modified approach is best.

Others have pick lines where waste is moved to a conveyor belt and materials are removed by laborers as it passes by. The goal of each practice is to increase diversion.

Station Gen:	Brand New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

➔ Separate area for materials exchange and donation

Providing a separate area for materials exchange and donation prevents reusable items from entering the waste stream. Our assumption is that the County would provide staff to facilitate transactions, or contract with a private or non-profit recycler to accomplish the retail function. On the basic level, material donation would be the simplest form, with no money exchange and only training in quality specifications necessary. On a more complex level, material exchange could include intake of material for later resale, and sales of goods. Consignment could be a part of the function, but introduces an added level of complexity.

Station Gen:	Brand New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		

Generator:	Multi-Family	Yes
	Commercial	No
Affected Haulers:	Self-Haul	Yes
	Commercial	No

 *Co-locate operations with a salvage retailer or processor to minimize transportation costs and increase visibility of salvage*

As a less aggressive alternative to a separate area for salvage materials exchange and donation, co-location of salvage retailers at transfer facilities would create transportation efficiencies for both sources of reusable goods, and customers. Diversion at the transfer stations for such a facility could be incorporated into some operations. We assume that the operation would be contracted to a private or non-profit contractor, and that reusable building materials and fixtures, furniture, and other working items would be included in the retail component.

Station Gen:	Brand New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	No	Initial Cost:	Medium
	Traditionals	No	Operating Cost:	Medium
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

10) Site, design and build new King County solid waste facilities to align collection and processing in advanced materials management system

 *Establish Wet/Dry collection and dedicated processing to each waste stream*

Typically, mixed dry waste loads contain all or some of the following materials: mixed waste paper, metals, plastics, yard debris, wood, concrete, rock, brick, dry asphalt, construction and demolition wastes, land clearing debris, and/or gypsum wallboard (untreated and unpainted). Wet waste typically is comprised of typical household and business waste, including food waste, which is liable to decay, spoil, or become putrid.

Our assumption is that processing facilities specific to each type of waste would be developed by the County or under contract to a private company. It further assumes that the County's (and region's) emphasis on three-bin collection (i.e., garbage, organics, and recyclables) would be reformulated to emphasize the wet/dry configuration. A full feasibility and economic analysis would be required prior to initiation.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long

Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Design and build a Hybrid mixed waste MRF / Transfer Station at new site*

The County would design, build, operate, and own a hybrid mixed waste material recovery facility (MRF)/transfer station at a new site. The facility would be configured to target loads rich in recyclables, which would be directed to the MRF. While some argue this lacks an important public education element because action is no longer required on the part of the waste generator, it provides another avenue to divert additional recyclables from disposal. Other configurations could include a dual stream processing line used for residential recyclables, a transfer station, and a citizen drop-off.

Many of these facilities divert materials to multiple uses, including commodity markets, fuel and energy, and composting. The technologies used at these facilities include the use of trammel screens and vibrating finger screens to make the initial separation of recyclable-rich waste from other MSW.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Design and build a Single Stream MRF at New Site*

The County would design, build, operate, and own a single-stream material recovery facility (MRF) at the new site. The facility would be configured to process all recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	No		
	Commercial	Yes		

 *Design and build a mixed waste processing facility at a new site*

The County would design, build, operate, and own a mixed waste processing facility at a new site. The effort to develop mixed waste MRFs, previously known as “dirty” MRFs, has seen a resurgence in the last 5-10 years due to high energy costs, aggressive waste diversion goals, favorable commodity values, rising tip fees, and technological advancements in separation equipment. While in the past, mixed waste MRFs recovered between 5% and 45% of the incoming material as recyclables with the remainder disposed, some newer mixed waste MRFs report achieving waste diversion rates of 25-75%. MRFs achieving higher waste diversion rates are recovering a significant percentage of materials in the form of biodegradable material that is sent for composting.

This strategy assumes County staff would be hired to operate the facility, and be given appropriate training. A full feasibility and economic analysis would be required prior to action. Also, if this strategy is chosen, additional work would be required to determine how much of the County's waste stream could be accommodated, and what to do with remaining system capacity.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Design and build a campus that co-locate distinct processing facilities for organics, reusable and recyclable items, mixed materials*

As the County considers future sites for transfer stations, the County may wish to consider co-locating processing for source-separated materials, including recyclables, organics and C&D. These processing facilities could continue to be operated by the private sector on land leased from the County. There are several potential synergies associated with co-located source-separated processing facilities with other transfer station operations:

- Residual materials from processing operations can be transferred by the transfer operation.
- C&D materials brought to the transfer station by self-haul customers can be processed by the C&D operation.
- Recyclables and organics brought to the transfer station by self-haul customers can be processed by the recyclables and organics processing lines.

While dedicating space at the transfer station for source-separation processing activities is desirable, it would not necessarily result in more diversion. However, through the public-private partnership, other benefits could be realized such as cooperative marketing and expanding outreach and education to visitors to the transfer station.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Separation of Self-Haul vehicles from Commercial vehicles (by building)*

Separation of self-haul vehicles from commercial vehicles is already a focus of King County in most of its transfer facilities. Self-haul wastes are typically delivered in smaller vehicles such as cars, minivans, SUVs, pickup trucks, and small trailers, although some arrive in flatbeds and vehicles of larger capacity. Because self-haul vehicles are typically unloaded by hand, they take longer to unload than mechanically unloaded vehicles; as such, they occupy the unloading stalls for longer periods and thus reduce the potential waste handling capacity of transfer facilities.

Separation of self-haul vehicles from commercial vehicles into two separate buildings provides additional safety, minimizes delays in commercial tipping activities, and provides additional

opportunity to separate recyclables. Differences in equipment and recovery techniques are also assumed to be inherent in the operation of the two facilities, allowing specific targets from each waste stream, using techniques appropriate for the recoverable materials in each. We assume that the two facilities would be co-located on one site.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	High
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

Optimizing Station Recycling for All Stations

11) Formalize and foster an internal staff culture that places a high value on reuse and recycling

The facilities profiled with high diversion rates all had a strong ‘culture of diversion’ where staff take pride in providing customer service that reflects this culture. A culture of diversion means that throughout all levels of the system the players placed value on diversion as one of the top priorities (if not the top priority), had a clear understanding of their role in achieving high levels of diversion, and worked together to do so. This culture resonated with the customers using the facility.

Developing a culture of diversion among staff and customer service, and community outreach that reflects this culture, is a big factor in driving additional diversion and successful implementation of other recommendations. To be truly successful, these set of recommendations should be considered largely as a whole, and may need periodic review and updating to keep the culture active.



Incorporate recycling responsibilities into all staff job descriptions.

Incorporating recycling responsibilities into staff job descriptions can help create a culture that supports recycling and diversion. A formal system of accountability that clearly identifies staff roles in reuse and recycling will also help improve efficiency and diversion. The system of accountability applies to all major functions and roles specific to transfer station operation in general, and to reuse and recycling in particular, including management, TSOs, scale house operators, and any new job classifications developed in the future.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Operations	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		



Link increased diversion to job security

As a more aggressive alternative to incorporating recycling responsibilities into all staff job descriptions, much like the current C&D contracts offer incentives for diversion, so too could a system of metrics be established for worker performance tied to material reuse and recycling. Ultimately, a formal system of accountability that clearly identifies staff roles in

reuse and recycling, provides performance outcomes and metrics specific to those roles, makes available tools and training to support meeting desired outcomes, and provides for rewards and consequences specific to staff roles will have wide-spread beneficial impacts; ultimately improving efficiency and diversion. All of these components should be self-reinforcing and continuously adapted as needed. The system of accountability applies to the major functions and roles specific to transfer station operation in general, and to reuse and recycling in particular, including management, TSOs, scale house operators, and any new job classifications developed in the future.

Some cultural resistance may occur with staff feeling extra pressure to meet budgets, and extra emphasis on the bottom line. However, more clarity, accountability, and transparency on the specific responsibilities and desired outcomes associated with assigned roles will ultimately reinforce the Division's overall Zero Waste of Resources mission.

Station Gen:	All		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

Consistent and frequent staff training and education, specifically for diverting reusable and recyclable materials, will help drive the culture, work ethic, and motivators among staff, and increase their confidence in meeting new recycling responsibilities outlined.

- ➔ Hold an All Staff meeting with customer service unit staff, transfer station operators (TSOs), scale operators and managers to recalibrate everyone to the mission of increased diversion.

The most highly effective facilities - whether transfer stations, MRFs, or some combination - encourage and train personnel to promote diversion and educate customers on proper material preparation, handling, and placement. Many facilities have staff that actively direct and assist customers to divert materials that were otherwise brought to the facility for disposal.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No

Affected Generator:	Single-Family	Yes
	Multi-Family	Yes
	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	Yes

➔ Design and implement a robust and targeted training series

The most highly effective facilities - whether transfer stations, MRFs, or some combination - encourage and train personnel to promote diversion and educate customers on proper material preparation, handling, and placement.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	No
	C and D	Yes	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

➔ Operator training where TSOs, scale operators and customer service unit staff better understand each other's roles in order to provide consistent and accurate information regarding opportunities and procedures at the transfer stations

A uniform message with cohesive elements means that staff from one station to another have the same goal in mind and understand what they need to do to achieve it (and the benefits of it) and that the customers hear that same message at all of the stations they use. Some of the staff suggestions for this included making sure that cross-training occurs for transfer station positions.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	No
	C and D	Yes	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ Scale operators and customer service unit staff education on why recycling is important, how the system operates, and other resources to consult

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling. Particular attention can be paid to external resources where opportunities exist for resource recovery not available at the county-owned facilities.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

- ➔ TSO training on the basic "do's", "don'ts", and "why's" for material specific diversion

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling. For example, training focused on "why recycle and compost" rather than "how to recycle and compost" can get customers to truly understand the benefits of recycling and composting, and then they will want to participate, and in turn will naturally seek out the "how to" component, including when visiting the transfer facilities.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ Basic customer service training that incorporates communication and customer education skills

Basic customer service training for all positions at the transfer station and within the transfer system. This training recognizes that personal interaction is the key component in instructing customers on proper management of loads and to direct customers to the appropriate areas for unloading and recycling. Clear interaction at throughout a facility is a critical opportunity to educate the public about recycling opportunities at the transfer station or at other local options.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost: Low
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: No
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

- ➔ Targeted training about any of the associated policy and operational changes instituted as part of this Optimized Transfer Station Recycling process, to ensure staff understand the changes and their role in making them effective

Targeted training to include, but not be limited to: ramifications of policy changes on operations; changes in or additional to job descriptions and classifications; "do's", "don'ts", and "why's" of material and product recycling; bin, trailer, and container management; sign logistics; load screening and contamination identification; customer service; traffic control to optimize reuse and recycling on flat floors; safety procedures due to operational changes.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost: Low
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: No
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

- ➔ Create and distribute resources that reinforce the culture and provide easily accessible references to training received

The most highly effective facilities - whether transfer stations, MRFs, or some combination - encourage and train personnel to promote diversion and educate customers on proper material preparation, handling, and placement.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

- ➔ Create a pocket 'cheat sheet' of do's, don'ts, and why's of recycling for floor operators, that is reviewed for consistency with the brochures customers use

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling. Some of the staff suggestions for what a tangible manifestation of this could look like included making sure that customer brochures have the same information as what staff use for reference guides (or are even the same brochure).

At the Ecocycle CHaRM facility, anyone who comes into contact with customers is trained to be able to answer questions accurately -at least the "do's and don'ts" of each material. Training includes yard staff (swapping bins and processing materials), phone answerers, outreach staff and drive-up window staff. Their most important training is on acceptable materials and their specifications. Outreach and window staff have to be able to answer the "why" questions. In particular, the uniformity in their answers for materials/specs questions is top priority.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		

Affected Haulers: Self-Haul Yes
Commercial Yes

- ➔ Create a visual poster for the staff 'shack' on recycling do's, don'ts, and why's with lifecycle (closed loop) examples, and consistent color coding or graphics as used in any revamped signage

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	No
	C and D	Yes	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ Use the same informational materials that customers receive for staff training to improve messaging consistency

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	No
	C and D	Yes	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ Use and display language that creates highlights reuse, recycling, and diversion as a common community goal

It is clear from research that the facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings,

brochures, and commodity-specific instructions. Using and displaying language that highlights these messages reinforces the culture of reuse, recycling, and diversion.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Low
	Traditionals Yes	Operating Cost:	Low
	Organics Yes		
	C and D Yes	Cost Avoidance:	No
	Bulky Yes	Revenue Generation:	No
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

➔ Rename transfer stations to reflect reuse, recycling and diversion, such as “Bow Lake Resource Recovery Facility.”

County leadership and management have an opportunity (and responsibility) to take the lead in defining or redefining the message that diversion is a priority, and that we all have a role to play. The words are important - and mindset changes often start with the words we use. The message that diversion is a priority is evident from the entry gates of many of the successful facilities profiled - simply by how they were named (Recycling Center, Resource Recovery Park, etc.).

Station Gen:	All	Status:	Base Recommendation
System Impact:	Single Generation	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Low
	Traditionals Yes	Operating Cost:	Low
	Organics Yes		
	C and D Yes	Cost Avoidance:	No
	Bulky Yes	Revenue Generation:	No
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

➔ Review and update all existing outreach messages to ensure the County’s recycling target / Zero Waste of Resources goals are highly visible

County leadership and management have an opportunity (and responsibility) to take the lead in defining or redefining the message that diversion is a priority, and that we all have a role to play. The words are important - and mindset changes often start with the words we use.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short

Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

12) Provide robust off-site community education and outreach materials that prepare customers for visiting King County solid waste facilities, and build the community’s culture of reuse, recycling and diversion.

An overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion goals. Facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions, including at the scale-house.



Employ or partner with public outreach and education specialists to provide technical assistance, education campaigns and on the ground dissemination especially when policies or programs change

Part of the overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion goals. Facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions, including at the scale-house. Education when policies or programs change is an important element of outreach.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ Review and update the County's website for customer usability, messaging consistent with the desired culture, and tips on what they can do to increase reuse, recycling and diversion

Part of the overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion opportunities. It is clear from research that the facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions. The County website is where many customers go to figure out where to take their waste and recyclables.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Medium
	Traditionals Yes	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	No
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

- ➔ Make sure County Transfer Station websites give as much or more visibility to recycling services at the transfer station as waste disposal services

Part of the overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion goals. As the nature of the activities taking place at the transfer facilities shifts away from purely disposal to an emphasis on resource recovery, so too must the nature of the education and outreach.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Medium
	Traditionals Yes	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	No
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

- ➔ Include information on the website about how to pack a vehicle to enhance reuse and recycling opportunities once at the station

Instructions on how to pack vehicles (i.e., order and/or grouping) in order to enhance opportunities for reuse and recycling prior to disposal, given the unique location of these collection locations within the transfer station. Consider a downloadable app to describe the best order for specific transfer facilities.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ Create a video or photographic tour of how to prep and what to expect at the transfer station.

Many sites provide tours and have videos to help customers and residents understand how the facility works before they arrive. Videos can include "rules" for use of the station, practical "how to" information for customers as well as background information about station design, and where recyclable or reusable materials go.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

➔ Create an interactive map component to the 'What do I do with...' web tool directing customers to other recycling/reuse resources

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling. An interactive map can show transfer facilities in the context of other alternatives for reuse and recycling specific materials. Benefits include diverting materials to appropriate recycling outlets prior to arrival at transfer facilities for disposal and avoidance of customer trips at facilities.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

➔ Review and update existing customer materials, and create new materials as needed, to reinforce the culture message and increase awareness of the customer's role

Part of the overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion goals. The most highly effective facilities - whether transfer stations, MRFs, or some combination - encourage and train personnel to promote diversion and educate customers on proper material preparation, handling, and placement.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

➔ Cease the use of transfer station specific brochures which are confusing for staff to keep track of and can confuse customers, who may use more than one station

Part of the overall emphasis on a uniform message with cohesive elements that ensures staff and customers are clear about overall reuse, recycling and diversion goals and opportunities, including the "do's", "don'ts", and "why's" of recycling. Some of the staff suggestions for what a tangible manifestation of this could look like included reducing the clutter of multiple brochures for individual stations and replacing with a system wide brochure.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low

	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

➔ Review fee sheet materials for user friendliness and ease in understanding

Part of the overall emphasis on a uniform message with cohesive elements that ensures customers are clear about overall reuse, recycling and diversion goals, and how different fees on different materials reinforces the it. User friendliness makes sure customers understand what they need to do to achieve the benefits of the lower or higher fees.

Station Gen:	All		Status: Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential: Low
Category:	Education & Outreach		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Low
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: No
	Bulky	Yes	Revenue Generation: No
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

➔ Create a set of 'welcome packets' about transfer station recycling information that is sent to customers upon opening a new utility account, tailored for residential and business customers

Welcome packets can provide a host of information about reuse and recycling opportunities curbside, at transfer facilities, and at other local recycling outlets. Information can be tailored to specific types of businesses (i.e., restaurants, retail, warehousing, distribution, manufacturing, transportation, etc.); or to either single- or multi-family residences. Information would also include transfer-station specific information, including hours, fees (including material-specific fees that incentivize recycling), upcoming recycling events. All materials would be consistent with overall messaging regarding Zero Waste of Resources goals.

Station Gen:	All		Status: Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential: Low
Category:	Education & Outreach		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Medium
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: No

Affected Generator:	Single-Family	Yes
	Multi-Family	Yes
	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	No

➔ Deliver public education about the different recycling symbols on products and where to recycle products with the different symbols

It is clear from research that the facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions, including at the scale-house.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes	Cost Avoidance:	Yes
	C and D	Yes	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

➔ Use community art projects to increase awareness of transfer stations and recycling
Community art helps reinforce the idea that the transfer station is a public resource. The City of Phoenix sponsored an art piece which involved photographing materials brought to the transfer station and displaying it on an interactive web page. Although the intent was art, it provides a unique type of education in making the value of items brought to the facility for disposal visible and tangible to residents.

Station Gen:	All	Status:	Base Recommendation	
System Impact:	Transfer System-Wide	Diversion Potential:	Low	
Category:	Education & Outreach	Implementation Time:	Short	
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	No
	C and D	Yes	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

13) Improve on-site information to motivate and direct proper placement of reusable and recyclable materials at the Transfer Station

Using simple signage that maintains flexibility in how information is relayed and to whom it is targeted will help drive behavior toward recycling and diversion once customers are on-site. Better information will also improve operational flow, and reduce the amount of re-sorting required by staff.

- ➔ Develop and implement a comprehensive signage program to increase flexibility with changing collection standard and material specific end markets, and create a more user-friendly and equitable experience for all transfer station customers

Currently most signage at transfer stations is permanent and simplistic, focusing on the proper locations for dropping materials and other rules and policies. Many new facilities are moving toward flexible and moveable signage, with the most flexible signage for materials accepted on a temporary basis. Movable signage is important for materials that vary widely in the volume collected or have a changing collection standard and/or require changing drop-off locations or areas, such as appliances and tires.

A comprehensive signage program would include consistent standards for use of colors, words, pictures, and placement. The program would also include a standard process for communicating the need for new signs, sign changes, or sign elimination. The Program would also include standard process for executing all of the aforementioned. The Program will also provide methods to accommodate a multilingual populace, using pictograms, and multilingual signage.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Low
	Traditionals Yes	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	No
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

- ➔ Color code the signage system for different materials, with consistent color coding in any print or online information or collateral

Part of the comprehensive signage program and the overall effort to provide consistency across the solid waste system when communicating reuse and recycling opportunities. Color coding can trigger an alternative association to a behavior that reinforces words being used, and cross language and educational barriers.

Station Gen:	All	Status:	Base Recommendation
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System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Medium
	Traditionals Yes	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	Yes
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

➔ Place easy to read material-specific signs with do's and don'ts right above the material's collection spot in the station

Part of the comprehensive signage program. Many new facilities are moving toward flexible and moveable signage, with the most flexible signage for materials accepted on a temporary basis. "Do's", "don'ts", and "Why's" of recycling can add particular attention to common contaminants. Location of the signs at the point of placement is important as a method of correctly identifying proper habits, with simple, large and concise wording critical for understanding.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Waste System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Medium
	Traditionals Yes	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	Yes
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

➔ Use flexible and moveable signage particularly for materials with a changing end market

Part of the comprehensive signage program. Movable signage is important for materials that vary widely in the volume collected or have a changing collection standard and/or require changing drop-off locations or areas, such as appliances and tires. It is important to accommodate a multilingual populace, using pictograms, and multilingual signage.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Education & Outreach	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Medium
	Traditionals Yes	Operating Cost:	Low
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes		

	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

➔ Use electronic reader boards to relay information about materials with changing collection standards

Part of the comprehensive signage program. Electronic reader boards provide an extremely flexible approach to communication, particularly toward vehicles entering the transfer station, or to direct traffic and behavior once inside. Programming can be made to attract maximum attention with movement and changing messages while vehicles wait in queue. These boards can respond quickly and cheaply (after the initial cost) to changing market conditions, collection standards, one-time events, or changes in facility operation.

Station Gen:	All		Status: Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential: Low
Category:	Education & Outreach		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Medium
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

➔ Include pictograms in signage, multilingual signage, websites and presentations to community groups to address language and cultural barriers

Part of the comprehensive signage program.

Station Gen:	All		Status: Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential: Low
Category:	Education & Outreach		Implementation Time: Short
Materials:	Curbside	Yes	Initial Cost: Medium
	Traditionals	Yes	Operating Cost: Low
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	No	

➔ Develop and hand out recycling guides, magnets, or other materials at the scale-house, with information about accepted materials and recycling tips

It is clear from research that the facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions, including at the scale-house. Research shows that brochures (and similar written materials) and facility signage, coupled with interactions with facility staff, supply the bulk of information about what, where, and how to recycle once onsite.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Medium
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

14) Institute or reinforce county-wide policies that support increased focus on reuse and recycling at King County solid waste facilities

➔ Ban specific materials from disposal

Many communities ban specific materials from disposal which place an inherent burden on disposal and transfer facilities. Forty-seven states nationwide have some level of disposal bans, including many hazardous materials. Some states also ban highly recoverable materials from disposal, such as paper, plastics, C&D debris, metal, mattresses, and yard trimmings. Banning these materials increases diversion, recycling, and provides safer disposal of hazardous materials.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 Identify additional target materials and retail outlet candidates who could participate in a Product Stewardship program initiated or jointly supported by the County

Product Stewardship is a product-centered approach to pollution prevention that makes all parties involved in producing, selling, or using a product take responsibility for the full environmental and economic impacts of that product. Shifting financial (and in some cases, physical) responsibility for collecting and recycling used products from local ratepayers to producers is a key component of Product Stewardship initiatives. It also seeks to incentivize producers to reduce the amount of packaging they create, substantially increase recycling rates, provide much needed revenue to improve efficiency of recycling systems, and reduce carbon footprint and energy use. One example of this is PaintCare® Inc. formed to serve as the architectural paint industry’s stewardship organization. Through PaintCare, manufacturers pay for the recycling and transportation from public and private transfer stations, and municipal HHW collection centers.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Transfer System-Wide	Diversion Potential:	Low
Category:	Policies & Fees	Implementation Time:	Short
Materials:	Curbside Yes	Initial Cost:	Low
	Traditionals Yes	Operating Cost:	Medium
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	No
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial Yes		

 *Develop a Product Stewardship Program that provides for a municipal collection and recycling system with funding provided by product manufacturers*

As a more aggressive alternative to identifying additional target materials and retail outlet candidates who could participate in a Product Stewardship program, a Hybrid Collection/Producer Funding program combines a municipal collection and recycling system with funding provided by product manufacturers. The funding mechanism would be subject to negotiation between the public agency and the product manufacturers targeted for responsibility. This strategy assumes that space would be provided for covered products at certain transfer facilities, or at other municipal sites capable of receiving, consolidating, and processing or shipping to market the products collected.

Station Gen:	All	Status:	More Aggressive
System Impact:	Waste System-Wide	Diversion Potential:	Low
Category:	Policies & Fees	Implementation Time:	Long
Materials:	Curbside Yes	Initial Cost:	Medium
	Traditionals Yes	Operating Cost:	Medium
	Organics Yes	Cost Avoidance:	Yes
	C and D Yes	Revenue Generation:	Yes
	Bulky Yes		

Affected Generator:	Single-Family	Yes
	Multi-Family	Yes
	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	Yes

➔ Adjust fees to further incentivize reuse and recycling

Offering differential tip fees can encourage self-haulers to separate specific materials or recyclables. Using differential tip fees has become common practice, as it is in King County, as an incentive for keeping various waste types separate, and with the objective of encouraging recycling participation and/or increasing transfer station or MRF operational efficiency.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ Different material-specific fees for targeted materials

King County code (KCC 10.12.021.G) allows fees for recycling to be set lower than those for disposal to encourage recycling over disposal. The use of differential fees is an important tool for increasing reuse and recycling. King County uses some differential material-specific fees to incentivize recycling of priority materials (e.g., yard waste, clean wood) and to cover the additional costs of recycling certain items (e.g., CD, DVDs, & VCRs, fluorescent bulbs, and appliances). To the maximum extent possible, the Division should be provided with flexibility in which materials are targeted and the rates set for them, based on market conditions.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		

Affected Haulers: Self-Haul Yes
Commercial Yes

➔ Per vehicle flat fee for using recycling area; additional facility use fee to access transfer station for disposal

From the operational perspective, re-locating traditional recyclables behind the scale house if space is available and requiring a fee for entry creates system-wide incentives that provide an overall benefit:

- Creates a new revenue stream that is able to fund new or enhanced recycling initiatives at the stations
- A fee on traditional material recycling at transfer stations should compel customers to place them into the curbside collection system, if it is available, rather than travel to transfer facilities. This reduces vehicle travel overall, and produces fewer emissions
- Fewer self-haul trips to County facilities keeps costs down and eases facility logistics.
- Additional monitoring from staff behind the scale house will also potentially cut down on contamination of recyclables that are received.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Waste System-Wide	Diversion Potential:	Low
Category:	Policies & Fees	Implementation Time:	Long
Materials:	Curbside Yes	Initial Cost:	Low
	Traditionals Yes	Operating Cost:	Medium
	Organics Yes	Cost Avoidance:	No
	C and D Yes	Revenue Generation:	Yes
	Bulky Yes		
Affected Generator:	Single-Family Yes		
	Multi-Family Yes		
	Commercial Yes		
Affected Haulers:	Self-Haul Yes		
	Commercial No		

➔ *Pay an annual fee to drop off recyclable materials and trash at the transfer station*

As a less aggressive alternative to a per vehicle flat fee for using the (formerly free) recycling area and an additional facility use fee to access transfer station for disposal, an annual fee may provide an easier transition to the notion of paying for recycling. In either case:

- The Program creates a new revenue stream that is able to fund new or enhanced recycling initiatives at the stations
- A fee on traditional material recycling at transfer stations should compel customers to place them into the curbside collection system, if it is available, rather than travel to transfer facilities. This reduces vehicle travel overall, and produces fewer emissions
- Fewer self-haul trips to County facilities keeps costs down and eases facility logistics.

- Additional monitoring from staff behind the scale house will also potentially cut down on contamination of recyclables that are received.

Station Gen:	All		Status:	Less Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	No		
	C and D	No	Cost Avoidance:	No
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 *Tipping fee surcharges placed on every ton of solid waste disposed at landfills*

As a more aggressive alternative to a per vehicle flat fee for using the (formerly free) recycling area and an additional facility use fee to access transfer station for disposal, a tipping fee surcharges placed on every ton of solid waste disposed at landfills in King County, transfer Station operators (including haulers that must bring collected garbage to King County facilities) could be highly motivated to divert materials in upstream collection programs and at the transfer station. These surcharges, levied by King County government, may create enough of an economic incentive to the County to make it cost-effective to process certain materials through some of the recommendations included in this report. .

Station Gen:	All		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 Review and update the 'no salvage policy' to allow floor staff to assist in diverting recyclables

Chapter 10.10.030 (I) King County Code indicates that salvaging and scavenging (defined as the removal of materials from a solid waste facility without the authorization of the division director and the health officer) are prohibited at all King County solid waste facilities. If County facilities are to take a more active role in diverting reusable products and materials

from its waste stream via staff assistance, manual sorts, floor picking, or similar customer direction, this policy should be altered to reflect that priority.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 Eliminate traditional recyclables at transfer station (except Vashon, Cedar Falls, Skykomish) in favor of curbside collection

Most County residents have access to curbside recycling, where traditional recyclables are collected "free" to customers. Significant emphasis has been placed on creating an easy and accessible infrastructure for recycling these materials, and creating incentives for residents to use the infrastructure in place. Eliminating recyclables at the Transfer stations would facilitate much of this transition. Traditional recyclables such as metals, glass, plastics, and cardboard often end up in the garbage at the transfer station because self-haul customers bypass recycling centers when they are placed outside of the fee gate at transfer stations. Couple with contamination from un-staffed recycling locations, emphasis at the available space at transfer stations could be put toward other materials for which no other opportunities (or very few) exist.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Policies & Fees		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 *Mandatory recycling laws which requires the recycling of designated items*

As a more aggressive alternative to eliminating traditional recyclables at transfer stations, mandatory recycling laws require recycling for specific materials. These measures require

alternatives to disposal to be largely in place (e.g., reuse or recycling) in order to function effectively and fairly. For example, Seattle Municipal Code (SMC) 21.36.082 mandates commercial recycling of corrugated cardboard and paper.

King County has an opportunity to create county-wide consistency on specific traditional and C&D recyclable materials, which should further engage the private recycling infrastructure to meet the requirements of the policy. This set of policies would also provide the impetus to strengthen internal operational and logistical requirements necessary to allow County facilities to handle these recyclables to meet the requirement of the policy, if it chooses.

Station Gen:	All	Status:	More Aggressive	
System Impact:	Waste System-Wide	Diversion Potential:	High	
Category:	Policies & Fees	Implementation Time:	Long	
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

15) Enhance or re-direct staff activities to actively facilitate material diversion to reuse and recycling

➔ Enhance scale-house screening identification, proper fee application, and to provide direction to recycling opportunities inside or outside of the transfers station; utilize visual inspection, camera, XRF, AHERA Documentation to inform staff

The scale operator is the primary staff member who interacts with the customers and directs them to the appropriate areas for unloading materials. The scale operator has many tasks to undertake to ensure efficient operations, including: weighing and recording vehicles, handling cash and recording charges, instructing customers on procedures, and evaluating loads for proper separation and potentially unacceptable materials. The scale operator must make the determination about whether a load is too contaminated for diversion.

A challenge to this approach is dealing with the "cover your load" requirement. Careful interviewing, "under the cover" inspection by dedicated load spotters, overhead cameras, or both combined with specific written load acceptance policies that are communicated to businesses using their facilities are possible methods to work with the current requirement.

Many facilities use x-ray fluorescence technology to detect lead-based paint, and require AHERA documentation for demolition loads to guard against receiving asbestos-containing materials. Our assumption is that if the County chose to handle these materials (or other C&D with similar issues), asbestos-free certification (or some level of assurance from self-haulers) would be required for materials delivered for recycling. Trans-load to processors

would likely require some sort of assurance from the County, though AHERA documentation is unlikely.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 Direct existing staff to provide active instruction to direct vehicles to proper location for reuse and recycling

Research shows that brochures (and similar written materials) and facility signage, coupled with interactions with facility staff, supply very important information about what, where, and how to recycle once onsite. Staff intervention can have important logistical and educational value for diverting materials to reuse or recycling. Emphasis away from disposal, or at least away from no direction, is desirable on all accounts.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 Use magnetic color coded cones on vehicles at scale-house to enable staff direction inside Transfer Station to proper recycling or disposal areas. Color coding would be consistent with signage color coding scheme.

In this practice small magnetic color coded cones (similar to those used at auto repair shops) drive the flow of materials to the proper drop off spot. At the scale house, the scale operator and a load screener interview the vehicle driver and visually inspect each incoming load, place a color coded cone on the hood of the vehicle. Staff within the station direct traffic based on the cones. This helps reduce wait times, educate customers, and ensure that

materials reach the proper destination for recycling. This method is used by the Berkeley Transfer Station Facility.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 Coordinate with local jurisdictions to offer recycling collection events at Transfer Stations, focusing on hard-to-recycle or other targeted materials

Special recycling collection events are one-time (or periodically scheduled) events to allow consumers to bring products to a central location for recovery. Typical recycle costs vary depending on material targeted. Recovery costs for electronics at drop off events can range as high as \$300/ton.

These events, staged at a facility that should be known as one central to resource recovery, allow the County to periodically target materials for diversion that may normally be disposed, highlight alternative outlets (e.g., the partners in the event) where materials can be brought on non-event days, and assess the need for establishing a more permanent infrastructure for that particular material.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	No		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 *Off-site grading, inventory and retail of reusable goods*

As a less aggressive alternative to offering recycling collection events at Transfer Stations, focusing on hard-to-recycle or other targeted materials, the County could have contractors receive reusable goods directly from collection points at transfer facilities for off-site

grading, inventory and retail. The County would still be required to provide collection areas for reusable materials and include monitoring and oversight by staff.

Station Gen:	All		Status:	Less Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Medium
	Traditionals	No	Operating Cost:	Medium
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	No		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 Direct existing staff to provide active unloading and sorting assistance to customers once they are parked (Personal Sorters)

“Personal sorters,” or personal shoppers in reverse, unload materials from vehicles and place them in the appropriate bins or bunkers for reuse. At the Hampton/Scotland Transfer Station in Connecticut, site/facility personnel are there to provide assistance by answering questions, to monitor the separation of trash and recyclables, and to reject any type of waste/loads that do not comply with state and/or town policy/regulation.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Processing		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 Hire additional staff (different job classifications) to provide more direct customer assistance with active unloading, sorting of all materials, directing material placement, and answering questions (Personal Sorters)

“Personal sorters,” unload materials from vehicles and assist customers to place them in the appropriate bins or bunkers for reuse or recycling. Site/facility personnel are there to provide assistance by answering questions, to monitor the separation of trash and recyclables, and to reject any type of waste/loads that do not comply with state and/or County policy/regulation.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ *Hire additional Transfer Station staff (new job classification) for loading/unloading of bulky and reusable or recyclable drop-off and directing the diversion for recovery*

Additional staffing is the number one thing that County staff reported could help with recycling at the stations. Due to the assignment of only 1 to 2 staff to the receiving area, few staff have the time to fully assist customer that may need help moving materials or products to reuse or recycling locations, or to serve any additional areas prescribed by these recommendations.

We assume a new job classification would be required and that the labor contract and Unions would be consulted for best methods for integrating new staff into the existing operations. We further assume that the pay grade for these positions will allow for the economics necessary to accomplish these basic functions, which could include area monitoring, customer education, unloading, sorting, segregation, picking, or salvaging.

Station Gen:	All		Status:	Less Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Processing		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Medium
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ *Hire additional Transfer Station staff (new job classification) to monitor recycling drop off areas, reuse areas*

Additional staffing is the number one thing that County staff reported could help with recycling at the stations. Due to the assignment of only 1 to 2 staff to the receiving area, few staff have in-depth customer interactions able to explain proper recycling, properly monitor recycling areas for contamination, or to serve any additional areas prescribed by these recommendations.

We assume a new job classification would be required and that the labor contract and Unions would be consulted for best methods for integrating new staff into the existing operations. We further assume that the pay grade for these positions will allow for the economics necessary to accomplish these basic functions, which could include area monitoring and customer education. For these positions, no actual unloading, sorting, segregation, picking, or salvaging would occur.

Station Gen:	All		Status:	Less Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ *Additional private/non-profit organization staff for loading/unloading of bulky and reusable or recyclable drop-off and directing the diversion for recovery*

Additional staffing is the number one thing that County staff reported could help with recycling at the stations. Due to the assignment of only 1 to 2 staff to the receiving area, few staff have in-depth customer interactions able to explain proper recycling, properly monitor recycling areas for contamination, or to serve any additional areas prescribed by these recommendations.

This strategy utilizes additional private or non-profit staff to accomplish prescribed work. We assume a new job classification would be required and that the labor contract and Unions would be consulted for best methods for integrating contracted staff into the existing operations. We further assume that the pay grade for these positions will allow for the economics necessary to accomplish these basic functions, which could include area monitoring, customer education, unloading, sorting, segregation, picking, or salvaging.

Station Gen:	Updated/Retrofitted & New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Medium
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

- ➔ *Identify partner salvage outlets and train Transfer Station staff to direct customers there with appropriate materials*

Utilizing a system-wide approach and emphasizing the importance of pre-screening loads at the scale house, information can readily be given as to how reusable materials can be donated, or brought to alternate private and non-profit locations to affect diversion from disposal. Most reusable material outlets have specific product and/or quality standards they employ for accepting materials for later sale. Training TSOs and scale operators on which potentially reusable materials are resalable and then directing customers to those outlets will increase diversion and reduce system costs.

Station Gen:	All		Status:	Less Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Education & Outreach		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

16) Institute selected material-specific actions to increase diversion at all King County solid waste facilities

Curbside and Traditional Materials

- ➔ Seek a private partner to install beverage container recycling kiosks in public areas to divert self-haul customers off site

Private recycling kiosks in public areas can be more convenient for the customer, reduce traffic at the transfer station, and increase recycling. Washington, DC is the latest City to work with Pepsi Co., Waste Management, and Greenopolis to establish beverage container recycling kiosks in its downtown business district. The program is called the Dream Machine recycling initiative. Pepsi pays for the kiosks, and they are maintained by the Downtown Business Improvement District.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Low
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	Low
	Traditionals	Yes	Operating Cost:	Low
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		

	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	No

➔ Establish free off-site drop-off centers (staffed) for reusable and recyclable materials
 Establishing free drop-off centers for reusable and recyclable materials off-site from transfer stations can increase recycling and diversion because they can be placed in areas that are more accessible to customers than transfer stations.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Medium
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	No	Cost Avoidance:	Yes
	C and D	No	Revenue Generation:	Yes
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

➔ Establish privately-operated recycling drop-off locations using City or County-owned property

Privately-operated recycling drop-off locations using City of County owned property can be more convenient for the customer, reduce traffic at the transfer station, and increase recycling.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	No	Cost Avoidance:	Yes
	C and D	No	Revenue Generation:	No
	Bulky	Yes		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

Bulky Materials

- ➔ Place an extra fee on mattress disposal at transfer stations; combined with additional mattress recycling collection events at King County solid waste facilities

The Division has proposed a fee on mattress disposal at its transfer stations (approved in 2012 but not implemented in the 2013-2014 rate schedule) to make it more expensive than recycling through one of the other channels. LinkUp is also working with end markets for mattress components (i.e., metal, foam, shoddy cloth, wood)

Our assumption is that recycling collection events would be staged by one of the private mattress collection and recycling organizations King County is assisting through its LinkUp program, using available space at Division facilities. This reinforces the market development strategy the County has been implementing by highlighting private recyclers as an alternative to increasingly expensive disposal. Use of solid waste facilities as a staging area provides visibility of private options to customers who typically use the transfer stations (and disposal) as a default.

Offering more mattress recycling events while increasing the fee of disposal for a mattress at the transfer station incentivizes recycling for customers.

Station Gen:	All	Status:	Base Recommendation
System Impact:	Waste System-Wide	Diversion Potential:	Low
Category:	Policies & Fees	Implementation Time:	Short
Materials:	Curbside	No	Initial Cost: Medium
	Traditionals	No	Operating Cost: Medium
	Organics	No	
	C and D	No	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

Construction & Demolition

- ➔ Focus significant effort on C&D diversion at the scale-house, carefully screening incoming loads and educating customers about on-site and off-site options

All of the jurisdictions researched cited careful screening at the scale house as potentially the biggest driver behind high C&D diversion. The scale operator is the primary staff member who interacts with the customers and directs them to the appropriate areas for unloading materials. The scale operator has many tasks to undertake to ensure efficient operations, including: weighing and recording vehicles, handling cash and recording charges, instructing customers on procedures, and evaluating loads for proper separation and potentially unacceptable materials. The scale operator must make the determination about whether a load is too contaminated for diversion.

A challenge to this approach is dealing with the "cover your load" requirement. Careful interviewing, "under the cover" inspection by dedicated load spotters, overhead cameras, or both combined with specific written load acceptance policies that are communicated to businesses using their facilities are possible methods to work with the current requirement.

Many facilities use x-ray fluorescence technology to detect lead-based paint, and require AHERA documentation for demolition loads to guard against receiving asbestos-containing materials. Our assumption is that if the County chose to handle these materials (or other C&D with similar issues), asbestos-free certification (or some level of assurance from self-haulers) would be required for materials delivered for recycling. Trans-load to processors would likely require some sort of assurance from the County, though AHERA documentation is unlikely.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Transfer System-Wide		Diversion Potential:	Medium
Category:	Operations		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 Establish a partnership to divert small amounts of C&D waste curbside (see Bagster Program)

The Bagster Program is provided upstream of the transfer station and serves to divert bulky reusable and recyclable materials that would otherwise be disposed. Our assumption is that a private contractor/hauler would administer and operate this "call-to-haul" program and that any contract would stipulate recycling standards for materials collected. Savings would accrue from avoidance of existing collection costs, and/or transfer costs. Issues related to Labor Contracts would need to be resolved.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Medium
	Traditionals	No	Operating Cost:	Medium
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	No		
	Commercial	No		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 Institute an ordinance requiring diversion of 100% of asphalt, concrete, soil, and land clearing debris and 50% of other C&D debris from landfill disposal

Many communities ban specific materials from disposal which place an inherent burden on disposal and transfer facilities. Forty-seven states nationwide have some level of disposal bans, including many hazardous materials. Some states also ban highly recoverable materials from disposal, such as paper, plastics, C&D debris, metal, and yard trimmings. For example, all mixed C&D waste generated in the City of Los Angeles must be taken to a certified C&D processor. Applicants for building permits must contract with a permitted C&D hauler or apply for a C&D hauling permit if they wish to self-haul their C&D materials.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Policies & Fees		Implementation Time:	Long
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	No
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Require and enforce mandatory processing of mixed (Commercial) C&D waste at certified C&D processor*

As a more aggressive alternative to instituting an ordinance requiring diversion of 100% of asphalt, concrete, soil, and land clearing debris and 50% of other C&D debris from landfill disposal, the County could require that all mixed C&D waste from commercial and private projects must be delivered to a C&D processing facility to remove the maximum amount of recyclable/reusable materials. The assumption is that all C&D material generated within the County and participating interlocal Cities would go to certified private facilities and the County would not be involved in building or operating the facility. The materials most likely to be recovered at high rates include clean wood, new gypsum, demolition gypsum, cardboard, metals, and asphalt roofing.

As a regulation, this option should achieve a high level of diversion. However, for this option to succeed, the County must ensure that there is also adequate private facility development to handle the quantities of C&D that must be processed, as well as adequate market development to provide outlets for materials diverted.

§ County costs would include program management including enforcement, educational costs including outreach and advertising to inform contractors and the public about the new requirements.

§ The ratepayer costs could be negative considering that the tipping fee at the facilities would likely be considerably less than tipping fees at County or private transfer stations or landfills.

§ Assume that facilities would need a capacity of approximately 1,000,000 tons per year.

Station Gen:	All		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Policies & Fees		Implementation Time:	Long
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	No		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

Organics



Create a voucher program for yard and landclearing waste at private facilities to allow the County to collect appropriate tipping fees, but allow direct placement of materials at private facilities

During large storm debris events, King County has authorized a voucher program to enable storm debris to be delivered directly to area organics processors, while still tracking material and receiving normal fees typically incurred with use of King County transfer facilities. The program provides an efficient way to alleviate congestion at King County transfer stations - while emphasizing recycling and composting - in order to handle the large volume of trees, branches, and other debris during clean-up.

Station Gen:	All		Status:	Base Recommendation
System Impact:	Waste System-Wide		Diversion Potential:	Low
Category:	Policies & Fees		Implementation Time:	Short
Materials:	Curbside	No	Initial Cost:	Low
	Traditionals	No	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	No		
	Commercial	Yes		

17) Evaluate partnering with private companies to operate some or all of the existing or new King County solid waste facilities, building in diversion goals into the contract

Utilizing all of King County’s public and private assets together in cooperative ways to divert additional materials from disposal and into their highest and best uses may add substantially to overall economic and logistical efficiencies, and provide environmental benefits as well. However, in contracts between King County and the Teamsters Locals 117P and 174, International Federation of Professional and Technical Employees Local 17A and International Union of Operating Engineers Local 302, the county has agreed that no jobs will be eliminated due to contracting out, and that work currently performed by members of the bargaining units will not be contracted out.

This strategy assumes that contract issues would be resolved, based on the use of new facilities only for such partnerships. Certainly, additional discussion with Unions and in the context of existing labor contracts would be required.

Station Gen:	Brand New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

Advanced System Configuration

All of the recommendations in this section reiterate recommendations listed previously, but are included here as a summary of considerations for configuring an advanced system focused on the highest diversion. Most of these options must be in alignment with a complementary collection system (which may be different than the current one), and appropriate end uses.

Older Stations

2) Convert obsolete or underused facilities into recycling facilities

 *Design and build a mixed Waste processing facility at Cedar Hills Regional Landfill*

As a more aggressive alternative to a County-owned resource recovery park at Cedar Hills Regional Landfill, the County would design, build, operate, and own a mixed waste processing facility at the Cedar Hills Regional Landfill, once closed. The effort to develop mixed waste MRFs, previously known as “dirty” MRFs, has seen a resurgence in the last 5-10 years due to high energy costs, aggressive waste diversion goals, favorable commodity values, rising tip fees, and technological advancements in separation equipment. While in the past, mixed waste MRFs recovered between 5% and 45% of the incoming material as recyclables with the remainder disposed, some newer mixed waste MRFs report achieving waste diversion rates of 25-75%. MRFs achieving higher waste diversion rates are recovering a significant percentage of materials in the form of biodegradable material that is sent for composting.

This strategy assumes County staff would be hired to operate the facility, and be given appropriate training. A full feasibility and economic analysis would be required prior to action. Also, if this strategy is chosen, additional work would be required to determine how much of the County's waste stream could be accommodated, and what to do with remaining system capacity.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	No
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		



Design and build a Single Stream MRF at Cedar Hills Regional Landfill

As a more aggressive alternative to a County-owned resource recovery park at Cedar Hills Regional Landfill, the County would design, build, operate, and own a single-stream material recovery facility (MRF) at the Cedar Hills Regional Landfill, once closed. The facility would be configured to process all recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Existing Older		Status: More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:
Category:	Processing		Implementation Time:
Materials:	Curbside	No	Initial Cost: High
	Traditionals	No	Operating Cost: High
	Organics	No	
	C and D	No	Cost Avoidance: No
	Bulky	No	Revenue Generation: No
Affected Generator:	Single-Family	No	
	Multi-Family	No	
	Commercial	No	
Affected Haulers:	Self-Haul	No	
	Commercial	No	



Convert existing Renton Transfer Station to Resource Recovery Park

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities.

This strategy calls for the conversion of the Renton Transfer Station site and building to a resource recovery park. Our assumption is that the focus would be on reuse, recycling, with minimal processing. Organics may be received, but not processed. County staff would continue to operate the facility, with proper training.

Station Gen:	Existing Older		Status: Base Recommendation
System Impact:	Renton		Diversion Potential: High
Category:	Processing		Implementation Time: Long

Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		

 **Demolish existing Renton Transfer Station and replace with a Resource Recovery Park**

As a more aggressive alternative to converting the existing Renton Transfer Station to Resource Recovery Park, this strategy calls for the demolition of the Renton Transfer Station building and designing and constructing a new resource recovery park.

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities. Many of these resource recovery parks co-locate both MRFs and composting operations. Organic wastes entering the tipping area is segregated and moved over to the composting area of the site. For those sites that do not have ample space, organics segregation is accomplished for off-site transfer to a composting facility located elsewhere.

Our assumption is that the focus would be on reuse, recycling, with some processing, depending on space provided with a new master plan. County staff would continue to operate the facility, with proper training.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	No		



Demolish existing Renton Transfer Station and design and build a Single Stream MRF at Renton Transfer Station

As a more aggressive alternative to converting the existing Renton Transfer Station to Resource Recovery Park, the County would design, build, operate, and own a single-stream material recovery facility (MRF) at the Renton Transfer Station site. The facility would be configured to process all recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Existing Older		Status:	More Aggressive
System Impact:	Renton		Diversion Potential:	Low
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	No	Cost Avoidance:	Yes
	C and D	No	Revenue Generation:	Yes
	Bulky	No		
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	No		
	Commercial	Yes		

Updated/Retrofitted and Brand New Stations

6) Convert or modify existing King County solid waste facilities to focus on reuse, recycling, waste diversion, and/or processing



Fill in Transfer Station pit at Enumclaw Transfer Station to create a flat floor area for receiving, storage and sorting/processing

Most current transfer stations are constructed and operated with a flat floor across the entire building. Operational changes at an existing transfer station with a flat, flexible floor design may enable King County to more highly utilize existing infrastructure and staff. For instance, source separation is effective in diverting certain waste stream portions, including C&D, green waste and food waste.

Station Gen:	Updated/Retrofitted & New		Status:	Base Recommendation
System Impact:	Single Generation		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes	Cost Avoidance:	Yes
	C and D	Yes		

	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 *Design and build a Hybrid mixed waste MRF/Transfer Station at existing updated / retrofitted facility*

As a more aggressive alternative to filling in the Transfer Station pit at Enumclaw Transfer Station to create a flat floor area, the County would design, build, operate, and own a hybrid mixed waste material recovery facility (MRF)/transfer station at an existing updated/retrofitted facility site. The facility would be configured to target loads rich in recyclables, which would be directed to the MRF. While some argue this lacks an important public education element because action is no longer required on the part of the waste generator, it provides another avenue to divert additional recyclables from disposal. Other configurations could include a dual stream processing line used for residential recyclables, a transfer station, and a citizen drop-off.

Many of these facilities divert materials to multiple uses, including commodity markets, fuel and energy, and composting. The technologies used at these facilities include the use of trammel screens and vibrating finger screens to make the initial separation of recyclable-rich waste from other MSW.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Waste System-Wide	Diversion Potential: High
Category:	Processing	Implementation Time: Long
Materials:	Curbside	Yes
	Traditionals	Yes
	Organics	Yes
	C and D	Yes
	Bulky	Yes
		Initial Cost: High
		Operating Cost: High
		Cost Avoidance: Yes
		Revenue Generation: Yes
Affected Generator:	Single-Family	Yes
	Multi-Family	Yes
	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	Yes

 *Co-locate single-stream MRF at existing updated / retrofitted facility*

As a more aggressive alternative to filling in the Transfer Station pit at Enumclaw Transfer Station to create a flat floor area, co-location of this facility at transfer facilities would create transportation efficiencies for both sources of material and customers. The County would design, build, operate, and own a single-stream material recovery facility (MRF) at an existing updated/retrofitted facility. The facility would be configured to process some, but not all of the recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and

despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Updated/Retrofitted & New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	High
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	No		
	Commercial	Yes		

7) Co-locate, design and build end-use and/or energy recovery facilities at existing or new King County solid waste facilities



Curbside and SH Organics processing at Transfer Station co-located with anaerobic digestion and/or in-vessel composting

As a more aggressive alternative to leasing sections of Transfer Station property to private organization for end-use and/or energy recovery facilities, the County would accept, divert, and process both commercially-collected curbside organics and self-haul organics in a mechanical biological treatment facility - a type of waste processing facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion. Anaerobic digestion of organics prior to composting produces biofuels for energy production and residual digestate suitable for beneficial soil amendment.

The technologies requires a large amount of space (5 to 10 acres) which may or may not be available at existing transfer stations. Should the County elect to pursue processing technologies for treating residual waste, the County should engage in a stakeholder-driven planning process to identify the most appropriate technology and site for such a facility.

The strategy assumes portions of the processing and anaerobic digestion facility would be contracted to a private partner with suitably trained staff and experience. Directing the County's organics waste stream through an anaerobic digestion process would provide biogas for electricity generation, producing between 75 to 150 kWh per ton of waste input. On this basis, an AD facility could potentially turn the County's organic waste stream into revenue stream, assuming reasonable amortization of land and facilities costs.

Station Gen:	Updated/Retrofitted & New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	Medium
Category:	Processing		Implementation Time:	Long

Materials:	Curbside	No	Initial Cost: High
	Traditionals	No	Operating Cost: High
	Organics	Yes	
	C and D	No	Cost Avoidance: Yes
	Bulky	No	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 *Co-locate recycling technology at existing updated / retrofitted facility*

As a more aggressive alternative to leasing sections of Transfer Station property to private organization for end-use and/or energy recovery facilities, co-location of a recycling technology at an existing updated/retrofitted facility would create transportation efficiencies for both sources of material and customers. Much like an "eco-park", this option seeks to enhance environmental and economic performance of a recycling end-market by efficiently sharing transfer station resources (information, materials, water, energy, and infrastructure) to enhance economic viability and increase efficient material diversion. The goal of this type of arrangement is to improve the economic performance of the participating business while minimizing their environmental impact. The outcomes of this type of development could bolster economic profits, job creation, and environmental responsibility. Our assumption is that the recycling technology would be provided by an appropriate private party working as a lease-holder for County property and with a materials agreement with the Division.

Station Gen:	Updated/Retrofitted & New	Status: More Aggressive
System Impact:	Single Generation	Diversion Potential: High
Category:	Processing	Implementation Time: Long
Materials:	Curbside	Yes
	Traditionals	Yes
	Organics	Yes
	C and D	Yes
	Bulky	Yes
Affected Generator:	Single-Family	Yes
	Multi-Family	Yes
	Commercial	Yes
Affected Haulers:	Self-Haul	Yes
	Commercial	Yes

 *Co-locate MSW conversion technology at existing updated / retrofitted facility*

As a more aggressive alternative to leasing sections of Transfer Station property to private organization for end-use and/or energy recovery facilities, co-location of an MSW conversion technology at an existing update/retrofitted facility would create transportation efficiencies for both sources of material and customers. Emerging thermal processing includes technologies such as gasification, plasma gasification, and pyrolysis, which use or produce heat, under controlled conditions, to convert waste into a synthesis gas (that can be used to produce a fuel, or cleaned and combusted to generate electricity) and other usable products

(e.g., vitrified aggregate, carbon-based char, metal). More traditional forms of thermal processing (i.e., mass-burn) involve combusting the waste in controlled conditions to generate electricity and industrial grade steam. Processing and combustion residuals would require landfilling. No gasification, plasma gasification, or pyrolysis facilities currently operate in the Northwest. Our assumption is that the conversion technology would be provided by an appropriate private party working as a lease-holder for County property and with a materials agreement with the Division. Our assumption is also that significant stakeholder planning and outreach, and technical feasibility and economic analyses would be required to complete this strategy.

Station Gen:	Updated/Retrofitted & New		Status: More Aggressive
System Impact:	Single Generation		Diversion Potential: High
Category:	Processing		Implementation Time: Long
Materials:	Curbside	Yes	Initial Cost: High
	Traditionals	Yes	Operating Cost: Medium
	Organics	Yes	
	C and D	Yes	Cost Avoidance: No
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

Brand New Stations

10) Site, design and build new King County solid waste facilities to align collection and processing in advanced materials management system

 *Establish Wet/Dry collection and dedicated processing to each waste stream*

Typically, mixed dry waste loads contain all or some of the following materials: mixed waste paper, metals, plastics, yard debris, wood, concrete, rock, brick, dry asphalt, construction and demolition wastes, land clearing debris, and/or gypsum wallboard (untreated and unpainted). Wet waste typically is comprised of typical household and business waste, including food waste, which is liable to decay, spoil, or become putrid.

Our assumption is that processing facilities specific to each type of waste would be developed by the County or under contract to a private company. It further assumes that the County's (and region's) emphasis on three-bin collection (i.e., garbage, organics, and recyclables) would be reformulated to emphasize the wet/dry configuration. A full feasibility and economic analysis would be required prior to initiation.

Station Gen:	Brand New		Status: More Aggressive
System Impact:	Single Generation		Diversion Potential: High
Category:	Processing		Implementation Time: Long
Materials:	Curbside	Yes	Initial Cost: High
	Traditionals	Yes	Operating Cost: High

	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 *Design and build a Hybrid mixed waste MRF / Transfer Station at new site*

The County would design, build, operate, and own a hybrid mixed waste material recovery facility (MRF)/transfer station at a new site. The facility would be configured to target loads rich in recyclables, which would be directed to the MRF. While some argue this lacks an important public education element because action is no longer required on the part of the waste generator, it provides another avenue to divert additional recyclables from disposal. Other configurations could include a dual stream processing line used for residential recyclables, a transfer station, and a citizen drop-off.

Many of these facilities divert materials to multiple uses, including commodity markets, fuel and energy, and composting. The technologies used at these facilities include the use of trammel screens and vibrating finger screens to make the initial separation of recyclable-rich waste from other MSW.

Station Gen:	Brand New		Status: More Aggressive
System Impact:	Waste System-Wide		Diversion Potential: High
Category:	Processing		Implementation Time: Long
Materials:	Curbside	Yes	Initial Cost: High
	Traditionals	Yes	Operating Cost: Medium
	Organics	Yes	
	C and D	Yes	Cost Avoidance: Yes
	Bulky	Yes	Revenue Generation: Yes
Affected Generator:	Single-Family	Yes	
	Multi-Family	Yes	
	Commercial	Yes	
Affected Haulers:	Self-Haul	Yes	
	Commercial	Yes	

 *Design and build a Single Stream MRF at New Site*

The County would design, build, operate, and own a single-stream material recovery facility (MRF) at the new site. The facility would be configured to process all recyclables collected from within the County and interlocal Cities. Our assumption is that additional diversion compared to the existing condition may be low, and despite high capital costs and moderate operating costs, the County would retain some cost advantages due to existing ownership of the site, and exclusion of excess fees. A full MRF feasibility study, including economic analysis that considers the County's labor cost structure would be required prior to action.

Station Gen:	Brand New	Status: More Aggressive
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System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	No		
	C and D	No	Cost Avoidance:	Yes
	Bulky	No	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	No		
	Commercial	Yes		

 *Design and build a mixed waste processing facility at a new site*

The County would design, build, operate, and own a mixed waste processing facility at a new site. The effort to develop mixed waste MRFs, previously known as “dirty” MRFs, has seen a resurgence in the last 5-10 years due to high energy costs, aggressive waste diversion goals, favorable commodity values, rising tip fees, and technological advancements in separation equipment. While in the past, mixed waste MRFs recovered between 5% and 45% of the incoming material as recyclables with the remainder disposed, some newer mixed waste MRFs report achieving waste diversion rates of 25-75%. MRFs achieving higher waste diversion rates are recovering a significant percentage of materials in the form of biodegradable material that is sent for composting.

This strategy assumes County staff would be hired to operate the facility, and be given appropriate training. A full feasibility and economic analysis would be required prior to action. Also, if this strategy is chosen, additional work would be required to determine how much of the County's waste stream could be accommodated, and what to do with remaining system capacity.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Waste System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Medium
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Design and build a campus that co-locate distinct processing facilities for organics, reusable and recyclable items, mixed materials*

As the County considers future sites for transfer stations, the County may wish to consider co-locating processing for source-separated materials, including recyclables, organics and C&D. These processing facilities could continue to be operated by the private sector on land leased from the County. There are several potential synergies associated with co-located source-separated processing facilities with other transfer station operations:

- Residual materials from processing operations can be transferred by the transfer operation.
- C&D materials brought to the transfer station by self-haul customers can be processed by the C&D operation.
- Recyclables and organics brought to the transfer station by self-haul customers can be processed by the recyclables and organics processing lines.

While dedicating space at the transfer station for source-separation processing activities is desirable, it would not necessarily result in more diversion. However, through the public-private partnership, other benefits could be realized such as cooperative marketing and expanding outreach and education to visitors to the transfer station.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Transfer System-Wide		Diversion Potential:	High
Category:	Processing		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

 *Separation of Self-Haul vehicles from Commercial vehicles (by building)*

Separation of self-haul vehicles from commercial vehicles is already a focus of King County in most of its transfer facilities. Self-haul wastes are typically delivered in smaller vehicles such as cars, minivans, SUVs, pickup trucks, and small trailers, although some arrive in flatbeds and vehicles of larger capacity. Because self-haul vehicles are typically unloaded by hand, they take longer to unload than mechanically unloaded vehicles; as such, they occupy the unloading stalls for longer periods and thus reduce the potential waste handling capacity of transfer facilities.

Separation of self-haul vehicles from commercial vehicles into two separate buildings provides additional safety, minimizes delays in commercial tipping activities, and provides additional opportunity to separate recyclables. Differences in equipment and recovery techniques are

also assumed to be inherent in the operation of the two facilities, allowing specific targets from each waste stream, using techniques appropriate for the recoverable materials in each. We assume that the two facilities would be co-located on one site.

Station Gen:	Brand New		Status:	More Aggressive
System Impact:	Single Generation		Diversion Potential:	High
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	High
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	Yes
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

All Stations

17) Evaluate partnering with private companies to operate some or all existing or new King County solid waste facilities

Utilizing all of King County’s public and private assets together in cooperative ways to divert additional materials from disposal and into their highest and best uses may add substantially to overall economic and logistical efficiencies, and provide environmental benefits as well. However, in contracts between King County and the Teamsters Locals 117P and 174, International Federation of Professional and Technical Employees Local 17A and International Union of Operating Engineers Local 302, the county has agreed that no jobs will be eliminated due to contracting out, and that work currently performed by members of the bargaining units will not be contracted out.

This strategy assumes that contract issues would be resolved, based on the use of new facilities only for such partnerships. Certainly, additional discussion with Unions and in the context of existing labor contracts would be required.

Station Gen:	Brand New		Status:	Less Aggressive
System Impact:	Single Generation		Diversion Potential:	Low
Category:	Operations		Implementation Time:	Long
Materials:	Curbside	Yes	Initial Cost:	Medium
	Traditionals	Yes	Operating Cost:	Low
	Organics	Yes		
	C and D	Yes	Cost Avoidance:	Yes
	Bulky	Yes	Revenue Generation:	No
Affected Generator:	Single-Family	Yes		
	Multi-Family	Yes		
	Commercial	Yes		
Affected Haulers:	Self-Haul	Yes		
	Commercial	Yes		

APPENDIX B

Criteria Evaluation

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Leverages resources through collaboration/partnership	Increases high value end uses	Has no negative program staffing resources impact	Creates manageable social equity impacts	Is operationally and technically feasible today	Is flexible for future station upgrades	Meets standard for 90% of users trips	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for Implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank	
						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
121	ALL	COM SF MF	SH	E&O	Review fee sheet materials for user friendliness and ease in understanding	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost	Low	Short	TS	All	Both	78%
123	ALL	COM SF MF	SH COM	E&O	Comprehensive Signage Program	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	91%
124	ALL	COM SF MF	SH	E&O	Develop flexible and moveable signage particularly for materials with a changing end market	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	91%
125	ALL	COM SF MF	SH	E&O	Develop a color coded signage system for different materials	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	91%
126	ALL	COM SF MF	SH	E&O	Use pictograms in signage, multilingual signage, websites and presentations to community groups to address language and cultural barriers	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	91%
127	ALL	COM SF MF	SH COM	E&O	Use electronic reader boards to relay information about materials with changing collection standards	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	91%
128	ALL	COM SF MF	SH COM	E&O	Place an easy to read material specific sign with do's and don'ts right above the material's collection spot in the station	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	91%
130	ALL	COM SF MF	SH	E&O	Include information on the website about how to pack a vehicle to enhance reuse and recycling opportunities once at the station	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Low	Short	TS	All	SH	96%
131	ALL	COM SF MF	SH	E&O	Create a 'welcome packet' about transfer station recycling information that is sent to customers upon opening a new utility account	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance	Low	Short	SW	All	Both	96%
132	ALL	COM SF MF	SH COM	E&O	Employ or partner with public outreach and education specialists to provide technical assistance, education campaigns and on the ground dissemination especially when policies or programs change	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Low First Cost Cost Avoidance Gen Revenue	Low	Short	SW	All	Both	91%
133	ALL	COM SF MF	SH COM	E&O	Deliver public education about the different recycling symbols on products and where to recycle products with the different symbols	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Cost Avoidance	Low	Short	SW	All	Both	91%
134	ALL	COM SF MF	SH COM	E&O	Use community art projects to increase awareness of transfer stations and recycling	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	Low Op Cost	Low	Short	SW	All	Both	87%
136	ALL	COM SF MF	SH COM	E&O	Create an interactive map component to the 'What do I do with...' web tool	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost Cost Avoidance	Low	Short	SW	All	Both	91%

Tier I - Top Priority	Tier II	Additional Info
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Num	MAT	GEN	HLR	CAT	Action/Strategies	<div style="display: flex; justify-content: space-between;"> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Demonstrates leadership</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Leverages existing or planned infrastructure</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Increases recycling of the County's high priority material</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Meets facility safety goals</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Is acceptable to customers</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Is consistent with market materials</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Leverages resources through collaboration/partnership</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Increases high value end uses</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Leverages existing program staffing resources</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Has no negative social equity impacts</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Is operationally and technically feasible today</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Is flexible for future station upgrades</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Meets standard for 90% of users trips</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Meets applicable regulatory requirements</div> <div style="width: 15%; transform: rotate(-45deg); font-size: 8px;">Achieves a desired high-volume diversion</div> </div>																		Level of Diversion (H, M, L, or tons)	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank	
						Low Op Cost	Cost Avoidance	Low	Short	TS	All	SH	87%																	
137	ALL	COM SF MF	SH COM	E&O	Make sure County Transfer Station websites give as much or more visibility to recycling services at the transfer station as waste disposal services	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low Op Cost	Cost Avoidance	Low	Short	TS	All	SH	87%
138	ALL	COM SF MF	SH COM	E&O	Review and update the County's website for customer usability	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low Op Cost	Cost Avoidance	Low	Short	TS	All	SH	87%
140	ALL	COM SF MF	SH COM	E&O	Create a video or photographic tour of how to prep and what to expect at the transfer station.	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost	Cost Avoidance	Low	Short	TS	All	SH	91%
143	ALL	COM SF MF	SH COM	E&O	Create a 'welcome packet' about transfer station recycling information for new businesses	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost	Cost Avoidance	Low	Short	SW	All	Both	91%
119	ALL	COM SF MF	SH	E&O	Develop and hand out recycling guides, magnets, or other materials at the scale house, with information about accepted materials and recycling tips	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost	Cost Avoidance	Medium	Short	TS	All	Both	96%
81	ALL	COM SF MF	SH COM	OPS	Formalize and foster a culture of customer service, teamwork, and an ethic that values and recognizes increased diversion at transfer stations.	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost	Low Op Cost	High	Short	TS	All	Both	91%
103	C&D	COM SF MF	SH COM	OPS	Dedicate tunnel slot for mixed C&D in top-loading trailer	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost	Low Op Cost	High	Short	TS	All	Both	87%
4	Mattresses	SF MF	SH	OPS	Mattress collection event at transfer station	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost	Low Op Cost	Low	Short	SW	All	SH	83%
23	ALL	COM SF MF	SH COM	OPS	Incorporate recycling responsibilities into staff job descriptions	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost	Low Op Cost	Low	Short	TS	All	Both	78%
84	ALL	COM SF MF	SH	OPS	Magnetic color coded cones on vehicles at scalehouse to enable staff direction inside Transfer Station	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost	Low Op Cost	Low	Short	TS	All	Both	87%
91	ALL	COM SF MF	SH COM	OPS	Enhanced scalehouse screening (visual, camera, XRF, AHERA Doc)	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	Low First Cost	Low Op Cost	Low	Short	TS	All	Both	83%	
101	ALL	COM SF MF	SH COM	OPS	Link increased diversion to job security	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost	Low Op Cost	Low	Short	SW	All	Both	96%
142	ALL	SF MF	SH	OPS	Coordinate with local jurisdictions to offer recycling collection events at Transfer Stations, focusing on hard-to-recycle or other targeted materials.	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low Op Cost	Cost Avoidance	Low	Short	TS	All	SH	96%
14	BULK	SF MF	SH	OPS	Off-site grading, inventory and retail of reusable goods	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	N	Cost Avoidance	Gen Revenue	Medium	Short	SW	All	SH	65%

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority												Tier II												Additional Info					
						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Is consistent with market potential of targeted partnership	Leverages resources through collaboration/	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Is operationally and technically feasible today	Is flexible for future station upgrades	Meets standard for 90% of users trips	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank							
19	CURB TRAD BULK C&D	COM SF MF	SH	OPS	Additional TS staff to monitor recycling drop off areas, reuse areas	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	TS	All	SH	87%					
21	ALL	COM SF MF	SH	OPS	Additional staff to provide more direct customer assistance with active unloading, sorting materials, directing material placement, and answering questions (Personal Sorters)	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	TS	All	SH	87%					
52	ALL	COM SF MF	SH COM	OPS	Enhance Scalehouse management for load identification and direction to diversion areas	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost	Medium	Short	TS	All	Both	78%						
73	C&D	COM SF MF	SH COM	OPS	Focus significant effort on C&D diversion at the scale house carefully screening incoming loads and educating customers	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	Medium	Short	TS	All	Both	96%					
104	ALL	COM SF MF	SH COM	OPS	Review and update the 'no salvage policy' to allow floor staff to assist in diverting recyclables	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Gen Revenue	Medium	Short	SW	All	Both	91%					
28	C&D	COM SF MF	SH COM	POL	Mandatory processing of mixed C&D waste at certified C&D processor	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	High	Long	SW	All	Both	91%					
30	TRAD CURB C&D	COM SF MF	SH COM	POL	Ban specific materials from disposal	N	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	High	Long	SW	All	Both	74%						
31	TRAD CURB C&D	COM SF MF	SH COM	POL	Mandatory recycling laws which requires the recycling of designated items	N	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	High	Long	SW	All	Both	74%						
34	ALL	COM SF MF	SH COM	POL	Tipping fee surcharges placed on every ton of solid waste disposed at landfills	N	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N	Low First Cost Gen Revenue	High	Short	SW	All	Both	74%						
78	C&D	COM SF MF	SH COM	POL	Ordinance requiring diversion of 100% of asphalt, concrete, soil, and land clearing debris and 50% of other C&D debris from landfill disposal	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost	High	Short	SW	All	Both	83%						
11	TRAD CURB	COM SF MF	SH	POL	Eliminate traditional recyclables at transfer station in favor of curbside collection	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	Low	Short	SW	All	SH	70%						
15	Mattre sses	COM SF MF	SH COM	POL	Extra fee on mattress disposal at transfer stations	N	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Cost Avoidance Gen Revenue	Low	Short	SW	All	SH	74%					
29	ALL	COM SF MF	SH	POL	Flat fee for using recycling area; additional facility use fee to access transfer station for disposal.	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Gen Revenue	Low	Short	SW	All	Both	87%						

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <p><i>Demonstrates leadership</i></p> <p><i>Leverages existing or planned infrastructure</i></p> <p><i>Increases recycling of the County's high priority material</i></p> <p><i>Meets facility safety goals</i></p> <p><i>Is acceptable to customers</i></p> <p><i>Is consistent with market potential of targeted partnership</i></p> <p><i>Leverages resources through collaboration/</i></p> <p><i>Increases high value end uses</i></p> <p><i>Leverages existing program staffing resources</i></p> <p><i>Has no negative social equity impacts</i></p> <p><i>Creates manageable negative environmental</i></p> <p><i>Is operationally and technically feasible today</i></p> <p><i>Is within 30 minutes for future station upgrades</i></p> <p><i>Meets standard for 90% of users</i></p> <p><i>Meets applicable regulatory requirements</i></p> <p><i>Achieves a desired high-volume diversion</i></p> </div> <div style="width: 45%; text-align: center;"> <p><i>Has an overall low net cost impact:</i></p> <p><i>Level of Diversion (H, M, L, or tons)</i></p> <p><i>Timeframe for implementation:</i></p> <p><i>System impact:</i></p> <p><i>Station generation:</i></p> <p><i>Targets Commercial or Self Haul Customers/Loads or both</i></p> <p><i>Notes</i></p> <p><i>Rank</i></p> </div> </div>																		Low First Cost Gen Revenue	Low Short	SW	All	Both	Rank
						Y	Y	N	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost						
36	TRAD CURB	COM SF MF	SH	POL	Pay an annual fee to drop off recyclable materials and trash at the transfer station	Y	Y	N	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	Low First Cost Gen Revenue	Low	Short	SW	All	Both	65%	
37	TRAD CURB BULK	COM SF MF	SH	POL	Per vehicle fee for reusable and recyclable materials drop-off at Transfer Station	Y	Y	N	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	Low First Cost Gen Revenue	Low	Short	SW	All	Both	65%	
86	C&D	COM	COM	POL	Receive Commercial C&D at Transfer Station	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost	Low	Short	TS	All	C	78%	
87	C&D	SF	SH	POL	Accept small amounts of C&D waste curbside (see Bagster Program)	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Cost Avoidance	Low	Short	SW	All	Both	83%	
146	ALL	COM SF MF	SH COM	POL	Identify candidates for targeted materials or retail outlets that could participate in a Product Stewardship program initiated or jointly supported by the County	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Cost Avoidance	Low	Long	SW	All	Both	87%	
147	C&D	COM SF MF	COM	POL	Voucher program for yard and landclearing waste at private facilities	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	Low	Short	TS	All	SH	87%	
153	ALL	COM SF MF	SH COM	POL	Municipal collection and recycling system with funding provided by product manufacturers	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Cost Avoidance Gen Revenue	Low	Long	SW	All	Both	78%	
154	TRAD CURB	COM SF MF	SH	POL	Beverage container Recycling Kiosks	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Low	Short	SW	All	Both	78%	
32	ALL	COM SF MF	SH COM	POL	Differential material-specific fees	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Medium	Short	TS	All	Both	83%	
35	TRAD CURB BULK	COM SF MF	SH	POL	Free off-site drop-off centers (staffed) for reusable and recyclable materials	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	Cost Avoidance Gen Revenue	Medium	Short	TS	All	SH	74%	
149	TRAD CURB BULK	COM SF MF	SH	POL	Privately-operated recycling drop-off locations using City or County-owned property	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Low Op Cost Cost Avoidance	Medium	Short	SW	All	SH	83%	
22	BULK	COM SF MF	SH	PROC	Additional TS staff for loading/unloading of bulky and reusable or recyclable drop-off and directing the diversion for recovery	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	TS	All	SH	83%	
25	ALL	COM SF MF	SH	PROC	Direct existing staff to provide active unloading, sorting assistance (Personal Sorters)	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	TS	All	SH	87%	
66	ALL	COM SF MF	SH	SITE	Resource recovery park for multiple recyclable and compostable materials at new site	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	High	Long	TS	All	Both	78%	

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority												Tier II												Additional Info					
						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Is consistent with market potential of targeted partnership	Increases high value end uses	Leverages existing program collaboration/impact	Has no negative social equity impacts	Is operationally and technically feasible today	Is flexible for future station upgrades	Meets standard for 90% of users trips	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank								
156	ALL	COM SF MF	SH COM	POL	Shared material marketing arrangement	Y	N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	N	Low First Cost Gen Revenue	Medium	Short	SG	Bow Lake Brand New	Both		65%					
12	ALL	COM SF MF	SH	OPS	Hard to recycle roundabout with bins and bunkers for reusable and recyclable materials placed on the outside of the circle	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	High	Long	SG	Brand New	SH		70%					
44	ALL	COM SF MF	SH COM	OPS	Separation of Self-Haul vehicles from Commercial vehicles (by building)	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	High	Long	SG	Brand New	Both		74%					
16	BULK	SF MF	SH	OPS	Separate area for materials exchange and donation	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	N	Y	N	Low First Cost Low Op Cost Cost Avoidance	Low	Short	SG	Brand New	SH		65%					
155	ALL	COM SF MF	SH COM	OPS	Partner with private companies to operate the transfer station, building in diversion goals into the contract	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	N	N	Low First Cost Low Op Cost Cost Avoidance	Low	Long	SG	Brand New	Both	May violate Union contracts	65%					
144	C&D	COM SF MF	SH COM	OPS	Co-locate operations with a salvage retailer or processor to minimize transportation costs and increase visibility of salvage	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Medium	Long	SG	Brand New	Both		87%					
151	ALL	COM SF MF	SH COM	OPS	Equity public/partnership in transfer/processing campus.	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	N	N	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Medium	Long	SG	Brand New	Both		78%					
24	ALL	COM SF MF	SH COM	PROC	Additional staff for floor-sorts/pick-line	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	N	Low First Cost Cost Avoidance Gen Revenue	High	Short	SG	Brand New	Both		65%					
41	ALL	COM SF MF	SH COM	PROC	Design transfer stations to have flat floors to increase customer ease in unloading materials, flexibility in where materials are unloaded, increased diversion, and processing capability	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	High	Long	SG	Brand New	SH		87%					
43	ALL	COM SF MF	SH COM	PROC	Co-located but distinct processing facilities for organics, reusable and recyclable items, mixed materials	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	High	Long	SG	Brand New	Both		78%					
67	ALL	COM SF MF	SH COM	PROC	Wet/Dry collection and dedicated processing to each	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	SW	Brand New	Both		74%					

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						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Leverages resources through collaboration/partnership	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Creates manageable negative environmental impact	Is operationally and technically feasible today	Is flexible for future station upgrades	Is within 30 minutes for future station upgrades trips	Meets standard for 90% of users	Achieves a desired regulatory requirements	Has an overall low net cost impact	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank		
71	ALL	COM SF MF	SH COM	PROC	Mixed Waste processing at New Site	Y	N	Y	Y	Y	N	Y	N	N	Y	Y	N	N	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	TS	Brand New	Both		61%
55	TRAD	COM SF MF	SH COM	PROC	Provide densifier or grinder for EPS	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Low	Short	SG	Brand New	SH		74%
10	BULK	COM SF MF	SH COM	PROC	Floor Sort for Bulky reusable and recyclable Items	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	Medium	Short	SG	Brand New	Both		74%
152	ALL	COM SF MF	SH COM	PROC	Lease sections of Transfer Station property to private organization for collection, processing, or both.	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	N	N	Y	Y	Y	Low Op Cost Cost Avoidance Gen Revenue	Medium	Long	SG	Brand New	Both		78%

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority															Tier II							Additional Info			
						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Is consistent with market potential of targeted partnership	Leverages resources through collaboration/	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Creates manageable negative environmental impact	Is operationally and technically feasible today	Is flexible for future station upgrades	Is within 30 minutes for 90% of users trips	Meets standard for time on site for 90% of users	Achieves a desired regulatory requirements	Has an overall low net cost impact	Level of Diversion (H, M, L, or tons)	Timeframe for Implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank		
46	ALL	COM SF MF	SH COM	OPS	Keep self-haul traffic and queuing separate from commercial vehicle queuing	N	N	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	Y	Y	N	Low Op Cost	Low	Long	SG	Older Existing	Both		57%	
47	ALL	COM SF MF	SH COM	OPS	Inbound and Outbound scales	N	N	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	Y	Y	N	Low Op Cost Cost Avoidance	Low	Long	Cedar Falls Skykomish	Older Existing	Both		52%	
68	ALL	COM SF MF	SH COM	PROC	Mixed Waste processing at Cedar Hills Regional Landfill	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	N	N	N	Y	Y	Y	Gen Revenue	High	Long	CHRL	Older Existing	Both		74%	
59	ALL	COM SF MF	SH	SITE	Resource recovery park for multiple recyclable and compostable materials at Cedar Hills Landfill	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Low Op Cost Gen Revenue	High	Long	CHRL	Older Existing	Both		91%		
61	ALL	COM SF MF	SH	SITE	Demolish existing Transfer Station and replace with Resource Recovery Park (Renton)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	Renton	Older Existing	Both		91%		
62	ALL	COM SF MF	SH	SITE	Convert existing Transfer Station to Resource Recovery Park (Renton)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	Renton	Older Existing	Both		87%		

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority										Tier II										Additional Info				
						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Leverages resources through collaboration/partnership	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Creates manageable negative environmental impact	Is operationally and technically feasible today	Is flexible for future station upgrades	Meets standard for 90% of users trips	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank		
108	BULK C&D	COM SF MF	SH COM	E&O	Arrange for private salvage or reuse companies to train transfer station staff on how to identify materials for reuse	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	Low	Short	SG	Updated / retrofitted Brand New	SH	Links to Culture	91%
3	Mattresses	SF MF	SH	OPS	Mattress collection for recycling at transfer stations (DR3)	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance	Low	Short	SG	Updated / retrofitted Brand New	SH		83%
9	Appliances	SF MF	SH	OPS	Appliance exchange for working items	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	N	Low First Cost Cost Avoidance	Low	Short	SG	Updated / retrofitted Brand New	SH		74%
58	ORG	COM SF MF	SH COM	OPS	Curbside Organics consolidation at Transfer Station and offsite transfer to processing	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low First Cost Cost Avoidance	Low	Short	SG	Updated / retrofitted Brand New	C		96%
88	Asphalt Shingles	COM	SH COM	OPS	Dedicated roll-off container for source-separated tear-off shingles	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	Low	Short	SG	Updated / retrofitted Brand New	SH		83%
93	C&D	COM SF MF	SH COM	OPS	Co-locate reused building material (architectural and utility salvage) retail at at Transfer Station	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	N	Cost Avoidance Gen Revenue	Low	Long	SG	Updated / retrofitted Brand New	SH		78%
145	ALL	SF MF	SH	OPS	Allow and procure mobile collection operators (such as a non-profit) to station a collection site outside of the transfer station	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	Low First Cost Gen Revenue	Low	Short	SG	Updated / retrofitted Brand New	SH		87%
6	BULK	SF MF	SH	OPS	On-site trailers for collection of reusable furniture and mattresses for off-site processing	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	SH		87%

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority												Tier II										Additional Info			
						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Leverages resources through collaboration/partnership	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Creates manageable negative environmental impact	Is operationally and technically feasible today	Is within 30 minutes for future station upgrades	Meets standard for 90% of users trips	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank			
7	BULK	COM SF MF	SH	OPS	Dedicated bulky Item Drop-Off Area using staging areas, bunkers, bins, drop-boxes, or trailers (i.e., furniture, mattresses, carpet, tires, other bulky items)	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	N	Y	Y	Low First Cost Low Op Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	SH	83%		
13	CURB TRAD BULK	COM SF MF	SH	OPS	Locate recycling and reuse collection areas after the scalehouse and charge a fee	Y	Y	Y	Y	N	Y	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	SH	74%		
17	Electronics	SF MF	SH	OPS	E-Waste collection drop-off point for E-Cycle program (rack system)	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	N	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	SH	65%		
33	ALL	SF MF	SH	OPS	Mandatory separation of recyclables at Transfer Stations with Recycling	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	N	Y	Y	N	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	SH	78%		
39	ALL	COM SF MF	SH	OPS	Make sure materials specific collection bins are adequately sized and spaced, easy to put materials into, and have clear signage.	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	SH	87%		
49	ALL	COM SF MF	SH	OPS	Direct vehicles to sorting area for recyclables as the default, rather than disposal area	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Low Op Cost Cost Avoidance Gen Revenue	Medium	Long	SG	Updated / retrofitted Brand New	SH	87%		
51	C&D BULK	COM SF MF	SH	OPS	Include a retail thrift store, building materials yard, reuse and recycling center at transfer stations	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Low First Cost Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	Both	83%		
82	ALL	COM SF MF	SH COM	OPS	Place excavator on elevated platform to enhance segregating and loading materials	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	Both	83%		

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority												Tier II										Additional Info				
						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers materials	Leverages resources through collaboration/partnership	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Creates manageable negative environmental impact	Is operationally and technically feasible today	Is flexible for future station upgrades	Meets standard for 90% of users trips	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank				
85	ALL	COM SF MF	SH COM	OPS	Direct loads to specific areas based on load quality and processing requirements	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Low First Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	SH	87%			
89	Gypsum	COM	SH COM	OPS	Dedicated roll-off container for source-separated gypsum wallboard new construction waste	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	SH	83%			
90	C&D	COM SF MF	SH	OPS	Co-locate Salvage Lumber Warehouse at Transfer Station	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	N	Cost Avoidance Gen Revenue	Medium	Long	SG	Updated / retrofitted Brand New	Both	83%			
92	Carpet	COM SF MF	SH COM	OPS	Carpet consolidation at Transfer Station for recycling at private processors	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	N	Y	Y	N	Low First Cost Low Op Cost	Medium	Short	SG	Updated / retrofitted Brand New	Both	78%			
74	WOOD	COM SF MF	SH COM	OPS	Set aside area where haulers, including residents, may deliver wood waste at a reduced tipping fee	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	Medium	Short	SG	Vashon Updated / retrofitted Brand New	Both	96%			
45	ALL	COM SF MF	SH COM	PROC	Fill in Transfer Station pit to create flat floor area for receiving processing	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	Y	Y	N	Low Op Cost Cost Avoidance Gen Revenue	High	Long	Enumclaw	Updated / retrofitted	Both	70%			
56	ALL	COM SF MF	SH	PROC	Dedicated sort line for all self-haul materials	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	SG	Updated / retrofitted Brand New	SH	74%			
60	ALL	COM SF MF	SH COM	PROC	Co-located Transfer Station and recycling technology	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	SG	Updated / retrofitted Brand New	Both	91%			
64	ALL	COM SF MF	SH COM	PROC	Portable Mini-MRF for all materials	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Short	SG	Updated / retrofitted Brand New	Both	83%			

Tier I - Top Priority

Tier II

Additional Info

Num	MAT	GEN	HLR	CAT	Action/Strategies	Tier I - Top Priority												Tier II										Additional Info				
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69	ALL	COM SF MF	SH COM	PROC	Hybrid mixed waste MRF / Transfer Station	Y	N	y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	SG	Updated / retrofitted Brand New	Both		74%		
70	ALL	COM SF MF	SH COM	PROC	Co-located Transfer Station and MSW conversion technology	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	Y	Y	Y	Gen Revenue	High	Long	SG	Updated / retrofitted Brand New	Both		74%		
75	C&D	COM SF MF	SH COM	PROC	Set up area to receive commingled loads of C&D; remove high value materials and difficult to manage materials (e.g., mattresses), and deliver the remaining material to a private C&D processing facility	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	High	Short	SG	Updated / retrofitted Brand New	C		91%		
77	C&D	COM SF MF	SH COM	PROC	Separate mixed C&D into dedicated roll-off or top loading containers for transfer to C&D processor	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Low First Cost Low Op Cost Cost Avoidance	High	Short	SG	Updated / retrofitted Brand New	SH		91%		
94	C&D	COM SF MF	SH	PROC	Dedicated self-haul C&D sort line to recover the most high value C&D materials	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	N	Cost Avoidance	High	Long	SG	Updated / retrofitted Brand New	SH		74%		
95	C&D	COM SF MF	SH COM	PROC	C&D diversion areas within Transfer Stations in order to use fairly simple equipment to recover the most high value C&D materials	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	N	Cost Avoidance Gen Revenue	High	Long	SG	Updated / retrofitted Brand New	SH		74%		
97	C&D	COM	SH COM	PROC	Commercial C&D processing on-site	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	High	Long	SG	Updated / retrofitted Brand New	C		78%		
8	TRAD	COM SF MF	SH	PROC	Source-separated block polystyrene foam Styrofoam ® densification at the transfer station	Y	N	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Low	Short	SG	Updated / retrofitted Brand New	SH		74%		

Tier I - Top Priority

Tier II

Additional Info

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						Demonstrates leadership	Leverages existing or planned infrastructure	Increases recycling of the County's high priority material	Meets facility safety goals	Is acceptable to customers	Is consistent with market materials	Leverages resources through collaboration/partnership	Increases high value end uses	Leverages existing program staffing resources	Has no negative social equity impacts	Creates manageable negative environmental impact	Is operationally and technically feasible today	Is flexible for future station upgrades	Meets standard for 90% of users	Meets applicable regulatory requirements	Achieves a desired high-volume diversion	Has an overall low net cost impact:	Level of Diversion (H, M, L, or tons)	Timeframe for implementation:	System impact:	Station generation:	Targets Commercial or Self Haul Customers/Loads or both	Notes	Rank		
53	TRAD CURB	COM SF MF	SH COM	PROC	Provide baler for paper, cardboard, plastic film, textiles	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance Gen Revenue	Low	Short	SG	Updated / retrofitted Brand New	Both	78%		
79	C&D	COM SF MF	SH COM	PROC	Public/private partnership for C&D/reusable building material sortation and diversion	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	Low First Cost Low Op Cost Cost Avoidance	Low	Short	SG	Updated / retrofitted Brand New	Both	87%		
26	BULK	COM SF MF	SH	PROC	Create a 'reuse zone' and employ staff to help the public unload items in the appropriate location	N	Y	N	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	N	Low First Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	SH	61%		
54	WOOD	COM SF MF	SH COM	PROC	Provide shredder/grinder for woody wastes	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	Both	70%		
63	ORG	COM SF MF	SH COM	PROC	Curbside and SH Organics processing at Transfer Station co-located with anaerobic digestion and/or in-vessel composting	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Medium	Long	SG	Updated / retrofitted Brand New	Both	87%		
65	ORG	COM SF MF	SH COM	PROC	Curbside and SH Organics processing at Transfer Station and offsite transfer to secondary processor	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	Both	83%		
76	WOOD	COM SF MF	SH COM	PROC	Manually sort wood waste from trash and deliver it to the wood waste collection area	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Low Op Cost Cost Avoidance	Medium	Short	SG	Updated / retrofitted Brand New	Both	91%		
80	WOOD	COM SF MF	SH COM	PROC	Grind or ship wood on-site by a contractor	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	Y	Cost Avoidance Gen Revenue	Medium	Short	SG	Updated / retrofitted Brand New	Both	74%		
150	CURB TRAD BULK C&D	COM SF MF	SH COM	PROC	Additional private/non-profit organization staff for loading/unloading of bulky and reusable or recyclable drop-off and directing the diversion for recovery	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	N	Y	Low First Cost Cost Avoidance Gen Revenue	Medium	Long	SG	Updated / retrofitted Brand New	Both	May violate Union contracts 83%		

APPENDIX C

Task 4: Research Summary



Optimized Transfer Station Recycling Feasibility Study

Task 4: Research Summary

Prepared for
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Introduction

As part of its effort to gain a complete picture of the potential for additional recycling within the King County transfer system, the consultant team conducted research regionally and nationally to identify facilities, activities, partnerships, and methods being used to achieve high recovery rates and enhanced revenue. Research focused on:

- Best practices, standard equipment, new technologies, unique rate structures, staffing, and policies at transfers stations and material recovery facilities
- Activities and arrangements that support the successful integration of public and private infrastructure AND Partnerships between publicly-owned waste/recycling infrastructure and commercial waste generators, product and packaging manufacturers, and re-manufacturers
- Practices, equipment or technologies for targeted C&D materials, and
- Training/Education/public outreach strategies at public and private facilities.

The consultant team conducted the research by:

- Identifying and communicating in person or in writing with successful municipalities with diversion rates in excess of 50%
- Communicating with professional contacts experienced with innovative recycling programs and jurisdictions
- Conducting web and literature searches for documentation of best practices, innovative recycling approaches, and successful implementation of recycling efforts at transfer stations, material recycling facilities, and in programs in general.

Transfer Stations with High Diversion Rates for Self-Haul Materials

To evaluate potential options for increasing diversion of recoverable materials, the Herrera, O'Brien and HDR consultant team profiled best practices at transfer stations with high diversion rates for self-haul materials, including:

- Berkeley Transfer Station, Berkeley, California - owned and operated by the City of Berkeley
- Center for Hard to Recycle Materials (CHaRM), Boulder, Colorado - owned and operated by Eco-Cycled
- Cold Canyon Resource Recovery Park, San Luis Obispo, California - owned and operated by Waste Connections
- Davis Street Transfer Station, San Leandro, California - owned and operated by Waste Management

- El Cerrito Recycling Center, El Cerrito, California - owned and operated by the City of El Cerrito
- Salisbury - Sharon Transfer Station, Salisbury, Connecticut - owned and operated by the Town of Salisbury
- SF Recycling & Disposal, San Francisco, California - owned and operated by Recology
- Portland Metro Central Transfer Station, Portland, Oregon - owned by City of Portland and operated by Allied Waste.

1. Practices, Standard Equipment, New Technologies, Unique Rate Structures, Staffing, and Policies for Transfer Stations

This section describes the best practices for maximizing diversion of recyclable materials at transfer stations by material type and by program and operational areas based on these national models, along with other facility or program models. Full facility or program profiles are referenced throughout the memorandum and are included in Appendix A.

Best Practices by Material Type

Different material types require different handling approaches in order to maximize diversion. This section describes the best practices for targeting these highly recoverable materials:

- Bulky items
- Traditional recyclables
- Compostable materials
- Other Materials.

These material types comprise over 80 percent of the materials discarded by all customers at King County Transfer Stations.

Bulky Items

Some cities have no transfer stations in-city, but rely on a robust curbside program to collect larger items. In Boston, large appliances, mattresses, carpet are accepted curbside. The Tacoma Call 2 Haul program and Waste Management's Bagster Program are examples of services provided upstream of the transfer station that serve to divert bulky reusable and recyclable materials that would otherwise be disposed.

→ See *Waste Management Bagster Program Description*:
<http://www.thebagster.com/videos/Default.aspx>

→ See *Tacoma's Call 2 Haul website*: www.cityoftacoma.org/Page.aspx?hid=1227

Bulky items (including furniture, mattresses and carpet) are typically targeted for diversion using drop-off areas within facilities. The Davis Street Transfer Station, the El Cerrito Recycling Center, and Center for Hard to Recycle Materials (CHaRM) all use drop-off areas for bulky items. Some facilities will recover bulky items through a floor sort operation. Materials are unloaded by the customer onto the tipping floor and diverted from disposal by transfer station staff. Both SF Recycling & Disposal and the Berkeley Transfer Station recover bulky items through floor sorting.

Drop-Off

At Davis Street, El Cerrito and CHaRM, self-haul customers are directed to roll-off containers, trailers or staging areas specifically designated for furniture, mattresses or carpet. At El Cerrito, Urban Ore and Goodwill Industries staff staging areas for acceptance of these materials. Customers unload the bulky items and they are loaded into roll-off containers or trailers using dedicated staff provided by Urban Ore and Goodwill. At Davis Street, customers are directed to a staging area for mattresses, carpet and electronic scrap. These materials are then loaded into trailers or containers by Davis Street staff.

- ➔ *See the Davis Street Transfer Station Facility profile (#11)*
- ➔ *See the El Cerrito Recycling Center profile (#12)*
- ➔ *See the Center for Hard to Recycle Materials (CHaRM) Facility profile (#6)*

Floor Sort

At the Berkeley Transfer Station, City staff and Urban Ore staff assist customers in unloading bulky items and other reusable or recyclable materials onto the tipping floor of the transfer station. City staff then load recyclable materials (including wood, metal and cardboard) into cubic yard dumpsters and roll-off containers and Urban Ore staff load reusable items (including furniture and household goods) into their collection vehicle for transport to the Urban Ore Eco-Park across town from the Berkeley Transfer Station.

- ➔ *See the Urban Ore and the City of Berkeley profile (#21)*

At SF Recycling & Disposal, as customers unload reusable furniture and recyclable mattresses they are targeted for diversion by Recology staff. St. Vincent de Paul provides trailers and Recology staff load the trailers with reusable furniture. The furniture is then transported for resale at the St. Vincent de Paul thrift stores. Mattresses and carpet are also targeted by Recology staff for



recycling. These materials are loaded into roll-off containers or trailers for transport to local recyclers.

→ See the *San Francisco Disposal & Recycling Facility profile (#19)*

Mattresses

Some examples of variations in the types of mattress recycling services being utilized regionally include:

- Many suburban King County cities stage one-day collection events, involving Save Our Landfills and Correctional Industries for collection and processing.
- A number of California transfer stations accept mattresses and box springs through a partnership with DR3, a wholly owned subsidiary of the St. Vincent de Paul Society of Lane County, a 501(c) 3 nonprofit based in Eugene, Oregon. Mattresses are deconstructed and their component parts recycled in appropriate commodity markets. Mattresses are accepted at:
 - Ben Lomond: Ben Lomond Transfer Station, Ben Lomond, 831-454-2430
 - Berkeley Transfer Station, Berkeley, 510-981-7270
 - Greenworx, Burlingame, 888-714-7444
 - Altamont Landfill, Livermore, 800-449-6349
 - Contra Costa Transfer & Recovery Station, Martinez, 925-313-8900
 - Newby Island Sanitary Landfill, Milpitas, 408-432-1234
 - Recology (formerly Coastside/Seacoast Disposal), Pacifica, 650-355-9000
 - Palo Alto Landfill, Palo Alto, 650-329-2655
 - City Of Redding Transfer Station & Recycling Facility, Redding, 530-224-6201
 - San Carlos Transfer Station, San Carlos, 650-592-0255
 - Recology, San Francisco, 415-330-1400
 - Davis Street Transfer Station, San Leandro, 510-638-2303
 - San Martin Transfer Station, San Martin, 408-683-4443
 - Santa Cruz Resource Recovery Facility, Santa Cruz, 831-420-6273
 - SMaRT Station, Sunnyvale, 408-752-8530
 - Buena Vista Landfill, Watsonville, 831-454-2430
- Mattresses can be recycled in Portland, but only at private facilities, not at the Metro transfer stations. DR3 is also the partner active at these facilities.
- There are three mattress recyclers in the Vancouver, B.C. The Government banned mattress disposal at all facilities (with some exemptions for non-recyclable mattresses, which can be disposed) and these three private businesses disassemble and recycle all mattresses (about 125,000 per year). Collection takes place at transfer stations.
- France has established a national Extended Product Responsibility law for furniture, including mattresses.

Traditional Recyclables and Compostable Materials (Metals, Glass, Plastics, Cardboard, Yardwaste)

Nearly all transfer stations we researched accept metal, glass, cardboard, and yard waste for recycling. Many accept additional materials including e-waste, tires, and appliances. Many facilities accept metals, glass, and cardboard— “anything we accept curbside.” However there are exceptions. In Minneapolis, items that are recyclable curbside are trash if they are brought to the transfer station.

Self-haul customers will often bypass recycling centers when they are placed outside of the fee gate at transfer stations. Two strategies for increasing separation of recyclable and compostable materials are providing a resource recovery park after the fee gate and requiring self-haul customers to separate materials appropriately using rate incentives.

Resource Recovery Park for Multi-Materials

Many transfer stations and recycling centers are designed to ensure that self-haul customers separate their recyclable and compostable materials appropriately.

The El Cerrito Recycling Center, which has been operated by the City of El Cerrito, California for over 40 years, was rebuilt in 2012 to enhance the user experience and expand the number of materials accepted for reuse and recycling. El Cerrito targets all traditional recyclables in addition to hard-to-recycle items such as plate glass, expanded polystyrene, and other rigid plastics. The queuing area (see Figure 2) is a roundabout with bins and bunkers for reusable



Figure 2. El Cerrito Recycling Center Queuing Area

and recyclable materials placed on the outside of the circle. Self-haul customers back in to marked parking spaces and then unload materials into the appropriate bins. A separate area for materials exchange and donation is located in front of the roundabout. Approximately 300 to 500 customers visit the El Cerrito Recycling Center per day and the facility is open seven days per week for the convenience of the customers. Two to three staff members assist customers in unloading and processing collected materials.

→ *See the El Cerrito Recycling Center profile (#12)*

The Salisbury-Sharon Transfer Station in Salisbury, Connecticut is also designed to ensure that customers separate materials appropriately. Self-haul customers pay an annual fee to drop off recyclable materials and trash at the transfer station. Customers unload materials and place them into the bins or bunkers dedicated to mixed paper, commingled containers, scrap metal, electronics, leaves and Christmas trees, clothing and shoes, and municipal solid waste. There is separate Swap Shop area for reusable items, such as books, toys and household goods. The transfer stations maintains a very high, nearly 42 percent diversion rate. There are four staff members dedicated to the transfer station.

→ *See the Salisbury - Sharon Transfer Station Facility profile (#18)*

In San Francisco and the City of Tacoma, residents and businesses can bring source-separated block polystyrene foam Styrofoam® to the transfer station for recycling. Recology (in San Francisco) and the City (in Tacoma) operate a special densifier that condenses loose pieces of Styrofoam into ingots, which are recycled and sold to the base boards and moldings market.

Self-Haulers Separate after Fee Gate

An emerging trend in design at transfer stations is to conduct all separation and processing after the fee gate. This allows transfer station staff to monitor and assist in appropriate sorting of materials and provides a more stable funding mechanism as facilities transition to higher diversion rates.

All self-haul customers at the Cold Canyon Resource Recovery Park are directed to bunkers for separating materials, including metal, yard trimmings and C&D (see Figure 3). Staff assist customers in directing them to separate materials appropriately. Customers pay a \$25 per vehicle fee, eliminating the need for inbound and outbound scales, for using the Resource Recovery Park and separating their materials. Customers wishing to by-pass the separation area and dump mixed loads must pay a Facility Use Fee (an extra \$20). As a result, 97 percent of self-haul customers separate their materials. One staff member is dedicated to the Resource Recovery Park area.

→ *See the Cold Canyon Resource Recovery Park profile (#10)*



Figure 3. Cold Canyon Resource Recovery Park Separation Area

Yard Waste

Most organizations researched accept yard waste for recycling at transfer stations - largely in separate containers or areas of the facility segregated from MSW - although some only accept it seasonally (generally April through October).

Bicycles

None of the regional or national facilities researched reported special collection for bicycles—they are typically accepted as metal for recycling.

Tires

The Southern Idaho Solid Waste (SISW) system diverts and recycles tires, scrap metal, and clean wood at its transfer stations in bunkers.

The Province of Ontario has an established tire stewardship program. A disposal fee was charged when tires were replaced, but was abandoned due to a problem with orphan tires. Since 2008, the Province has moved to an advanced disposal fee at the time of purchase. Up to four tires can be dropped off at Provincial transfer stations for “free.”

The City of Tacoma accepts tires at their transfer station, also in bunkers (see Figure 4).



Figure 4. Tacoma Transfer Station Tire Bunker

Appliances

Certain appliances (i.e., washers, dryers, stoves, ranges, dishwashers, microwaves, and hot water tanks) are widely accepted for recycling at transfer stations across the country. Appliances that are regulated under the Clean Air Act, which contain chlorofluorocarbons (CFCs) (i.e., refrigerators, freezers, air conditioners, heat pumps and dehumidifiers), may or may not be accepted for recycling at transfer stations. These appliances are often the focus of energy conservation programs that offer incentives and rebates for new energy-efficient appliances, with pickup and recycling of older CFC-containing appliances part of the package, usually by private recyclers. Fees usually apply when handled at transfer stations, whereas there are no or low fees associated with appliance exchanges.

Electronics

The Clinton County (PA) Solid Waste Authority (Authority) implemented an electronics drop-off program in 2006. The County has approximately 40,000 residents and, upon request, businesses can participate in the program. The Authority recycled about 60 tons of electronics in 2008. This equates to approximately (12) 100 cubic yard trailers. The Authority fits 18 to 22 gaylord boxes per trailer. The Authority estimates they spend about 5 hours per week on handling and loading electronics.

Dauphin County, Pennsylvania implemented an electronics recycling program allowing residents to drop-off electronics at the Recycling Center on specified days and times. Electronics are unloaded from vehicles by residents with assistance from County staff as needed into gaylord boxes. The County added a rack system inside the Recycling Center so that gaylords on skids could be stored/stacked prior to being loaded onto a trailer that is staged at one of the Recycling Center loading docks. Electronics from businesses are accepted on a limited basis, for a fee, to ensure the volume of material can be operationally and economically feasible to handle.

Textiles

Some examples of variations in the types of textile recycling services being utilized regionally include:

- In 2005, Patagonia launched its Common Threads Garment Recycling Program, through which customers could return their worn out Capilene® long underwear to the company for recycling. In 2007, Patagonia expanded the list of recyclable garments acceptable. The program collects only certain Patagonia products or types of clothing made from polyester and nylon 6, and that come with a Common Threads label (Patagonia 2009). Patagonia works with Teijin, a Japanese textile company, and Toray, a chemical manufacturer (Patagonia 2009b).
- Other clothing recycling programs within the retail fashion industry mimic Patagonia's program, and include Levi's partnership with Goodwill's "Donate Movement," the GAP's "Recycle Your Blues" program to recycle unwanted denim products, and Nike's "Reuse Your Shoes," among others.
- France instituted an extended producer responsibility for textiles. All organizations that sell new clothing, shoes, or household linens into the French consumer market pay a contribution to fund EcoTLC. EcoTLC is responsible for marketing recycling programs and to support the collectors and sorters of textiles.

Summary of Best Practices by Material Type

Based on these national models, the best strategies for diverting self-haul materials by material type are:

- C&D materials - dedicated self-haul sort line separate from the commercial C&D sort line
- Bulky items - drop off areas for specific materials and/or floor-sort using staff to assist in unloading and proper placement of materials
- Traditional recyclable and compostable materials - resource recovery park for multiple materials and/or requiring separation of materials after the fee gate

Specific Recyclable Materials

The table on the following page lists the specific materials targeted at each of the high diversion transfer stations.

Table 1. Specific Self-Haul Materials Targeted at High Diversion Transfer Stations

Material	Berkeley	CHaRM	Cold Canyon	Davis Street	El Cerrito	Salisbury - Sharon	SF Recycling	Metro Central
Appliances (large)	✓		✓	✓			✓	✓
Appliances (small)		✓			✓	✓		✓
Batteries					✓	✓	✓	✓
Bicycles (as scrap metal)	✓	✓	✓	✓	✓	✓	✓	✓
Books and magazines	✓	✓			✓			✓
Building materials	✓				✓	✓	✓	
Cardboard	✓	✓	✓	✓	✓	✓	✓	✓
Carpet				✓	✓		✓	
Cartons / aseptic packaging					✓			
Clothing	✓	✓		✓	✓	✓		
Container glass		✓	✓		✓	✓		✓
Electronic scrap	✓	✓		✓	✓	✓	✓	✓
Expanded polystyrene		✓			✓			
Film plastics		✓		✓	✓			✓
Fines							✓	
Hazardous waste							✓	
Inerts						✓	✓	
Mattresses	✓			✓			✓	
Metals	✓	✓	✓	✓	✓	✓	✓	
Motor oil				✓	✓		✓	✓
Paper		✓	✓	✓	✓	✓		✓
Pharmaceuticals and sharps					✓		✓	
Plate glass					✓			
Reusable items	✓			✓	✓	✓	✓	
Rigid plastic		✓	✓	✓	✓		✓	✓
Universal waste					✓		✓	
Wood	✓			✓	✓	✓	✓	✓
Yard trimmings			✓	✓		✓	✓	✓
Yoga mats		✓						

Best Practices by Program Area

In addition to targeting materials with high diversion potential, specific strategies are also used to enhance diversion of materials in the following areas:

- Recycling policies and programs
- Rate structure and fees
- Facility and site layouts
- Operations
- Equipment and Staffing

Recycling Policies and Programs

There are a limited number of recycling policies and programs that directly influence transfer stations only; many are system-wide policies. Trips to the transfer station are undertaken when excess materials are generated or to deliver bulky items or other hard to recycle materials. The following recycling policies and programs can contribute to maximizing recovery of materials at transfer stations.

Tipping Fee Surcharges

Operators of the Davis Street Transfer Station report that they are highly motivated to divert materials at the transfer station because of tipping fee surcharges placed on every ton of solid waste disposed at landfills in Alameda County, California. Local and state fees amount to about \$18.95 per ton on municipal waste placed in Alameda County landfills¹ These surcharges, levied by Alameda County government, create enough of an economic incentive to the operator to make it cost-effective to process the materials through the public area MRF prior to disposal. Approximately 60 percent of self-haul materials delivered to Davis Street are diverted from disposal.

➔ *See the Davis Street Transfer Station Facility profile (#11)*

Disposal Bans

Many communities ban specific materials from disposal, which places inherent burdens on disposal and transfer facilities. Forty-seven states nationwide have some level of disposal bans, including many hazardous materials.² Some states also ban highly recoverable materials from disposal, such as paper, plastics, metal, and yard trimmings. Since 2008, yard trimmings have been banned from disposal in Alameda County. Thus, all yard trimmings are diverted from disposal at the Berkeley Transfer Station and at Davis Street. Self-haul customers delivering loads of yard trimmings mixed with trash must pay a 50 percent surcharge. These loads are then processed for recovery.

¹ Alameda County Waste Management Authority, Long Term Revenue Memo, August 19, 2009, page 2. http://www.stopwaste.org/docs/long_term_revenue_memo.pdf

² Disposal Bans & Mandatory Recycling in the United States, The Northeast Recycling Council, Inc., June 24, 2011, page 1. http://www.nerc.org/documents/disposal_bans_mandatory_recycling_united_states.pdf

- See the Berkeley Transfer Station Facility profile (#4)
- See the Davis Street Transfer Station Facility profile (#11)

Mandatory Recycling Laws

Connecticut has a mandatory recycling law which requires the recycling of 11 designated items, including paper, plastics, metal, and yard trimmings. Although not technically a “ban”, these designated items must be recycled and cannot be disposed. The Salisbury - Sharon Transfer Station provides recycling opportunities for all of the designated items that cannot be disposed in landfills in Connecticut.

- See the Salisbury - Sharon Transfer Station Facility profile (#18)

Seattle, Pittsburgh, and San Diego, among others, are communities that have similar recycling mandates. Some communities also require builders and contractors to recycle their C&D materials. For example, all mixed C&D waste generated in the City of Los Angeles must be taken to a certified C&D processor.³ Applicants for building permits must contract with a permitted C&D hauler or apply for a C&D hauling permit if they wish to self-haul their C&D materials.

Mandatory Separation at Transfer Stations

Self-haul customers can also be required to separate their materials. At the Ben Lomond Transfer Station and Buena Vista Landfill in Santa Cruz County, separation of recyclable materials is mandatory. Trash loads must contain no more than 5 percent of recyclable materials. Mixed loads are not accepted and customers must separate their materials prior to disposing of trash.⁴ Santa Cruz County code does not specify how enforcement is applied at the disposal facilities.

Portland Metro’s contract with transfer station operators requires material diversion and recovery.

Rate Structures and Fees

Using differential tip fees has become common practice, as it is in King County, as an incentive for keeping various waste types separate, and with the objective of encouraging recycling participation and/or increasing transfer station or MRF operational efficiency. Offering differential tip fees can encourage self-haulers to separate specific materials or recyclables.

Free Drop-Off

Some communities sponsor free drop-off centers for reusable and recyclable materials. The City of El Cerrito Recycling Center is regional destination free to all customers and paid for

³ City of Los Angeles C&D ordinance, http://www.lacitysan.org/solid_resources/recycling/c&d.htm

⁴ Santa Cruz County mandatory separation ordinance, http://www.dpw.co.santa-cruz.ca.us/www.santacruzcountyrecycles/Landfill_Ban/index.html

through the City's collection rates. The cost of staffing and maintaining the recyclable center amounts to approximately \$4 per household per month.

→ See the El Cerrito Recycling Center profile (#12)

Per Vehicle Fees

To ensure a more sustainable cost structure, many transfer stations charge a per vehicle fee for dropping off reusable or recyclable materials. The CHaRM in Boulder charges a \$3 facility fee for every vehicle visiting CHaRM. The Ben Lomond Transfer Station and the Buena Vista Landfill in Santa Cruz County charge \$2 per vehicle for use of the recycling drop-off area.

→ See the Center for Hard to Recycle Materials (CHaRM) Facility profile (#6)

Material-Specific Fees

In addition, most transfer stations charge differential rates for different material types. Listed below are the material-specific fees at several of the transfer stations surveyed for this memorandum.

Table 2. Material-Specific Fees at Transfer Stations

Material	Berkeley	Cold Canyon	Davis Street	Salisbury-Sharon	SF Disposal
Trash	\$126 ton \$29 minimum	\$70 ton \$25 minimum	\$121.43 ton \$30.62 cubic yard	\$70 per vehicle per year – recycling is mandatory	\$140.76 ton \$25 minimum
Trash mixed with yard trimmings	\$189 ton \$43.50 minimum		\$182.14 ton \$45.93 cubic yard		
Mixed C&D	\$126 ton \$29 minimum		\$121.43 ton \$30.62 cubic yard	\$50 cubic yard \$5 minimum	\$140.76 ton \$25 minimum
Clean wood	\$67 ton \$23 minimum	\$30 ton	\$60 ton \$26 cubic yard	\$50 cubic yard \$5 minimum	
Yard trimmings	\$67 ton \$23 minimum	\$30 ton	\$60 ton \$26 cubic yard		
Dirt & concrete		\$20 ton	\$105 ton \$55 cubic yard		\$140.76 ton \$25 minimum
Carpet			\$7.50 each	\$25 cubic yard \$5 minimum	
Appliances	\$43 each refrigerator Other appliances free at adjacent Berkeley Recycling Center	\$15 each	\$35 each	\$25 each refrigerator \$10 each other appliances	\$40 each refrigerator
Tires	\$10 each passenger tire \$15 each truck tire	\$5.50 each	\$15 each passenger tire \$29 each truck tire	\$5 each passenger tire	\$8-10 each passenger tire \$20-25 each truck tire
Electronics	\$9 each TV or monitor (first two are free)	Free	\$12.18 each (no screen) Free with screen		Free

Material	Berkeley	Cold Canyon	Davis Street	Salisbury-Sharon	SF Disposal
Mattresses & box springs	\$14 each	\$7.50 each	\$21.70 each	\$15 each	\$10 each
Cardboard, newspaper, mixed office paper, mixed res. paper, aluminum cans, glass bottles & jars, plastic bottles & jugs, scrap steel & aluminum	Buyback at adjacent Berkeley Recycling Center	Free	Free	\$70 per vehicle per year – recycling is mandatory	
Foam carpet pad			Free		
Motor oil	Pays \$0.16 per gallon		Free for residents		
Paint				\$1 per quart \$2 per gallon	
Asphalt shingles				\$110 cubic yard. \$10 min.	
Facility use fee for unsorted loads		\$25			

Facility Use Fee

Self-haul customers can be encouraged to separate materials for recycling by charging differential rates for mixed loads.

Customers at the Cold Canyon Resource Recovery Park pay a \$25 per vehicle fee for using the Resource Recovery Park and separating their materials. Customers wishing to by-pass the separation area and dump mixed loads must pay a Facility Use Fee (an extra \$20). As a result, 97 percent of self-haul customers separate their materials.

➔ *See the Cold Canyon Resource Recovery Park profile (#10)*

Facility and Site Layouts

Facility and site layouts can have an impact on the diversion programs at transfer stations.

Flat Floors

Older generation transfer stations were designed as simple direct dump operations, using a receiving pit into which customers disposed of all waste. These types of stations are generally small and cannot be easily reconfigured or expanded to make operation changes.

Most current transfer stations are constructed and operated with a flat floor across the entire building. The reason for the shift towards flat floors is most transfer station owners prefer a flat floor to a grade separated floor. Following are the key advantageous features a flat tipping floor provides to owners:

- More operational flexibility,
- Better waste screening and sorting capability,
- Easier cleaning of the tipping floor,
- More overall flexibility for waste pile management and expansion for future operations,
- Increased mobility of recyclables, waste, and staff between the recycling areas and waste tipping floor, and
- Faster unloading for self-haul customers (not lifting over a wall or cable) resulting in less time onsite.

Operational changes at an existing transfer station with a flat, flexible floor design may enable the owner “to more highly utilize existing infrastructure and staff. For instance, source separation is effective in diverting certain waste stream portions, including C&D, green waste and food waste. When these materials are received at transfer stations, segregating and staging them require tipping floor space that may already exist and the existing loading equipment, staff and infrastructure can be utilized to transfer them to recyclers or to energy conversion facilities.”⁵ As an example, the new flat floor Tacoma Recycling and Transfer Station was designed to allow for staff to screen self-haul loads and direct those with recyclables to an area that allows for floor sorting of these materials. In addition, this new station can modify operations to allow space for a future mixed waste processing line to increase diversion.

Some older transfer stations, including the Berkeley Transfer Station, the Davis Street Transfer Station, and SF Recycling & Disposal were originally designed for efficient direct transfer of trash and have needed to be redesigned and redeveloped to enhance recovery programs.

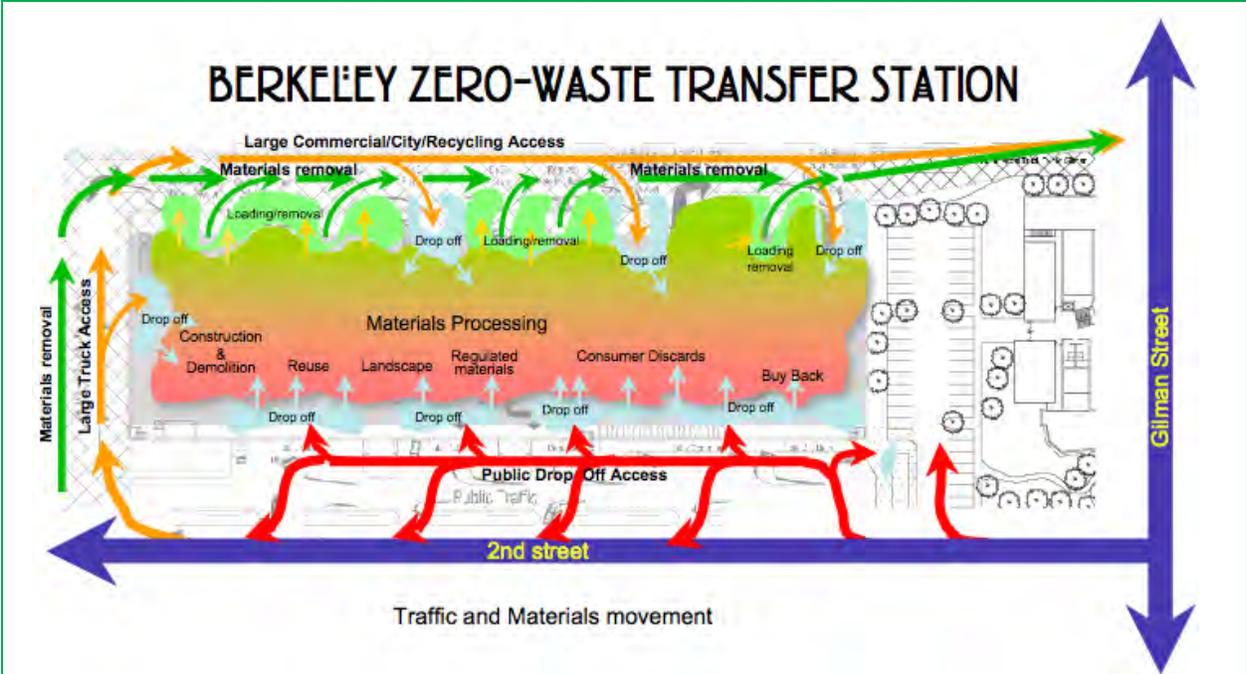
For example, the Davis Street Transfer Station was originally designed with a large outdoor pit for self-haul disposal. Self-haul customers unloaded all materials into the pit and loader operators pushed the materials into the transfer station building for transfer to a remote landfill. In 2008, Waste Management filled in the pit for self-haul materials creating a flat floor area for processing. New processing stations for self-haul materials were developed and the C&D recovery operation was expanded. Thus, no self-haul materials or commercial C&D materials are transferred to the landfill without first being processed for recovery. Davis Street is being redeveloped in stages to add new recovery programs, including an enhanced drop-off area for reusable and recyclable materials and a new organics processing building.

➔ *See the Davis Street Transfer Station Facility profile (#11)*

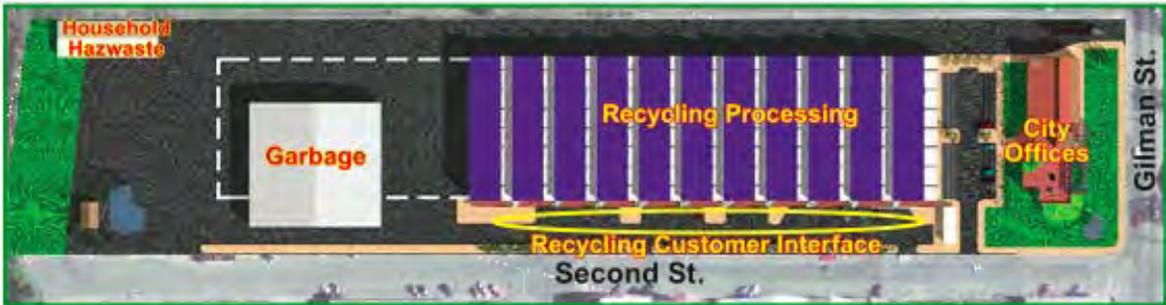
⁵ Miller, J., Drennen, and D. Clark, S., Planning and Designing Transfer Station and Materials Recovery Facilities to Support Zero Waste Initiatives, 2012

Similarly, the Berkeley Transfer Station was designed to feed into a mass burn incinerator, which was never built. However, the transfer station was designed with a flat floor that allows transfer station staff and staff from Urban Ore to recover materials for reuse and recycling from self-haul customers. Improvements to the facility complex have been made over time, including the expansion of the adjacent Berkeley Recycling Center and the relocation of the Urban Ore Eco-Park across town. The City of Berkeley has studied options for improving recovery at the transfer station (See Figure 5), including demolishing the existing transfer station building and developing a resource recovery park on the site. Since space is limited at the transfer station, C&D materials are not processed on site, but are transferred to a remote C&D facility. This double handling of C&D materials is inefficient and expensive, but is currently the only option available to the City until the transfer station is redeveloped.

→ *See the Berkeley Transfer Station Facility profile (#4)*



What Could Be



What Is Today



Figure 5. Conceptual Design for Berkeley Transfer Station

Recology has modified and expanded SF Recycling & Disposal many times over the past 50 years of its existence. As new processing capacity was required for new diversion programs, some processing, fleet maintenance, and parking functions were moved to other areas of the City.



Figure 6. Conceptual Design for San Francisco Zero Waste Facility

Recology has expanded processing on-site, including relocating the Public Area Disposal and Recycling site indoors in an old warehouse on the site. Recology also built a commercial C&D materials recovery facility on-site. Because of limited space at the site, the recyclables processing facility was developed at a remote location. Recology and the City of San Francisco are currently planning to redevelop and expand the site to bring all recycling, C&D, organics and self-haul processing on-site (see Figure 6). The new Zero Waste Facility will include three new processing buildings for organics, recyclables and mixed materials.

➔ See the *San Francisco Disposal & Recycling Facility profile (#19)*

Queuing

The optimal designs for transfer stations provide for efficient queuing of vehicles. This allows both self-haul customers and transfer station staff an appropriate amount of time and space to accurately sort materials for recovery. Transfer station design elements that provide for efficient queuing include:

- Roundabouts

- Inbound and Outbound Scales
- Separation of Self-Haul Vehicles and Commercial Vehicles

Roundabout

Roundabouts are preferred by transfer station designers seeking to maximize the number of materials separated for reuse and recycling. The El Cerrito Recycling Center uses a roundabout for self-haul vehicles (see Figure 7). Customers back into the parking spaces and then deliver materials to the appropriate bins for recycling.



Figure 7. Roundabout at El Cerrito Recycling Center

➔ See the *El Cerrito Recycling Center profile (#12)*

Inbound and Outbound Scales

SF Recycling & Disposal uses both inbound and outbound scales to keep traffic moving and avoid long lines of vehicles. Self-haul customers enter the transfer station and their vehicles are weighed. They drive in to the Public Disposal and Recycling Area building, unload their materials, and exit through a second outbound scale. This method requires extra scale house staffing, however, Recology believes that it keeps traffic moving more smoothly.

➔ See the *San Francisco Disposal & Recycling Facility profile (#19)*

Separation of Self-Haul Vehicles from Commercial Vehicles

Most transfer stations keep self-haul traffic and queuing separate from commercial vehicle queuing. At Davis Street (see Figure 8), commercial route trucks unload trash at the transfer building and unload residential recyclables at the single-stream materials recovery facility. These areas are off-limits to self-haul vehicles.

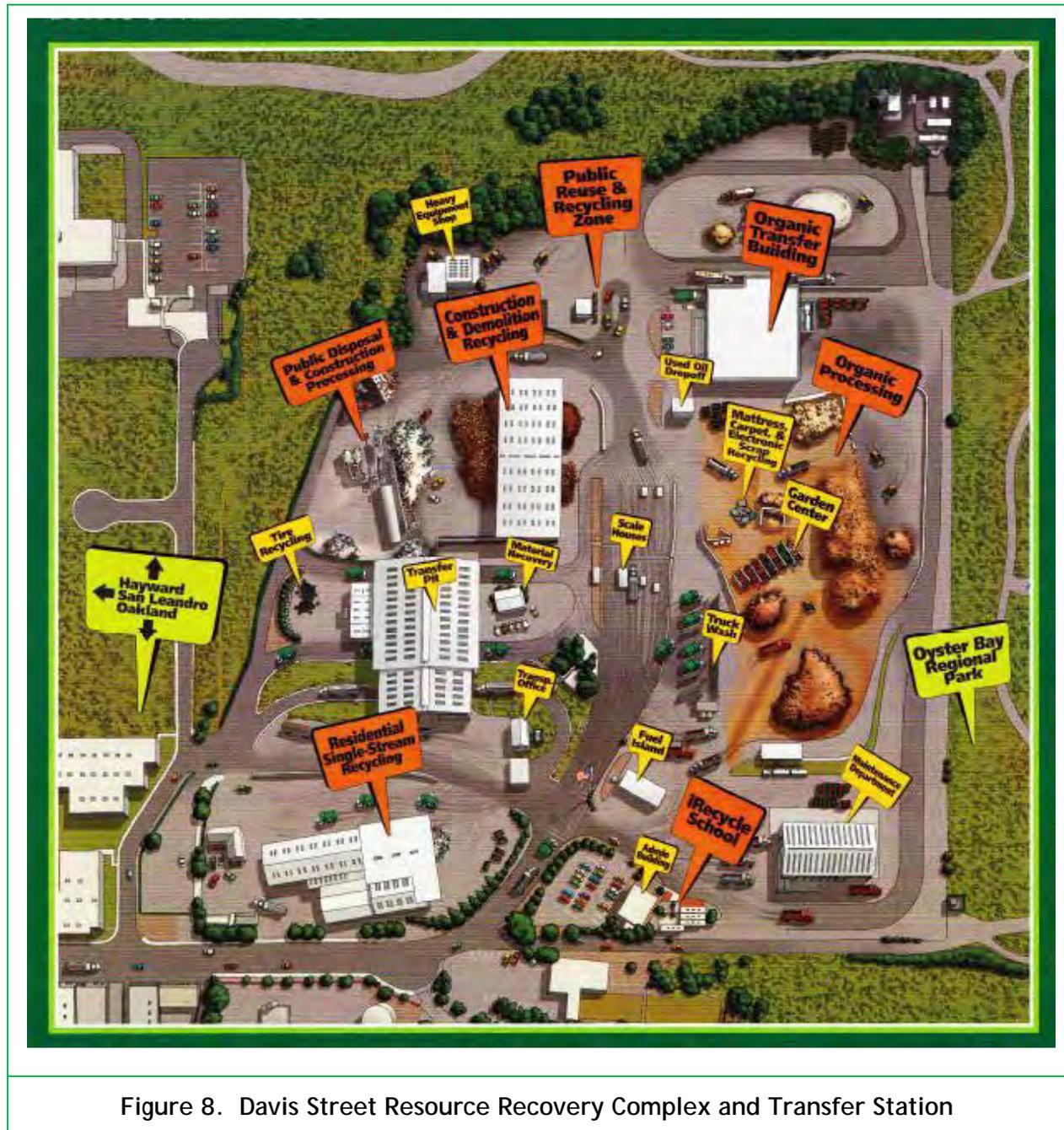


Figure 8. Davis Street Resource Recovery Complex and Transfer Station

Self-haul vehicles deliver materials to different areas of the facility through a modified roundabout. Areas are designated for organics, mattresses, used oil, public reuse & recycling

zone, public disposal processing. Transfer station staff direct self-haul customers to the appropriate areas for unloading materials.

→ See the *Davis Street Transfer Station Facility profile (#11)*

Self-haul traffic and queuing is also separated from commercial queuing at the Berkeley Transfer Station and SF Recycling & Disposal.

Operations

Operations that enhance diversion of self-haul materials at transfer stations include:

- Scale House Management
- Spotters and Helpers
- Location of Materials
- Material Handling
- Separation and Loading

Scale House Management

At most transfer stations, the scale house or fee gate operator is the primary staff member who interacts with the customers and directs them to the appropriate areas for unloading materials. The fee gate operator has many tasks to undertake to ensure efficient operations, including: weighing and recording vehicles, handling cash and recording charges, instructing customers on procedures, and evaluating loads for proper separation and potentially unacceptable materials. The fee gate operator must make the determination about whether a load is too contaminated for diversion. The operator must also instruct customers on proper management of loads and direct customers to the appropriate areas for unloading. At large facilities, a good scale house manager is essential to keeping employees motivated and efficient. Waste Management attributes part of the success of their operation at Davis Street to the scale house manager who has a coach's temperament and a good relationship with his team.

Spotters and Helpers

The diversion programs at the Berkeley Transfer Station and SF Recycling & Disposal rely exclusively on spotters and helpers to divert materials for recovery. All self-haul customers bring materials to a central location for unloading. There is minimal active separation undertaken by the customers. The spotters and helpers assist in unloading the vehicles and diverting the materials to the proper bins or bunkers. At the Berkeley Transfer Station, City staff divert recyclable materials, including cardboard and metals and Urban Ore staff divert reusable and resalable items. At SF Recycling & Disposal, Recology staff assist customers in unloading and placing materials in the appropriate locations for recycling and reuse.

At the Cold Canyon Resource Recovery Park and the El Cerrito Recycling Center, spotters and helpers direct self-haul customers to the appropriate bins or bunkers for unloading materials. At these facilities, the spotters and helpers are not actively separating the materials, but directing customers to sort properly.

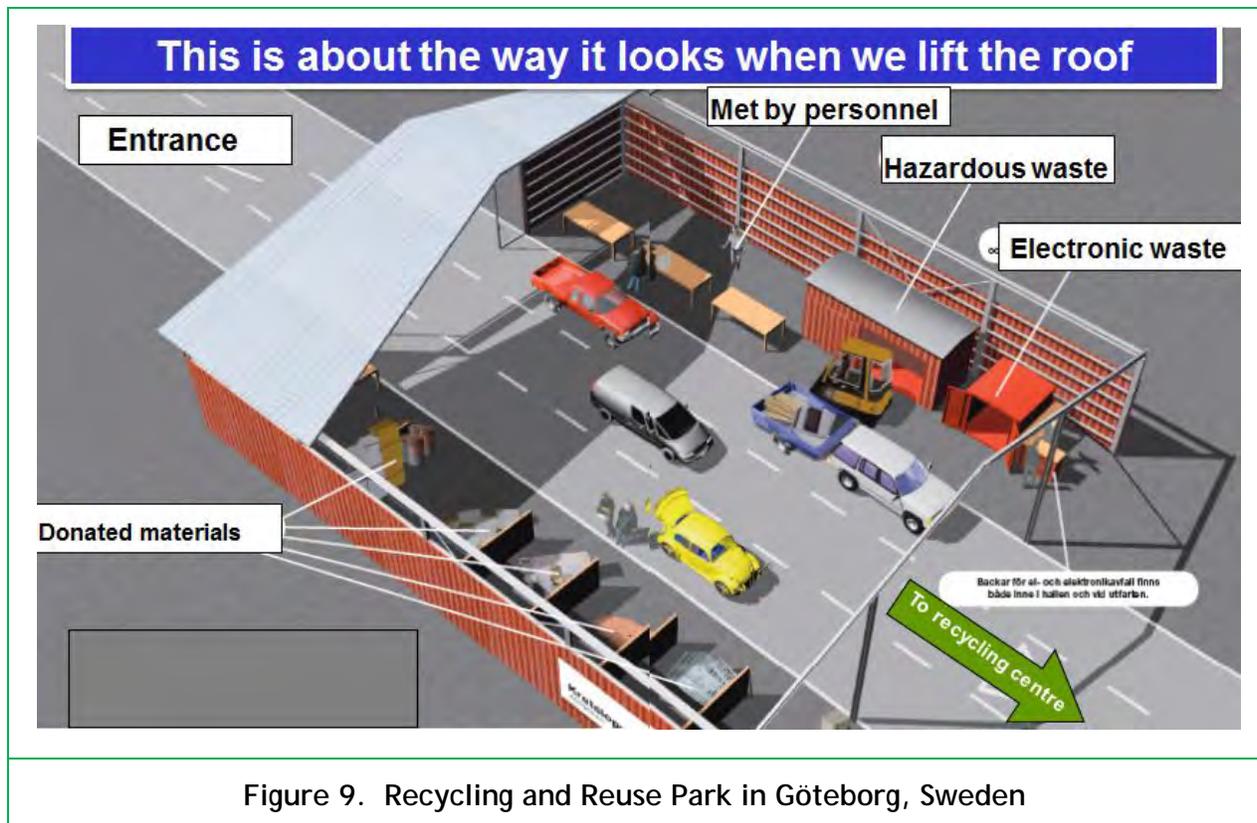


Figure 9. Recycling and Reuse Park in Göteborg, Sweden

Kretsloppsparken Återbruket, the “Recycling and Reuse Park” in Göteborg, Sweden has been designed to enhance the customer experience while maximizing reuse and recycling. “Personal sorters,” or personal shoppers in reverse, unload materials from vehicles and place them in the appropriate bins or bunkers for reuse. The facility includes a retail thrift store, building materials yard, reuse and recycling center, and a café. In designing the Recycling and Reuse Park, the Göteborg City Council wanted to create a destination the community, an amusement park for recyclers and reusers. The facility hosts concerts and festivals and has clowns and dog trainers (with dogs trained to sort materials) on staff.

➔ See the *Alelyckan Re-use Park, Göteborg Sweden Facility profile (#1)*

At the Hampton/Scotland Transfer Station in Connecticut, site/facility personnel are there to provide assistance by answering questions, to monitor the separation of trash and recyclables, and to reject any type of waste/loads that do not comply with state and/or town policy/regulation.

Location of Materials

It is important that the areas designated for reuse and recycling are located conveniently or more conveniently than the area for trash disposal. At many transfer stations, the trash disposal area is the prominent, default location for depositing materials and customers need to hunt around to find the proper location for sorting for reuse and recycling.

At the Cold Canyon Resource Recovery Park and the Salisbury - Sharon Transfer Station, customers enter the facility and are directed to the separation area where they are required to separate materials appropriately prior to depositing unrecyclable trash in designated locations.

Material Handling

At most of the model facilities, reusable or recyclable materials are placed in bins or bunkers or loaded on-to containers for shipping. Since most recoverable materials delivered to transfer stations by self-haul customers are bulky (wood, metals, rigid plastics, yard trimmings, furniture) densifying, compacting and baling are not common or necessary practices for handling the materials. In most cases, materials are aggregated in roll-off bins and shipped directly to markets. At some facilities, wood and yard trimmings may be compacted or chipped prior to loading onto transfer trucks.

At facilities where recyclables processing facilities are co-located with self-haul transfer stations, the operators may process the materials prior to shipping. The El Cerrito Recycling Center and the Boulder CHaRM both have balers for paper, film plastic and textiles and densifiers or grinders for expanded polystyrene.

Separation and Loading

Davis Street, SF Recycling & Disposal, and Portland Metro Central Transfer Station have dedicated sort lines for self-haul materials. These facilities are able to divert 50 to 70 percent of self-haul materials, including cardboard, wood, metal, plastics, sheetrock, inerts, fines using the sort lines. Loader operators move the materials onto the sort lines.

Most of the facilities use forklifts for moving bales materials onto shipping containers or moving bins around the facility for proper placement near drop-off areas.

- ➔ *See the Berkeley Transfer Station Facility profile (#4)*
- ➔ *See the Cold Canyon Resource Recovery Park profile (#10)*
- ➔ *See the Salisbury - Sharon Transfer Station Facility profile (#18)*
- ➔ *See the Davis Street Transfer Station Facility profile (#11)*
- ➔ *See the San Francisco Disposal & Recycling Facility profile (#19)*
- ➔ *See the Portland Metro South Station Facility profile (#16)*

Equipment and Staffing

The table on the following lists the equipment and staffing used at each of the high diversion transfer stations for managing self-haul materials.

Table 3. Equipment and Staffing Levels for Targeted Materials at High Diversion Facilities

	Berkeley	CHaRM	Cold Canyon	Davis Street	El Cerrito	Salisbury - Sharon	SF Recycling	Metro Central
Facility								
Population Served	114,000	98,000	275,000	1,500,000	24,000	6,800	812,000	593,000
Households	50,000	41,000	100,000	540,000	11,000	3,000	375,000	247,000
Annual Capacity (Tons)	200,000	500	150,000	3,500,000	6,000	10,000	1,800,000	640,000
Equipment								
Containers	Bins, roll-off boxes	7 roll-off boxes, 5 semi-trailers	Bunkers and bins	Cubic yard dumpsters, roll-off containers, electronic scrap boxes	30 3 to 7 cubic yard bins and 40 cubic yard roll-off boxes	Drop-off bins, boxes and bunkers	Bunkers, bins and roll-off containers	Drop-off bins, carts and bunkers
Sorting				Sorting line			Conveyor and sort line	Conveyor and sort line
Compaction		2 down-stroke balers, grinder / densifier			1 horizontal baler, densifier			
Rolling Stock	Box Truck	Fork Lifts		Loader	3 Fork Lifts		Loader	Loader and Excavator
Staffing								
Manager		0.75			0.5	1		
Drive up window		1.2						
Sorters		3 Processing Crew		24			10 - 12	
Spotters / Helpers	2		1	1.5	1 - 2	1 - 2	4	
Reuse Staff	3			1.5				
Loader Operator				2			1	

¹Based on Full-Time Equivalent staff.

Sorting Equipment

The following table shows additional detail on the fixed sort line equipment used for targeted materials at those high diversion facilities using sorting systems.

Table 4. Equipment and Process for Sorting Targeted Materials

Facility	Sort Line	Equipment Used	Sorting Methods
Davis Street	Single Stream (plastics, glass, aluminum, metals, paper, cardboard)	Conveyor belts, magnets, triple deck disk screen optical sorters Eddy current separator blowers baler.	Variable speed belt, manual sorting in combination with equipment. Two shifts 30-40 tons per hour
	Dry Waste/Construction & Demolition Debris (Commercial fiber, cardboard, dry waste, clean wood, metals, concrete)	Excavator/grapple Conveyor belts, large shaker screens (8" minus) magnets, star screen (2" minus) wood grinder (clean wood)	Variable speed belt, manual sorting in combination with equipment. 350 tons per day
	Public Area (Self Haul) Construction & Demolition Debris	Excavator/grapple Conveyor belts, large shaker screens (8" minus) magnets, star screen (2" minus) wood grinder (clean wood)	Variable speed belt, manual sorting in combination with equipment. 350 tons per day
SF Recycling	Single Stream (Pier 96)	Conveyor belts, inclined and multi-deck disk screens magnets, Eddy current separator optical sorters blowers baler.	Manual sorting in combination with equipment.
	Construction & Demolition Debris (i-MRF) (Wood, metal, concrete, gypsum drywall, cardboard)	Loader Conveyor belts, shaker screens.	Manual sorting in combination with equipment.
Portland Metro Central	Dry Waste/Construction & Demolition Debris	Excavator/grapple Conveyor belts,	Manual sorting off conveyor belt

In addition to fixed sort lines as described above, mobile sort lines are also used to provide sorting capability for lower volumes or where space constraints necessitate multiple uses of floor area at different times.

Mobile elevated sort lines can be moved into facilities for processing of recyclables, and often consist of an 8-station mobile unit mounted on a semi trailer, with an integrated feed conveyor and cross belt magnet capable of attracting and sorting small pieces of ferrous and

recyclable metals. The units are capable of processing as little as 15 tons per day and up to 150 tons per day depending on the feed material.

Once on the sort-line conveyer, “pickers” or sort-line employees manually toss commodities into 3-4’ steel bins located under the stations of the sort line. The number of pickers employed on the sort line at any given time will vary in response to the quantities of recyclables being processed.

Depending on unit scale (i.e., size of conveyor belt, motor, magnet) and sturdiness, these sort lines are capable of handling “traditional” commodities (i.e., aluminum, HDPE and PET containers, and cardboard) as well as self-haul and C&D materials. Once sorted, the commodities are suitable for additional handling or marketing.

Summary of Best Practices by Program Area

Based on these national models, the best strategies for diverting self-haul materials by program area are:

- Requiring customers to separate materials for diversion
- Placing the reuse and recycling areas after the fee gate and charging extra for customers who refuse to separate
- Designating areas or stations for unloading specific materials
- Making recycling as convenient or more convenient than wasting
- Using spotters or helpers to assist customers in unloading and separating materials
- Targeting all reusable and recyclable materials for diversion

System-Wide Innovations

Beyond specific strategies for targeted materials received at transfer stations and for enhancements in transfer station program areas, a number of facility approaches that rely on system-wide innovations are emerging as key drivers for diversion of materials:

- Mixed Waste Processing
- Wet/Dry Facilities
- Conversion Technologies
- Recycling Technologies
- Resource Recovery Parks

In these approaches, transfer stations are simply the conduit to desired end-uses, including disposal, waste conversion, re-manufacturing, composting, reuse, etc. A key differentiator in these systems is the level of sorting to be accomplished, which in turn drives a variety of collection schemes.

Mixed Waste MRFs

The effort to develop mixed waste MRFs, previously known as “dirty” MRFs, has seen a resurgence in the last 5-10 years due to high energy costs, aggressive waste diversion goals, favorable commodity values, rising tip fees, and technological advancements in separation equipment. While in the past, mixed waste MRFs recovered between 5% and 45% of the incoming material as recyclables with the remainder disposed, some newer mixed waste MRFs report achieving waste diversion rates of 25-75%. MRFs achieving higher waste diversion rates are recovering a significant percentage of materials in the form of biodegradable material that is sent for composting. (Pinellas 2009)

The EDCO Recovery and Transfer Station, in the Barrio Logan neighborhood of San Diego is operated by EDCO Disposal Corporation, has modified and expanded the facility to handle 1,500 tons per day of mixed waste and documented loads of mixed C&D debris for transfer to a certified mixed C&D processing facility under the City of San Diego’s C&D Ordinance.

- The facility handles waste from Coronado, La Mesa, National City, Lemon Grove, Chula Vista, and portions of the City of San Diego’s commercial waste stream.
- Site Capacity: 1,500 tons per day
- Facility Size: 1.6 acres
- Operating Area Size: 1.6 acres
- Incoming Waste Material: 1,506 Passenger Car Equivalent Vehicles (PCEV) per day (total in/out combined)

The Ramona MRF and Transfer Station, located in Ramona, California, is primarily a mixed waste transfer station. This facility hosts a public buy-back center. Loads high in recyclable content are floor sorted for recyclables. This facility also accepts documented loads of mixed C&D debris for transfer to a certified mixed C&D processing facility under the City of San Diego’s C&D Ordinance. It is not located in the City of San Diego, but serves commercial waste generators in the City. The facility diverts an estimated 5% of the total throughput.

- Daily Peak Loading: 700 tons per day
- Annual Loading: 218,400 tons
- Facility Size: 9,300 square feet
- Operating Area Size: square feet

Some communities are constructing hybrid mixed waste MRF/transfer stations in which loads rich in recyclables are directed to the MRF. Others are sending the entire target sector’s waste through the MRF. While some argue this lacks an important public education element because action is no longer required on the part of the waste generator, it provides another avenue to divert additional recyclables from disposal. (Pinellas 2009)

The Sunnyvale, California SMaRT Station includes a mixed waste MRF, a dual stream processing line used for residential recyclables, a transfer station, a yard waste grinding

operation, and a citizen drop-off. At the Puente Hills, California MRF site - located at a landfill site and encompassing a transfer station - only loads identified as being rich in recyclables are sent through the processing line. Here multi-family and commercial loads are targeted.

Many of these facilities divert materials to multiple uses, including commodity markets, fuel and energy, and composting. The technologies used at these facilities include the use of trammel screens and vibrating finger screens to make the initial separation of recyclable-rich waste from other MSW. In order to minimize the moisture of processed waste, a variety of policies are in place, including differential tip fees, waste stream targets, and wet/dry collection.

- ➔ See the Western Placer Waste Management Authority (WPWMA) profile (#22).
- ➔ See the Sunnyvale SMaRT Station, Sunnyvale, CA profile (#20)
- ➔ See the Puente Hills, Whittier, CA profile (#17)

Wet / Dry Facilities

In some cities, including Portland, OR, Clark County, WA, and New York, NY, a distinction is made between wet and dry waste, with some transfer stations authorized to receive only one type. Waste flows in the Portland Metro Transfer stations adhere to the model shown in Figure 10.

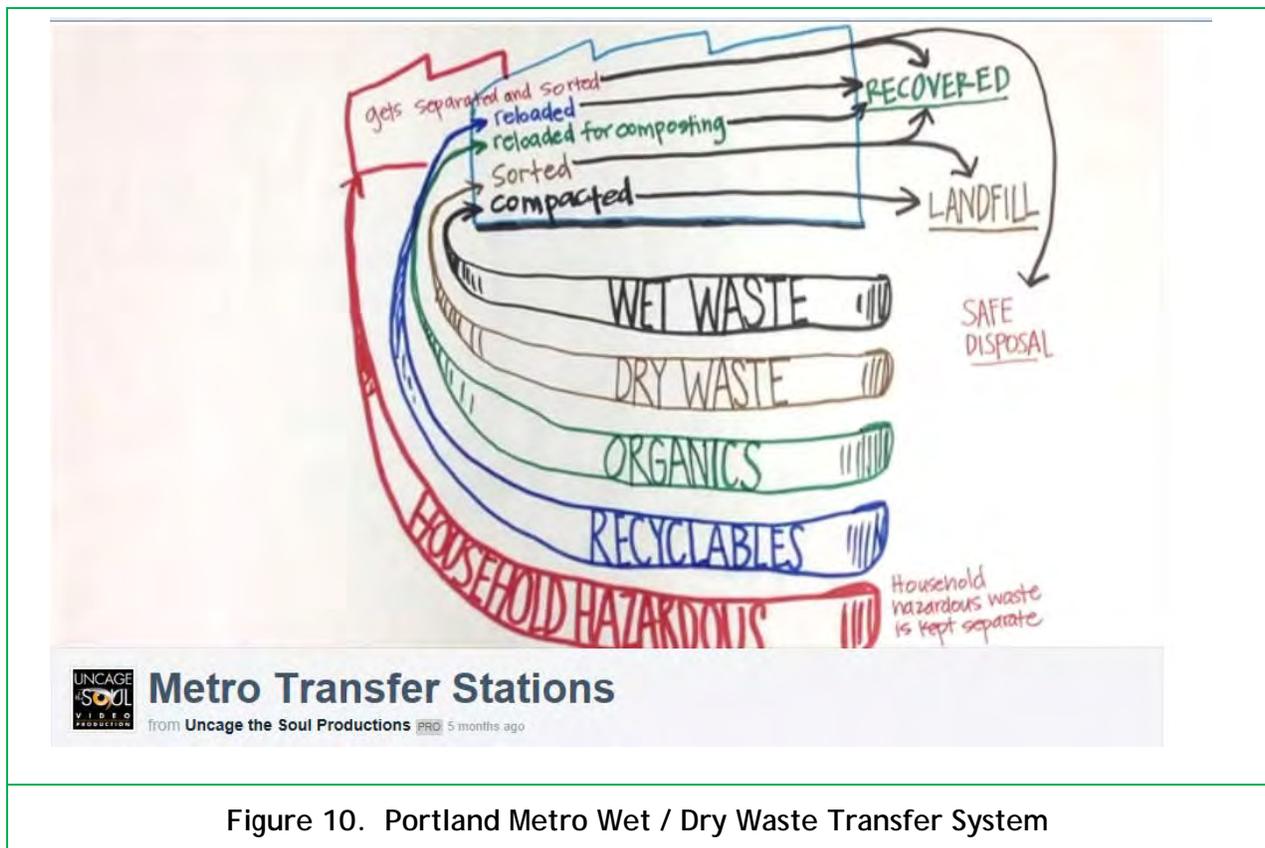


Figure 10. Portland Metro Wet / Dry Waste Transfer System

Typically, mixed dry waste loads contain all or some of the following materials: mixed waste paper, metals, plastics, yard debris, wood, concrete, rock, brick, dry asphalt, construction and demolition wastes, land clearing debris, and/or gypsum wallboard (untreated and unpainted). Wet waste typically is comprised of typical household and business waste, including food waste, which is liable to decay, spoil, or become putrid. Even so, Portland provides for differential rates depending on the load type, as shown in Table 5, below.

Table 5. Portland Load Type Fees

Load Type	Fees
Mixed waste – uncovered loads	\$118.84 per ton plus a \$12 transaction fee. Minimum charge is \$32 for 340 pounds or less.
Mixed waste – covered loads	\$93.84 per ton plus a \$12 transaction fee. Minimum charge is \$28 for 340 pounds or less.
Yard debris and clean wood – uncovered loads	\$70.78 per ton plus a \$12 transaction fee. Minimum charge is \$24 for up to 340 pounds.
Yard debris and clean wood – covered loads	\$45.78 per ton plus a \$12 transaction fee. Minimum charge is \$20 for up to 340 pounds.
Compostable organics	Covered/tarped loads of residential organics are charged \$54.83 per ton plus a \$12 transaction fee. Minimum charge is \$21 for up to 340 pounds. Covered/tarped loads of commercial organics are charged \$52.30 per ton plus a \$12 transaction fee. Minimum charge is \$21 for up to 340 pounds.
Car tires	Minimum charge is \$12 for first tire. Each additional tire is \$2 off rim or \$4 on rim. Tires 21 inches and larger not accepted. Bicycle tires, motorcycle tires and solid core tires are accepted as garbage at the garbage rate. Once the per tire fee exceeds the tip fee minimum (\$28), loads will be weighed and charged the mixed-waste rate. Limit of 15 tires per day per customer. The per-ton rate applies if tires are brought in with a garbage load.
Appliances	Air conditioners, freezers, refrigerators and other units built to contain coolant: \$30 (limit of five units). The per-ton rate applies if appliances containing coolant are brought in with a garbage load.

Advantages of this system include higher recovery rates for individual businesses, convenience to the customer by using two containers (i.e., wet and dry) instead of three (i.e., garbage, recyclables, organics), and the ability to use the same collection fleet for all routes.

Wet/dry collection has also been used to increase the efficiency of mixed waste MRFs, described above. Nationally, only a small number of communities have implemented wet/dry collection programs for residents. In addition to Portland, this is the primary collection system in the communities utilizing the Athens MRF in Los Angeles.

➔ See the Athens Services, City of Industry, CA profile (#2)

Resource Recovery Parks

Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials.

The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities.

- ➔ *See the Alelyckan Re-use Park, Göteborg Sweden Facility profile (#1)*
- ➔ *See the Davis Street Transfer Station Facility profile (#11)*
- ➔ *See the San Francisco Disposal & Recycling Facility profile (#19)*
- ➔ *See the Cold Canyon Resource Recovery Park profile (#10)*

Many of these resource recovery parks co-locate both MRFs and composting operations. Organic wastes entering the tipping area is segregated and moved over to the composting area of the site. For those sites that do not have ample space, organics segregation is accomplished for off-site transfer to a composting facility located elsewhere.

- ➔ *See the Davis Street Transfer Station Facility profile (#11)*
- ➔ *See the Western Placer Waste Management Authority (WPWMA) profile (#22).*

Recycling Technologies

New recycling technologies are being developed to both sort and segregate more effectively, and to use sorted material in new and innovative re-manufacturing applications.

For new recycling technologies oriented toward material segregation, optical sorting, air classification and conveyance, drum separators, bag breakers, rotating trommels, new screen configurations, glass clean-up systems, programmable logic controllers (PLC), and Supervisory Control and Data Acquisition (SCADA) systems are among the newest developments.

For new re-manufacturing applications, while there are dozens of examples, most are not integrated with transfer facilities in any physical way. Most re-manufacturing technologies benefit from being located at or near waste facilities that can supply necessary feedstock. For example, Agilyx is a private company that has developed a technology to convert mixed waste plastics to crude oil. Their focus is on waste plastics that cannot be economically recycled (including overseas shipment). Their current supply need is 50 tons per day, though

smaller distributed systems are also being considered. They are currently developing a facility in Portland, OR, with a research and development location in Beaverton, OR.

A number of building material and bulky item reuse facilities cited earlier in this report are either co-located at transfer stations or MRFs, or are located nearby. The co-location provides decreased transportation costs and eases logistics for these low-margin products.

→ *See the Urban Ore and the City of Berkeley profile (#21)*

→ *See the Last Chance Mercantile Facility profile (#14)*

Conversion Technologies

In 2004, Los Angeles County Department of Public Works (DPW) began a preliminary evaluation of a range of conversion technologies and technology suppliers, and initiated efforts to identify material recovery facilities (MRFs) and transfer stations (TSs) in Southern California that could potentially host a conversion technology facility. Los Angeles County residents generate over 24 Million tons per year of waste. The project resulted in identification of a preliminary short list of technology suppliers and MRF/TS sites, along with development of a long-term strategy for implementation of a conversion technology demonstration facility at one of these sites. LA County intentionally pursued integrating a conversion technology facility at a MRF/TS site in order to further divert post-recycling residual waste from landfilling and take advantage of a number of benefits from co-locating a conversion facility at a MRF.

Starting in 2007, LA County began to review permitting pathways, identify funding sources, verify technology suppliers and conversion technologies, and conduct public outreach. Today, the County is continuing to facilitate development of a demonstration facility in Southern California. Technologies under consideration include anaerobic digestion, thermal depolymerization, pyrolysis, pyrolysis/high temperature gasification, and low temperature gasification.

Both Davis Street and SF Recycling & Disposal are investing in new technologies for treating organic materials. These facilities currently receive source-separated yard trimmings and food scraps from commercial route trucks and transfer the materials to remote organics processing facilities. Future developments at Davis Street and SF Recycling & Disposal will include organics processing technology which could include anaerobic digestion, in-vessel composting, mixed materials composting and steam separation, or even fuel or conversion technologies.

These future developments exemplify the potential for co-location of organics processing, every recovery, and organic product manufacturing at transfer stations or resource recovery complexes. It is applicable to both curbside and commercial organics-rich loads which would be directed to the new technology facilities in the future.

→ *See the Davis Street Transfer Station Facility profile (#11)*

→ See the *San Francisco Disposal & Recycling Facility profile (#19)*

The Spokane County Waste-to-Energy (WTE) Facility is the designated disposal facility for MSW in Spokane County, but it is also one of three transfer facilities for yard waste, inert and non-processible material, large recyclable scrap metals separated from refuse on the tipping floor, recyclables from the Recycling Area (located at the same site), and household hazardous waste (HHW) from the HHW facility. Spokane County generates approximately 500,000 tons per year of MSW.

W2E, a private company based in Princeton, New Jersey, has developed an innovative system of converting municipal solid waste (MSW) into a slate of usable energy and energy-related products. For them, Municipal Solid Waste Transfer Stations can make MSW available in large quantities, on a continuous basis. W2E has targeted these sites to become Alternative Energy Centers, which will help eliminate MSW disposal issues and make energy from waste.

2. Practices, Equipment or Technologies for Targeted C&D Materials

C&D debris represents a promising target for King County to increase the amount of solid waste being recycled from within its transfer system. Not only does C&D debris represent a relatively large waste stream, but it also has well established markets for many of the materials it contains. The market values for these materials are often low, however, and the margins of return after factoring in separation and processing are also low.

Transfer stations that divert high percentages of C&D materials typically use fairly unsophisticated gross sorting equipment (e.g., excavators, loaders, skid steers, and trucks) and little to no new/innovative technology.

The transfer stations researched are typically set up to receive commingled loads of C&D as well as some source separated materials (e.g., metals, clean wood, concrete); most of these facilities remove high value materials and difficult to manage materials (e.g., mattresses), and deliver the remaining material to a private C&D processing facility.

Most transfer stations target residential self-haul and independent contractors; some facilities (e.g., the San Francisco facility operated by Recology) also receive materials from commercial C&D haulers. Most jurisdictions reported doing very little in the way of education and outreach via brochures and advertising, but do focus significant effort at the scale house carefully screening incoming loads and educating customers.

Best Practices by Material Type

As previously discussed, different material types require different handling approaches in order to maximize diversion. This section describes the best practices for targeting recoverable C&D materials:

Clean Wood

Ada County, Idaho diverts 25,000 tons of wood waste a year from its landfill using a two-tiered diversion program. In Tier I, a special collection area is set aside where haulers, including residents, may deliver wood waste at a reduced tipping fee. The wood is chipped on-site by a contractor and sold for use in secondary markets as fuel, firewood, or landscaping. This program captures about 50% of all wood delivered to the landfill. In Tier II, mixed waste loads identified as carrying wood waste along with garbage are diverted to a separate area of the working face. At this site, workers manually sort wood waste from trash and deliver it to the wood waste collection area for chipping and sale. This program captures 20% more wood waste.

The Southern Idaho Solid Waste (SISW) system diverts and recycles tires, scrap metal, and clean wood at its transfer stations. Wood waste is shredded at each site by SISW employees using a portable tub grinder. The shredded wood waste is then sold directly to landscapers, composting operations, and dairies for use in manure management. Approximately 100,000 cubic yards of wood waste are diverted from the landfill each year.

Philadelphia accepts a wide variety of materials curbside, including small amounts of residential C&D waste (the interviewee admitted they accept more than they probably should).

Metals

The City of Tacoma accepts metals in multiple roll-off containers at their transfer station, placed alongside the transfer station wall.

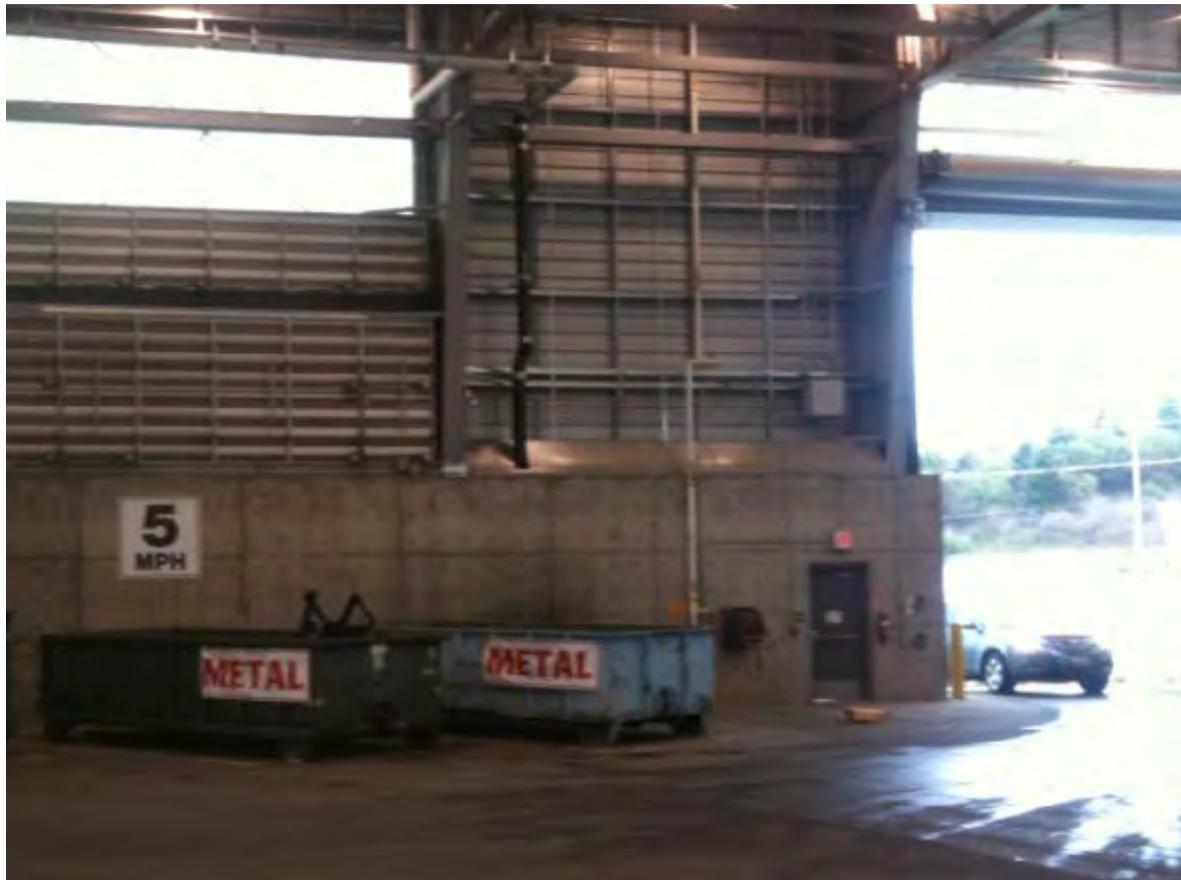


Figure 11. Tacoma Transfer Station Metal Bins

Carpet or pad

Carpet is accepted for recycling at several of the stations we have reviewed, including El Cerrito, Davis Street, and San Francisco Recycling.

- ➔ See the Davis Street Transfer Station Facility profile (#11)
- ➔ See the San Francisco Disposal & Recycling Facility profile (#19)
- ➔ See the El Cerrito Recycling Center profile (#12)

St. Vincent de Paul has initiated a new recycling program in a partnership with the Lane County Waste Management Division in Oregon. The organization is accepting carpet at the

Glenwood Transfer Station and sending it to a private company on the west coast for recycling. The carpet must meet the following guidelines:

- Rolled, minimum of 4' x 4'
- Free of tack stripping, metal, wood, garbage
- Dry (slightly damp is fine)
- Carpet *padding* separated from carpet and rolled
- Off-loaded by customers into correct trailers

Concrete

Source-separation is the best method for recycling concrete. Most is already captured by the private recycling infrastructure.

Asphalt shingles

A number of shingle recyclers use a wide variety of source separated sourcing systems that rely on the generator (e.g., roofing contractor) and/or hauler to sort the shingles from the other roofing debris at the job site.

- For example, roofing companies can use separate trailers or roll-off boxes for shingles and smaller containers for non-shingle debris (e.g., plastic, wood, metal). The specific parties involved, job site operations and sorting specifications depend on the individual site and the shingle recycler's supply specifications.
- In general source-separated tear-off shingles should be kept separate from other roofing debris (e.g., plastic, metal, wood) at the site before loading and then loaded separately onto the truck, trailer or rolloff box.

Reusable building materials

Recovery of many of the reusable building materials can follow the recommendations shown in the Bulky Items section of Part 1 of this Memo.

Best Practices by Program Area

In addition to targeting materials with high diversion potential, specific strategies are also used to enhance diversion of self-haul materials in the following areas:

- Recycling policies and programs
- Rate structure and fees
- Facility and site layouts
- Operations
- Equipment and technologies
- Staffing

Recycling Policies and Programs

A variety of recycling programs and policies are used to increase C&D recycling throughout the United States. Successful programs include those listed in Table 6.

Table 6. C&D Recycling Programs and Policies in the U.S.

Name	Description
Disposal ban	A law or ordinance that specifically bans the disposal of certain waste materials from being disposed of in a landfill or restricted to certain landfills that have increased protection of the environment, such as RCRA Subtitle D or C landfills.
Disposal tax	Artificially inflating the cost of disposal to make recycling or reuse a more economical option to the public.
Subsidized recycling	Artificially decreasing the cost of recycling in order to make recycling or reuse a more economical option to the public.
Percentage recycling requirement	A law or ordinance that requires that a percentage of the waste stream is recycled.
Material recycling requirement	A law or ordinance that requires certain waste materials to be recycled.
Deposit/Advanced disposal fee (ADF)/ Rebate	A law or ordinance that requires the public to pay for disposal before waste generation (generally at the time that the building permit is applied for). This fee is returned if proof is given that the material is recycled. Often combined with a requirement for recycling facilities to complete waste ban disposal plans in order to become certified C&D recyclers.
Certified Processing Requirement	Requirements for materials to be taken to a certified facility that operates under mandated recycling percentage requirements.
Government waste recycling requirement	A law or ordinance that says that all government agency construction activity that produces waste (including C&D debris) must recycle or divert from the landfill some portion of that waste.
Government recycling purchasing requirement	A law or ordinance that requires government agencies to purchase materials that have some recycled content.
Business development	Finances that are provided from the government to businesses to help develop recycling.
Education	Educational efforts performed by the government to increase recycling awareness specifically for C&D debris.
Recycling Goal	Legislation that provides a recycling percentage goal.
Green Building	A regulation or legislation that encourages green building in the region. Often requires building project permit holders to carefully track and report the quantity of C&D material recycled on each project
Salvage requirement	Demolition contractors are required to post notice of an impending demolition to allow anyone to salvage materials from the building.

Successful examples of these transfer station or recycling facility policies include:

- Requiring scale house operators to work closely with transfer station customers to carefully screen incoming loads
- Landfill bans are used statewide in Massachusetts for certain C&D related materials such as asphalt pavement, brick and concrete; clean gypsum; metals; cardboard; and wood. In California, Senate Bill AB 341 sets a goal for municipalities to divert 75% of all municipal solid waste including C&D from landfills by 2020.

- In 2001, the City of San Jose established the first Construction and Demolition Diversion Deposit Program in the nation to use financial incentives to encourage diversion of C&D material from landfills. San Jose's program is modeled by other cities including New York and San Diego. Building permit holders must prove via weight tags and/or donation receipts that they have recycled at least 75 percent of C&D waste. C&D haulers must also register with the City and their waste diversion facilities must be certified. The certification requirements for transfer station/processing facilities include:
 - Having a dedicated C&D processing area separated from the transfer operation
 - Directing ALL C&D loads to the dedicated processing area for processing; and
 - At a minimum, processing at the dedicated processing area must include Physical Separation of C&D materials/loads (hand pickers, floor sorters, etc.), supported by dedicated Heavy Equipment Separation (front-end loaders, skip loaders, grapplers, etc.); and
 - Process ALL C&D loads at the dedicated processing area such that available recoverable material is recovered
- The City of Berkeley modified its Construction and Demolition Ordinance to maintain consistency with the 2010 California Green Building Standards. As a result, all 1) newly constructed buildings, 2) building renovations valued over \$100,000, and 3) demolitions valued over \$3,000, must divert 100% of asphalt, concrete, soil, and land clearing debris and 50% of other C&D debris from landfill disposal.
- In California, the state passed legislation that requires that jurisdictions must meet a 50% recycling rate by a specified time; if not met, the jurisdictions may be subject to fines of up to \$10,000 per day. This has resulted in municipalities targeting C&D debris for recycling.

Rate Structure and Fees

The City of Berkeley charges the same rate for mixed C&D as it does for MSW. Berkeley must pay \$5 more per ton to its contracted C&D processor, but receives a benefit through the C&D diversion credits it can claim. Nantucket, MA (an island community) charges \$30 per ton for clean source-separated wood that can be shredded and reused onsite in its biofiltration air-scrubbing system versus \$360 per ton for mixed C&D, the residuals from which are shipped to the mainland for landfill disposal or incineration. Jurisdictions typically sort out certain materials that are easy to separate and create revenue for a facility such as metals, cardboard, wood, and certain plastics.

Facility and Site Layouts

A common theme among the jurisdictions interviewed/researched regarding facility and site layouts is that space constraints are a challenge. This major factor has led many jurisdictions to set up C&D diversion areas within their transfer stations in order to use fairly simple

equipment to recover the most high value C&D materials before delivering remaining material to private C&D processing facilities.

Space constraints, traffic flow, and need for areas with roofs to comply with stormwater pollution requirements were all cited as factors that influence facility design. Requirements in some jurisdictions to have a physical barrier between the C&D processing area and MSW tipping area also influence facility design.

- The City of Nantucket’s MRF uses an excavator on an elevated platform that provides efficiency for segregating and loading materials; this also allows the operator the widest field of view to observe the C&D pile being worked on.

➔ See the City of Nantucket Facility profile (#8)

- Other facilities use a tunnel that long haul trailers are backed into so that sorted C&D can easily be pushed off of the tipping floor with a loader into the waiting trailer.
- A private C&D processor in Massachusetts cited proximity to a railroad spur as a significant cost savings (over trucking) with respect to shipping sorted C&D materials to end markets.

Operations

Many high diversion transfer stations, including Davis Street Transfer Station and SF Recycling & Disposal target C&D loads from self-haul customers for recovery.

Sort Lines

One of the most effective means of diverting C&D materials is through a sort line. A comparison of different types of sort lines versus C&D sort lines is shown in Table 7. Materials are unloaded by self-haul customers and placed on a conveyor belt by a loader operator. Workers at 10 to 12 sorting stations recover recyclable C&D materials, including wood, paper, rigid plastic, and wallboard.

Table 7. Comparison of MRF Types in the United States

System Aspect	C&D	Dual Stream	Single Stream	Mixed Waste
Typical incoming material stream	C&D Recyclables with non-recyclables; no organics and minimal aggregates	Commingled containers and mixed fibers in separate streams	Commingled containers and mixed fibers in one stream; glass may be separate	Recyclables mixed with non-recyclables, preferably with organics and wet waste removed
Average residue levels	5-75%	With glass: 6.79% Without glass: 5.84%	With glass: 11.71% Without glass: 8.10%	Range: 25-75%

System Aspect	C&D	Dual Stream	Single Stream	Mixed Waste
Average throughput per processing line	35-1,200 tons/day	137 tons/day	206 tons/day	400-2,400 tons of MSW/day
Specialized equipment	Manual sorting; crushers/loaders; Shredders; larger belt; magnet; screen; grinder; Trommel	Standard MRF equipment	Inclined disk screens to separate fiber from containers; polishing screen	Bag breaker; drum separator, trommel and/or vibrating screen to separate recyclables from MSW
Final product quality	Variable	Typically high with minimal contamination	Increased risk of cross contamination between containers and fiber	Variable depending on feedstock and processing line
Average facility size (square feet)	20,000 - 80,000	10,000 – 50,000	50,000 – 150,000	50,000 – 200,000
Average capital cost (2013\$)	\$2,000,000 - \$11,000,000	\$5,700,000	\$8,600,000 (up to \$25,000,000)	\$3.5-13 million for equipment alone

Note: Adapted from Pinellas 2009. Materials Recovery Facility Technology Review. Pinellas County, Department of Solid Waste Operations, St. Petersburg, Florida. Prepared by Kessler Consulting, Inc., Tampa, Florida. September 2009.

Davis Street, SF Recycling & Disposal, and Portland Metro Central Transfer Station operate sort lines for self-haul materials separately from their C&D sort lines for commercial C&D materials (See Figures 12 and 13). These facilities are able to recycle 50 to 70 percent of materials processed through the self-haul sort lines. Note Portland's is an indoor line.

- ➔ See the Davis Street Transfer Station Facility profile (#11)
- ➔ See the San Francisco Disposal & Recycling Facility profile (#19)
- ➔ See the Portland Metro South Station Facility profile (#16)



Figure 12. Sorting line for Self-Haul at Davis Street Transfer Station



Figure 13. Portland Metro Central Transfer Station Sorting Line

The Zanker Materials Recovery Facility, in San Jose, CA, is divided into several different processing areas, each capable of processing different types of waste streams. These areas include a demolition debris recycling area, a mixed debris recycling area and a wood waste recycling area. The mixed C&D sort line:

- Handles waste from the City of San Jose and other nearby cities in Santa Clara county
- Is capable of sorting 30 to 40 tons per hour with an average 60 to 70% diversion rate
- Handles both residential and commercial loads

The sorting follows process typical of many advanced mixed C&D sorting lines:

- Material is tipped onto a floor and an excavator removes large material and places them in bunkers
- Remaining material goes onto conveyor, passes by a ferrous magnet and enters a trommel screen where 2.5" minus material is removed and enters a vibrating screen to remove fines, which are deposited in a stockpile
- Material then goes through a de-stoner to separate light from heavy, with lighter material going to a separate conveyor for processing. Heavies (asphalt, concrete, rock) are mixed with 8" minus, stockpiled and recycled through the process
- Lighter materials go through a washing process floating off plastics and wood. Plastic and wood is handsorted. Sinkables go to conveyor where metal, larger brick and concrete are removed. Remainder of sinkables are stockpiled
- Larger materials, including wood go onto a sorting line, and pass under a magnet. Metal is separated into a bunker, concrete is manually removed, and wood waste is stockpiled and dried.

Charlotte County, Florida has an additional challenge of frequent hurricanes which generate waste made up of C&D, yard waste, and sometimes household hazardous waste. They have strict guidelines on keeping regular household waste separate from hurricane-generated waste which would otherwise overload the system.

Salvage for Resale

Most of the jurisdictions that focus on salvage of bulky waste at transfer stations described in Part 1 of this Memo include a focus on diversion of C&D materials for resale as part of the effort. Again, the most successful salvage for resale programs of C&D materials are often those that have formed a public/private partnership that allow a private/non-profit to set up at the transfer station to pull out the salvageable materials.

Receiving/Screening

All of the jurisdictions researched cited careful screening at the scale house as potentially the biggest driver behind high C&D diversion.

The Berkeley Transfer Station is notable for its use of small magnetic color coded cones (similar to those used at auto repair shops) to drive the flow of materials to the proper drop

off spot. At the scale house, the scale operator and a load screener interview the vehicle driver and visually inspect each incoming load, place a color coded cone on the hood of the vehicle, and staff within the station direct traffic based on the cones. This helps reduce wait times, educate customers, and ensure that materials reach the proper destination for recycling.

→ See the *Berkeley Transfer Station Facility profile (#4)*

All of the C&D processors researched have specific written load acceptance policies that are communicated to businesses using their facilities. All specify items that are acceptable and those that are not. All employ visual inspection of the load when it arrives at the facility, utilizing receiving personnel, overhead cameras, or both. Many facilities use x-ray fluorescence technology to detect lead-based paint, and require AHERA documentation for demolition loads to guard against receiving asbestos-containing materials.

Location of Recycling

The location of C&D recycling at transfer stations varies considerably due to site-specific constraints.

Generally, all of the facilities route materials to specific dumping areas based on load quality (and therefore processing requirements) and end-use markets.

- For example, facilities that receive both clean wood and landclearing debris deposit these materials in separate piles since they will each require a different level of sorting and processing to reach end-market requirements. This also prevents cross-contamination.
- One processor interviewed for their hauling perspective, indicates that C&D loads must contain more than 75 percent clean wood to qualify for the lowest rate.

Many facilities direct self-haul residential customers and contractors to dump commingled loads of C&D on a tipping floor. Once materials are dumped onsite, all processors employ some level of manual sorting prior to any mechanical processing to remove garbage, nontargeted recyclables, high-value items (e.g., salvage timbers), or large items that are incompatible with processing equipment. Each of the facilities then utilizes some level of mechanical processing to prepare the material for market (see below).

→ See the *Self-Haulers Separate after Fee Gate Section in Part 1 of this memo.*

Equipment and Technologies

A variety of equipment is used to handle C&D at transfer stations within the jurisdictions surveyed; none reported using new or innovative technologies to manage C&D. Rubber tired loaders, excavators equipped with a thumb, and top load long-haul trailers are the equipment most commonly cited for managing C&D. Most of the facilities interviewed did not report using compaction equipment to handle C&D since the material is often transported offsite to a private C&D processor for further sorting.

Staffing

The methods for separating C&D materials from the waste stream each have different staffing requirements, depending on the level of mechanization and tonnage processed.

- Sort lines require trained staff to sift through material dumped on a conveyor to reclaim materials. This technique collects a higher portion of the waste stream but has the disadvantages of high equipment cost and space.
- Hand sorting requires trained staff to sift through material dumped on a concrete slab to reclaim materials. This technique collects a higher portion of the waste stream (including for salvage) but has the disadvantages of high labor cost, space and safety.
- Separation by generator requires fewer staff because the customer dropping off the waste at the transfer station is directed through signage or staff to pull out the salvageable materials and deposit them in a dedicated area or to unload directly into a dedicated container. This is more cost effective but there are disadvantages of lost tonnage and contamination.

Any of these methods employed at transfer stations requires trained and motivated staff for receiving and screening functions.

- ➔ *See the Davis Street Transfer Station Facility profile (#11)*
- ➔ *See the San Francisco Disposal & Recycling Facility profile (#19)*
- ➔ *See the Portland Metro South Station Facility profile (#16)*
- ➔ *See the Urban Ore and the City of Berkeley profile (#21)*

3. Practices for the Integration of Public and Private Recycling Efforts

The waste management system in most areas is a complex mix of public and private organizations, facilities, and programs - all of which is enveloped in a complex stew of regulations, incentives, contracts, and practices.

Recycling Policies and Programs

A variety of recycling policies are used throughout the region and nationally to affect the degree of integration of public and private recycling efforts.

- Policies and regulations that stipulate public or private participation in operation of collection (MSW and recyclables/compostables), recyclables processing, MSW transfer operations, or MSW disposal operations.
 - Policies that stipulate parameters of curbside collection and the acceptable materials included in that collection.
 - Policies, contracts, or union agreements that stipulate labor policies regarding contracted work.
 - Flow control requirements for MSW, recyclables, CDL, or yardwaste.
 - Extended producer responsibility or product stewardship policies or requirements.
 - Mandatory recycling laws, market development and technical assistance that create powerful incentives for private sector involvement in recycling.
- ➔ *State of California - The Integrated Waste Management Act, Assembly bill 939*, set goals to California's resource conservation patterns. The law motivated public and private investment in California's waste management infrastructure and the state helped develop new markets for recycled products by establishing environmentally preferable purchasing rules for state agencies and creating Recycling Market Development Zones, which provide loans, marketing and other assistance to businesses in specified areas that use waste materials to manufacture their products.

Recycling rules may also be aimed at different segments in the life cycle of a product (e.g., producer, retailer, generator, hauler, processor, or transfer or disposal facility); and at different sectors within the generator community (e.g., single-family residences, multifamily residences, commercial businesses, and self-haulers). This helps determine which of the public or private assets is engaged in the recycling or disposal process.

Integration of Public and Private Recycling Infrastructure

State law (RCW 70.95.020) mandates public oversight and authority for the planning and handling of solid waste. This currently precludes the possibility of a purely private solid waste system with no public sector involvement.

Contractual Models

Our research indicates that typical arrangements for transfer stations include: municipal ownership and operation; private ownership and operation; or municipal ownership and private operation.

1. Municipal ownership and operation (public only). Public sector operation of collection (MSW and recyclables/compostables), recyclables processing, MSW transfer operations, or MSW disposal operations using publicly-owned infrastructure.
2. Private ownership and operation (private only). Private contracts for collection (MSW and recyclables/compostables), recyclables processing, MSW transfer operations, or MSW disposal operations using privately-owned infrastructure.
3. Municipal ownership and private operation (hybrid). Private contracts for collection (MSW and recyclables/compostables), recyclables processing, MSW transfer operations, or MSW disposal operations using publicly-owned infrastructure.

It is rare to see shared ownership of anything, although it can occur:

- The City of Napa materials recovery facility was 50% owned by the City and 50% owned by the operator. When the operating agreement expired, the City purchased the operator’s 50% share and went out to bid for operation of the facility.
- ➔ See *City of Napa and Napa Recycling and Waste Services profile (#9)*

The same basic models exist for Material Recovery Facilities (MRFs). The number of MRFs falling into each category in the U.S. is provided in Table 7, and includes large facilities processing single-stream materials and other facilities processing source-separated or dual-stream recyclables. A breakdown by size of facility is not available.

Table 8. Ownership and Operation of MRFs in the U.S.

	U.S.
Privately owned and operated	68%
Publicly owned and operated	20%
Public owned and privately operated	12%

Source: Pinellas 2009. Materials Recovery Facility Technology Review. Pinellas County, Department of Solid Waste Operations, St. Petersburg, Florida. Prepared by Kessler Consulting, Inc., Tampa, Florida. September 2009.

Our research regionally and nationally found examples of each type of model in use and achieving various levels of material diversion at transfer or multi-function stations. Examples are provided below.

Municipal ownership and operation (public only)

The Last Chance Mercantile (Last Chance) is a reuse and salvage operation owned and operated by the Monterey Regional Waste Management District. Last Chance was constructed together with a major materials recovery facility (MRF) in 1996. Since then, It has more than doubled the tonnage salvaged and increased revenues from sales of salvaged materials by almost 500 percent. Materials salvaged and sold include the following: Furniture, Lumber, Used building materials, Housewares, Garden, Hardware/electrical, Clothes and textiles, Sporting goods, Reusable paints, cleaners, and pesticides, and Automotive parts.

➔ See the *Last Chance Mercantile Facility profile (#14)*

Private ownership and operation (private only)

The City and County of San Francisco has a long-term partnership with its waste hauler, Recology, parent to Sunset Scavenger, which serves the large residential neighborhoods, and to Golden Gate Disposal & Recycling, which serves the downtown area. Since Recology does not have a contractual agreement with the City, the City influences Recology's activities through regular communications, the ratemaking process and other mechanisms to implement the City's goals of 75 percent diversion by 2010 and zero waste by 2020:

- Senior program managers from the City's Department of the Environment and Recology meet weekly to review ongoing tasks and resolve outstanding issues;
- The City provides commercial technical assistance and outreach to commercial businesses through third party contractors who work closely with Recology staff to provide services to commercial customers;
- The City provides Environment Now interns and volunteers to provide outreach to businesses and multifamily buildings;
- Recology develops recycling processing and composting infrastructure, construction and demolition debris processing, public area drop-off diversion, and new anaerobic digestion technology based on investments approved by the City through the ratemaking process.

➔ See the *City and County of San Francisco Recycling and Recology profile (#7)*

Municipal ownership and private operation (hybrid)

Examples of municipal and private cooperation discovered during research include the following:

- The Athens-Clarke County Recovered Materials Processing Facility (RMPF) is a public-private partnership between ReCommunity Recycling (formerly FCR of Charlotte, North Carolina), and the Unified Government of Athens-Clarke County.

→ See the *Athens-Clarke County Recycling Facility profile (#3)*

- The City of Boise and several private companies host a number of recycling drop-off sites throughout the city.
 - Private recycling processors host drop-off sites for many common recyclable items such as newspapers, phone books, cardboard, aluminum, glass, and plastic.
 - Because glass is not collected in the city's curbside program, Boise has set up seven glass-only recycling sites, generally at government facilities such as fire stations or sewer districts throughout the city.
 - The downtown business district has eight sites with bins for newspaper, plastic, and aluminum. These are sited in central locations such as outside restaurants or well traveled street corners. All city-run drop-off sites use a contractor for collection and transport of materials to the recycling processor.
- Recycletown is another example of a program designed to promote reuse of materials through a hybrid model; operated by Garbage Reincarnation, Inc. (a local nonprofit educational group), and located at the Sonoma County Central Landfill. Recycletown processes large volumes of materials for reuse and recycling, with about 50 tons a month sold for reuse. More than 300 tons of metal and significant amounts of paper, glass, and other recyclables are recycled.
- This WorldBank Group website is sponsored by the National Solid Waste Organization and EPA and provides Public-Private Partnership example contracts and resources.
 - See <http://ppp.worldbank.org/public-private-partnership/sector/solid-waste/toolkits>

Shared Use of Facilities

Ownership/leasing models

The Monterey Regional Waste Management District (MRWMD), in addition to owning and operating LasT Chance Mercantile, also uses a hybrid approach by contracting certain processing at their "Regional Environmental Park." The District leases part of this publicly owned site to several local composting companies for a nominal fee. As part of the contract with these composters, the District requires them to use MRWMD organics as feedstock for their products. The District sells low-cost landscaping supplies made from recycled wood and yard waste at a retail facility onsite.

The South Bayside Waste Management Authority contracted with BFI (now Republic) for collection services (and BFI owned all of the transfer and recycling infrastructure). In anticipation of the expiration of the contract, the Authority purchased the transfer station from BFI. They now own the transfer station and contract for operation through a third party.

- See the link to the operating agreement.
<http://www.rethinkwaste.org/rfpsrfqs/facility-operations>

The City of Napa and Napa Recycling and Waste Services MRF was built in the early 1990s with an equity share agreement between the City and a local recycling company, Napa Garbage Service. At the end of the term (2005), the City and Napa Garbage Service would each have 50% ownership in the facility and the City would have the right of first refusal to purchase entire ownership in the MRF which they did. In January of 2004 the City closed escrow and had 100 % ownership of the MRF.

- See the City of Napa and Napa Recycling and Waste Services profile (#9)

Staffing

The Berkeley Transfer Station is owned and operated by the City, but they contract for reusable recovery services through Urban Ore. Urban Ore is a for-profit corporation in Berkeley that runs a salvaging and reuse business. Urban Ore salvages materials from landfills and transfer stations and sells the merchandise in retail trade. It is an excellent arrangement for the City (they save \$40 per ton for every ton Urban Ore removes from the transfer station).

- See the Urban Ore and the City of Berkeley profile (#21)
- See the City resolutions describing the contracts between the City of Berkeley and Urban Ore in Appendix B.

Table 9. Berkeley Transfer Station Self-Haul Recovery

Self-Haul Recovery	Staffing (full-time equivalent)	Equipment	Targeted Materials	Rates
City of Berkeley recyclable and compostable materials	2 sorters/helpers	Bins, roll-off boxes	Cardboard, metal, appliances, mattresses and tires	\$126 per ton \$29 per cubic yard
		Staging area	Plant debris, other organics	\$67per ton \$23 per cubic yard
Urban Ore targeting reuse	3 reuse staff	Box truck	Reusable building materials and household goods	\$126 per ton \$29 per cubic yard

Note: The Berkeley facility processes about 350 tons per day and serves a population of 114,000.

Operations

The Portland Metro Transfer Stations are operated by a private firm selected by competitive procurement. Metro negotiates the price for operation of transfer station, which injects important competition into the transfer market. Material recovery efforts at transfer stations in the Metro region include:

- Stations recover range of materials including wood, metal, and cardboard (see Table 1)

- Some stations have floor operations in which laborers retrieve items from the tip floor. Others have pick lines where waste is conveyed and materials removed by laborers as it passes by.
- The cost of processing is recovered through tip fees and material sales.
- Costs of diverting materials increase with decreases in load size.

➔ *See the Portland Metro South and Central Stations Facility profile (#16)*

Eco-Cycle created the first MRF (Materials Recycling Facility) in Boulder County in 1979, and grew it as a private nonprofit until 2001 when, in partnership with Boulder County, a new, modern and public recycling facility was built with funds from a special short-term sales tax. Eco-Cycle basically handed over its “book of business” to the Government in exchange for a creative contract approach. While the government retained final say on operations and business decisions, Eco-Cycle was given full responsibility to operate the facility and achieve three benchmarks: (1) operate at low cost; (2) market material for high revenues; and (3) grow the amount of tons being recycling through the facility.

➔ *See the Boulder County and Eco-Cycle profile (#5)*

The Miramar Recycling Center in San Diego, California incorporates a Goodwill Drop-off Center at its entrance to help customers donate household items and clothing for reuse that would otherwise end up in the trash. The Center is a continuation of a pilot program that took place during October 2002, when the City of San Diego, Goodwill Industries of San Diego County and the Allan Company joined together.

- Items accepted in: clothing, furniture, household goods, jewelry
- Items not accepted include: computer equipment (monitors, key boards and CPUs), household hazardous waste, large household appliances such as water heaters, refrigerators, washers and dryers and broken items, anything with an electrical plug
- All acceptable donations go directly to benefit Goodwill Industries of San Diego County.

Orange County, North Carolina Solid Waste Department provides bins and carts service (including pickup) to small public events and lends recycling tools such as bins and signage to private and public larger events.

Toronto, Canada requires event organizers to submit a waste management plan and provides Blue and Green bin services at no cost. All remaining garbage is the responsibility of the event organizer.

Shared Material Marketing Arrangements

The City of Harrisburg, Pennsylvania and Dauphin County have experimented with recyclables consolidation arrangements that are meant to improve recycling program economics and performance. The City operates a low-tech recyclables transfer operation adjacent to the Recycling Center and Harrisburg Incinerator. The County has placed some of its recyclables

(e.g. plastics) into a transfer trailer along with City recyclables to reduce program costs by eliminating hauling and labor costs incurred while delivering to market. Combining County and City recyclables helps both entities negotiate market arrangements.

Shared Outreach and Education

The Athens-Clarke County Recycling Division schedules tours of the Athens-Clarke County Recycling Facility. Tours are available at no charge to ages kindergarten through adult (minimum tour group size is one; maximum tour group size is 35). These field trips are targeted to school, youth, scout, and community groups.

- The Recycling Division also provides free flash drives with a tour of the RMPF, landfill and compost facility.

The San Francisco Department of the Environment, which is largely funded by refuse collection revenues, has a team of zero-waste specialists whose outreach efforts have significantly increased participation in waste diversion programs. The team provides technical assistance, audits and literally knocks on thousands of doors to provide information when the rules change. The Department of the Environment also annually distributes \$600,000 in grants to nonprofit organizations, to support innovation in reuse, recycling, composting, market development and education that could cost-effectively further increase waste diversion

Integration of Public Infrastructure, Waste Generators, and Recycling Value Chain

Policies and Programs

Product Stewardship is a product-centered approach to pollution prevention that makes all parties involved in producing, selling, or using a product take responsibility for the full environmental and economic impacts of that product. Shifting financial (and in some cases, physical) responsibility for collecting and recycling used products from local ratepayers to producers is a key component of Product Stewardship initiatives. It also seeks to incentivize producers to reduce the amount of packaging they create, substantially increase recycling rates, provide much needed revenue to improve efficiency of recycling systems, and reduce carbon footprint and energy use.

There is no single way in which to implement product stewardship; the primary guideline is that all those involved in the life cycle of a product take shared responsibility for the impacts to human health and the natural environment that result from the production, use, and end-of-life management of the product. Product stewardship programs often take the form of “take-back” programs where a private infrastructure is established to recover end-of-life products. Producers may assume full physical and financial responsibility for end-of life product management, or they may share responsibility with stakeholders including local government. Some systems utilize public/private partnerships. Practically speaking, take-back programs generally take two forms: retail take-back and producer take-back.

- Voluntary retail take-back programs are often implemented because the retailer views the program as an opportunity to advertise (both the store and the beneficial practice)

and to drive customer traffic to the store. Mandatory retail take-back programs are implemented through a requirement imposed by the government as a condition of selling the product in that jurisdiction. For both types of retail take-back programs, funding to operate the program comes from the individual retailers.

- Voluntary producer take-back programs are often implemented by industry associations or groups over a wide geographic area, also as a way to advertise, drive customer traffic to stores, and to control liability risks. Voluntary programs may also forestall mandatory programs that have components or requirements that are not desired by the industry. Mandatory producer take-back programs are generally the result of state or national legislation that requires producers to internalize the costs of operating the recycling or disposal system into the cost of the product. In this case, the cost to the consumer at the point of recovery is zero. There may also be producer or consumer paid “assessments” or “eco fees” that fund a program. Producer take-back programs can use a variety of collection mechanisms, including through retailers, private vendors or recyclers, mail programs, or public or private collection systems.

Table 10. Potential Advantages and Disadvantages to the County of a County-Sponsored Product Stewardship Mechanism.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Depending on program/legislation design, may place financial responsibility for end-of-life product management on producer and ultimately the consumer that purchases, uses and gains benefit from the product. • Depending on program/legislation design, may place logistical responsibility for end-of-life product management on the producer and other private sector entities. • May not require up-front public financing • Places some end-of-life product management responsibility on consumer • Incentivizes product designs that emphasize reduced environmental and waste management impacts • Recognizes that there aren't currently recycling programs for many of these products • Multiple recovery mechanisms can provide added convenience for consumers 	<ul style="list-style-type: none"> • A product stewardship approach may not work for some products • Depending on program/legislation design, may place logistical responsibility for end-of-life product management on transfer system • May not be appropriate at the local government level because of extensive coordination with state and federal governments to implement legislation effectively • May require some up-front public financing • Legal authority to govern the actions of international producers is murky • May require enforcement • More cost effective to have a broader statewide program administered by one (or a couple) organization (vs a different program in each county or city in the state)

Hybrid Collection/Producer Funding

Many descriptions of Product Stewardship indicate a dual responsibility (both physical and financial) on the part of the manufacturer (producer). Physical responsibility refers to the

reverse logistics necessary for the producer and/or its supply chain to physically receive, dismantle, process and use or market the recyclable components of its products, or to physically facilitate disposal of returned products. Financial responsibility refers to the producer and its supply chain as the funding source for such activities.

In practice, the manufacturer is required to provide the financing and be responsible for making sure that a statewide program is in place, but they usually utilize the existing infrastructure for the collection and processing. They don't build a whole new system. A Hybrid Collection/Producer Funding program combines a municipal collection and recycling system with funding provided by product manufacturers. The funding mechanism would be subject to negotiation between the public agency and the product manufacturers targeted for responsibility.

A number of EPR models exist where the integration of public infrastructure and waste generators or manufacturers is active.

- The EPR model in Ontario provides an example where “Product Stewards” provide 50% of the physical and financial recovery infrastructure for their products. Ontario’s Blue Box Program Plan (BBPP) creates a system where the Brand Owners and first importers are “stewards” responsible for funding 50% of the approved net cost of municipal residential Blue Box (BB) programs.
 - The program is narrowly focused on consumer packaging material and printed papers commonly found in the residential waste stream. Stewards report on/pay for the amount and type of printed paper and packaging they generate, which is defined by regulation (ON Reg. 273/02), and includes glass, metal, paper, plastic and textiles or any combination of those.
 - There are Small business exemptions (i.e., less than \$2M sales; less than 15,000 kg (about 6800 lbs) of designated materials)
 - A major criticism of these 50/50 systems is that the efficiency that is necessary to rationalize recycling capacity and reduce costs can't happen if control over the direction of the program is shared. In addition, Ontario has been criticized for having too many layers of government on EPR.
 - Ontario has proposed moving towards a 100% industry-funded model, raising the possibility that producers will be given more authority over operating the collection program now administered by municipalities.
- The province of British Columbia has mandated a 100% industry-funded EPR packaging system that will likely be operated by producers, in some cases in cooperation with municipalities. The system will go into operation in 2014. B.C. municipalities may continue to collect materials as a contracted provider to a producers' organization, or may opt to stop providing collection services.

- The province of Quebec is in the process of transitioning its original shared 50/50 financial responsibility packaging program to a 100% industry-funded, but will remain a municipally operated system.
- There was an EPR mattress bill in the California legislature that died last year.
- Washington, DC is the latest City to work with Pepsi Co., Waste Management, and Greenopolis to establish beverage container recycling kiosks in its downtown business district. The program is called the Dream Machine recycling initiative. Pepsi pays for the kiosks, and they are maintained by the Downtown Business Improvement District.

To date, legislation in the U.S. has tended to focus manufacturers on the recovery of “hard to recycle” and hazardous materials.

- For the E-Cycle Washington program, local governments do not need to set up collection sites or pay for the recycling program. Recycling plans must provide service throughout the state. This means having a collection service in each county and for each city or town with a population greater than 10,000. Local governments may provide collection sites at public facilities, and must register with Ecology if they wish to be compensated by a recycling plan for collecting electronics.
 - According to a 2010 evaluation of the E-Cycle Washington program, transfer stations in King County and Snohomish Counties decided not to participate because they are not a good fit for collection activities and private sector collectors are expected to operate more effectively and efficiently.
- For the Oregon E-Cycles program, some programs made arrangements with transfer stations operated by public entities and private solid waste companies to collect electronics. Most programs used a combination of private businesses, charitable organizations, and public sector locations
- PaintCare® Inc. was formed to serve as the architectural paint industry’s stewardship organization. Through PaintCare, manufacturers pay for the recycling and transportation from public and private transfer stations, and municipal HHW collection centers.
 - Oregon passed legislation in 2009 (Chapter 777 Oregon Laws 2009) which establishes a statewide paint stewardship pilot program to reduce the generation of post-consumer architectural paint; promote the reuse of post-consumer architectural paint; and collect, transport and process post-consumer architectural paint for end-of-product life management. PaintCare Inc. operates as the “stewardship organization” of the producers of architectural paint sold in Oregon.
 - In 2010, California passed Assembly Bill 1343 creating the California Architectural Paint Stewardship Program. The statute requires architectural paint manufacturers to develop and implement a program to reduce, reuse, recycle and properly manage postconsumer architectural paint in the State.

PaintCare Inc. operates as the “stewardship organization” of the producers of architectural paint sold in California.

Other Contractual or Program Models

Some additional examples of EPR providing the context for cooperation between public waste handling infrastructure and waste generators include:

- The Boulder County Business Zero Waste Start-up Rebate Program offers a rebate of up to \$250 for compost/recycling items including containers, compostable collection bags, compostable service ware, compostable take-out containers, education and material signage. Other incentives include Business Recycling Coupon (covers first 3-months of service); Commercial Composting Collection Incentive (\$2.50/cy collected)
- The City of Austin along with Keep Austin Beautiful (KAB) offers an Event Recycling Rebate incentive for Event organizers.
- Many communities hold special drop off events at public facilities. Special drop off events are one-time (or periodically scheduled) events to allow consumers to bring products to a central location for recovery. Drop off events typically achieve 1-3 percent participation, while participant efficiency can be very high (EcoCycle, Boulder CO). Typical recycle costs vary depending on material targeted. Recovery costs for electronics at drop off events can range as high as \$300/ton.
 - Current re-use of electronics recovered from recycling events is approximately 10 percent of disposed materials. (Resource Recycling Journal, Portland OR).
- The City of Seattle and LaFarge North America (through their SysTech Environmental subsidiary) maintains a contract for direct acceptance/receipt, sorting, and recycling/treatment/disposal of vector wastes (a mixture of solids and liquids). All liquid and solid materials, other than debris screened from solids, are consumed as alternate raw material in the production of cement. All handling of materials is done within the contained facility. Liquids are used as process water.

Ownership/leasing models

The City of Paris, Illinois owns the Transfer Station property and the property is leased or “contracted” by Ingram Waste Disposal II, Inc. The transfer station is operated for-profit, and the property is no longer for public use (during the life of their agreement).

Shared outreach and education

Alameda County - Stopwaste.org works with large employers to promote green purchasing. They offer free fact sheets and other resources to help entities make more sustainable purchasing decisions. StopWaste.org is also involved with the “Use Reusables” campaign with the Reusable Packaging Association and EPA through a Climate Showcases Communities grant. The campaign provides free educational materials, training workshops, and expert advice to help businesses transition to reusable transport packaging (including pallets, boxes, crates and other containers to ship ingredients, parts, and products between producers, manufactures, wholesalers and retailers.

4. Practices for Training, Education, and Public Outreach Strategies

General

It is clear from research that many of the facilities that excel at diversion of materials employ a coordinated and flexible outreach and education effort involving all signs, web postings, brochures, and commodity-specific instructions. In addition, most highly effective facilities - whether transfer stations, MRFs, or some combination - encourage and train personnel to promote diversion and educate customers on proper material preparation, handling, and placement. Many facilities have staff that actively direct and assist customers to divert materials that were otherwise brought to the facility for disposal.

In the context of public education, many facilities start with a name that demonstrates that it serves as more than just waste disposal site and that reuse and recycling also occurs there:

- *See the San Francisco Disposal & Recycling Facility profile (#19)*
- *See the Athens-Clarke County Recycling Facility profile (#3)*
- *See the Center for Hard to Recycle Materials (CHaRM) Facility profile (#6)*
- *See the Cold Canyon Resource Recovery Park profile (#10)*
- *See the El Cerrito Recycling Center profile (#12)*
- *See the Sunnyvale SMaRT Station, Sunnyvale, CA profile (#20)*
- *See the Hennepin County Recycling Center and Transfer Station / South Hennepin Recycling and Problem Waste Drop-off Center Profile*

Many jurisdictions have city or county-wide recycling targets, regardless of whether there is a current recycling mandate, that serve to reinforce the education and outreach message and incentivize action. This information is ripe for promotion and integration with existing outreach messages at King County.

Staff Training

Formal staff training programs are relatively rare. Most staff learn by “on the job” training from their supervisors or peers and most stations reported very low turn-over. Any minimal training typically focuses on basic policies and rates. In many cases, staff are given the same printed materials as provided to the public for their ongoing reference and, when updates to policies occur, a memo is sent out.

The most robust education program was found in Portland, Oregon. Scale house operators are government staff, but those on the floor are private contractors. Metro orchestrates special training days where all staff switch positions so they can better understand the other’s role. They also have facility staff work for a day with the recycling information call center staff. It

helps them better understand the customers' needs, helps them ask better (more direct) questions of customers, and helps them better communicate in general. They do this every few years, if they are experiencing an issue, and also when a new program comes online.

The primary staff roles are very consistent among the facilities researched:

- Inspection of loads at the scale house
- Ensuring safety and rule compliance on the floor, and
- Operating machinery.

Staff Training about Recycling

Most organizations allow self-motivated staff to encourage customers to recycle, with some - but a minority - with staff for whom that is an explicit part of the job description. Some staff are simply motivated to provide good customer service, which includes informing visitors of where materials for recycling or reuse can be brought for a lower cost. This may result in customers being encouraged to go elsewhere, including to private facilities.

Some organizations have a structure that emphasizes staff training for recycling and diversion at the transfer station. For example, Urban Ore stations three staff persons at the Berkeley transfer station every day; these people are trained to know which potentially reusable materials are resalable. All Urban Ore staff members participate in a pay system that through income- and profit-sharing incentivizes them to divert as much material as possible from wasting and to feed it into the highest paying markets available.

According to the Recycling Programs manager at Waste Management's Davis Street Transfer Station, employees can see a direct relationship between recycling and jobs because of the increase in staff for sorting and for the Public Area MRF (PAM) while three staff were laid off at the landfill. A Reuse Zone isn't staffed yet, but will be in 2013. That person will be trained to help the public unload their items and stack them appropriately in the right area (mattresses, e-waste, etc).

➔ *See the Urban Ore and the City of Berkeley profile (#21)*

➔ *See the Davis Street Transfer Station Facility profile (#11)*

At the Ecocycle CHaRM facility, anyone who comes into contact with customers is trained to be able to answer questions accurately -at least the "do's and don'ts" of each material. Training includes yard staff (swapping bins and processing materials), phone answerers, outreach staff and drive-up window staff. Their most important training is on acceptable materials and their specifications. Outreach and window staff have to be able to answer the "why" questions. In particular, the uniformity in their answers for materials/specs questions is top priority. Of equal importance is that their customers get a good feeling that they are doing the right thing because they made a choice to support CHaRM rather than to dispose of the resource.

➔ *See the Center for Hard to Recycle Materials (CHaRM) Facility profile (#6)*

Staff Education of Customers

As mentioned previously, the operator at the scale house provides the first personal interaction available at entry to the transfer station to instruct customers on proper management of loads and to direct customers to the appropriate areas for unloading and recycling. Clear interaction at the scale house, following careful screening of loads, is a critical opportunity to educate the public about recycling opportunities at the transfer station or at other local options.

→ See the *Davis Street Transfer Station Facility profile (#11)*

A primary component behind the success of San Francisco's waste diversion programs is intensive public outreach provided by San Francisco's Department of the Environment and Recology. They are focused on "why recycle and compost" rather than "how to recycle and compost". It is believed that if they can get customers to truly understand the benefits of recycling and composting, they will want to participate, and in turn will naturally seek out the "how to" component, including when visiting the transfer facilities. To accommodate a multilingual populace, pictograms, multilingual signage, websites, presentations to community groups and individualized conversations are utilized.

→ See the *City and County of San Francisco Recycling and Recology profile (#7)*

When they arrive on site at the Charlotte County (FL) Mini Transfer and Recycling Facilities, customers are educated about where to deposit each material. The scale house staff also scan customer's driver's license to verify residency. Because they are visible from the scale house and their information is on file, very few people intentionally attempt to break the rules. Customers are sent to different areas of the station from the scale house, directed via signs. Staff also suggest to customers that they take certain items to CARE (the partner salvage outlet) which also saves customers on disposal costs.

Team Structure/Staff Culture

The EcoCycle CHaRM facility in Boulder, Colorado is a pre-eminent recycling facility for "hard-to-recycle" items. While their facility staff doesn't necessarily have an environmental ethic at the point of hire, it is critical that they take pride in their work. Their customers can sense it if the pride is not there; and the specifications for most materials don't allow much leeway before the market becomes unavailable. The office staff generally comes in with a high environmental ethic, so without question their ethic comes both from leadership and "pre-packaged" with most incoming staff. EcoCycle believes the team and staff culture supporting recycling is one of the key issues that will help translate the CHaRM concept into a municipal operation - "it doesn't work without a motivated staff, pretty much top to bottom."

→ See the *Center for Hard to Recycle Materials (CHaRM) Facility profile (#6)*

Likewise, Charlotte County, Florida reported that their Foreman has a long tenure and is very conscientious about putting things in the right place. He is also very knowledgeable about

hazardous waste and proper disposal. He splits his time between two sites and he reinforces the staff culture of taking pride in their work.

Education and Outreach Activities at Transfer Stations

Once customers arrive on site, most facilities rely on the attendants at the scale house to inform visitors on everything they need to know to use the facility. This includes directing people to the right recycling and off-load locations. Attendants are often given the same printed materials created for customers. Research shows that brochures (and similar written materials) and facility signage, coupled with interactions with facility staff, supply the bulk of information about what, where, and how to recycle once onsite.

Brochures

Few of the jurisdictions contacted had a specialized flier for their transfer station (the one exception is included below. Examples are included in Appendix C.

- Denver sends out a special recycling guide each year, which includes transfer station information.
- Houston has a “Trash Facts” newsletter that, this winter, featured basic information about transfer stations.
- Charlotte-Mecklenburg, NC has a very easy-to-read fee sheet that is available for download on their web site.
- Charlotte County, Fla. has a flier dedicated to their transfer stations.
- The Eco-Cycle®/City of Boulder CHaRM (Center for Hard-to-Recycle Materials) has a brochure and EcoCycle Guide [<http://ecocycle.org/ecocycleguide>] describing all things about their facilities and program. They are in the process of segmenting their information toward specific targets (i.e., residential customers, businesses, etc.). The brochure mostly goes out through the CHaRM’s drive-up window and through the county HHW facility. The Guide goes out through its network of volunteers who distribute in their neighborhoods.

The brochure has been extremely effective for educating about what the facility accepts and for maintaining quality control in the materials. Quality is unquestionably the key to CHaRM.

- The City of Phoenix hands out magnets about what they accept on site to help people remember for next time.

Signage at Transfer Stations

Most signage is permanent and simplistic, focusing on the proper locations for dropping materials and other rules and policies. Many new facilities are moving toward flexible and moveable signage, with the most flexible signage for materials accepted on a temporary

basis. If materials vary widely in the volume collected and require changing drop-off locations or areas, such as appliances and tires, movable signage is important.

In the City of Hamilton, Ontario, residents requested the City to install new color-coded signs (see Figure 14) to help the public easily find where they needed to go once they were at the site. An electronic message board was also installed at the Mountain Community Recycling Centre to notify customers of any news, updates or messages.

In Phoenix, where bilingual populations pose a particular challenge, all signage is in English and Spanish.

Minneapolis reported that signage for materials like tires and mattresses was the most flexible as it needed to change locations based on the current volume.

At the Ecocycle CHaRM facility, each material has a separate identifying sign right above the collection stations for each material, with the full specifications of what they do and don't accept. The signage is oriented toward drive-up customers. They rely on the customer to do as much of the work as possible, as long as the collection bins are scanned regularly. Typically, customers are extremely good at being respectful of what they are doing, generally handling and placing materials correctly if it looks orderly.

In Seattle, the new South Recycling and Disposal Station has installed portable signage to designate unloading areas for recyclables. The design of the signs allows the City to adjust the size of areas based on seasonal variation in waste loads and to designate multiple areas to receive various materials.



Figure 14. City of Hamilton Color-Coded Signs



Figure 15. City of Seattle Portable Signage

Education and Outreach Activities – General

All jurisdictions interviewed “rely heavily” (personal conversation with Jeff Jenks, Business Application Manager (previous Interim Director for Solid Waste and Recycling) on their web site as the primary method for communicating their recycling programs.

All areas surveyed had at least five web pages of information about their recycling programs, though most of it was focused on their curbside or yard waste programs. These pages are generally full of helpful pictures that clearly explain what can be recycled.

“What do I do with” directories, like the one utilized by King County, are more rare. A sample of these directories is available on these web pages:

- Text-based: <http://www.msa2.saccounty.net/wmr/Pages/HowDoIRecycle.aspx>
- Map-based: <http://maps.co.mecklenburg.nc.us/website/recyclecenters/>

Web site content about transfer stations is often focused on driving directions and rules such as securing load. Rate information and items accepted are usually present, but can be difficult to find. For each site, instructions on how to pack vehicles in order to enhance opportunities for reuse and recycling prior to disposal, given the unique location of these collection locations, may be helpful.

For some jurisdictions, the creation of a new utility account is often the impetus for generating a “welcome” packet on city services which is sent to the address and is the primary method for communicating recycling, including transfer station, information.

Phoenix has a very robust recycling education program. Their team not only presents at schools, but stays at each school for a full week to monitor adoption of new habits and provide feedback. They have visited over 200 schools of all types, using their state-certified curriculum which includes a video with footage of the transfer station.

Metro in Portland relies heavily on a Master Recycler’s program they fund. These volunteers are trained to give recycling presentations throughout the community.

Multiple respondents reported redundancy in educational efforts as sometimes necessary for information to be absorbed.

Websites and Brochures

The City of Phoenix website photo rotates between curbside, household hazardous waste, bulk item pick-up, and transfer station info. It also has an embedded video.

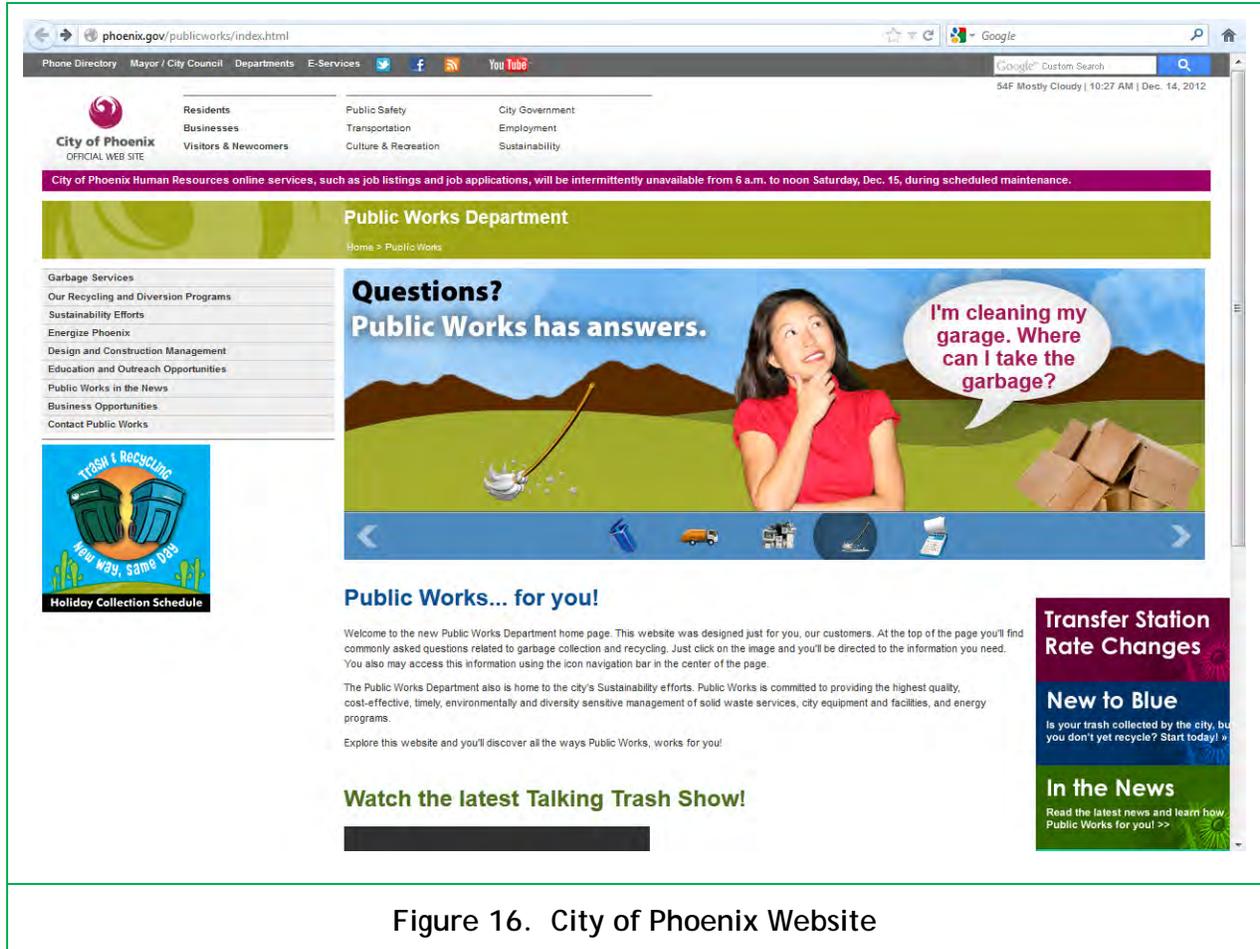


Figure 16. City of Phoenix Website

The City of Charlotte-Mecklenburg, NC has a very clean web site, with icons at bottom that link to other pages or, in some cases, PDFs (like the current rate sheet).



Figure 17. City of Charlotte-Mecklenburg Website

The City of Charlotte-Mecklenburg, NC also has an interactive map version of “what do I do with.”

The screenshot shows a web browser window with the URL maps.co.mecklenburg.nc.us/website/recyclecenters/. The page title is "Recycling Center Locator". On the left, there is a green sidebar with the following sections:

- Are you a resident or business?** (Dropdown menu: "You Must Choose a Type Here")
- Select a Category:** (List: ABC Containers, Batteries, Biomass/Wood, Chemicals, Construction and Demolition)
- Select a Sub-Category:** (Empty dropdown)
- Select a Recycler Type: (optional)** (Dropdown menu: "County Operated and Private Recycling Centers")
- Address: (optional)** (Text input field)
- Instructions: "To find a recycler within 5 miles that allows drop-offs please enter an address above to use in your search. Leaving this empty will show you all recyclers who accept the material (by drop-off or pick-up) you wish to recycle."
- DISCLAIMER** button

The main area features a map of North Carolina with numerous blue location pins. A search bar at the top of the map area says "ZOOM TO RECYCLING CENTER: Select Recycling Center". The map shows major cities like Charlotte, Raleigh, and Greensboro, and major highways like I-77, I-85, and I-95.

Figure 18. City of Charlotte-Mecklenburg Interactive Map

The County of Sacramento, CA web site helps visitors identify where they can take materials based on pictures. It is not a comprehensive list (glass is notably omitted, because it is only recycled at private facilities)

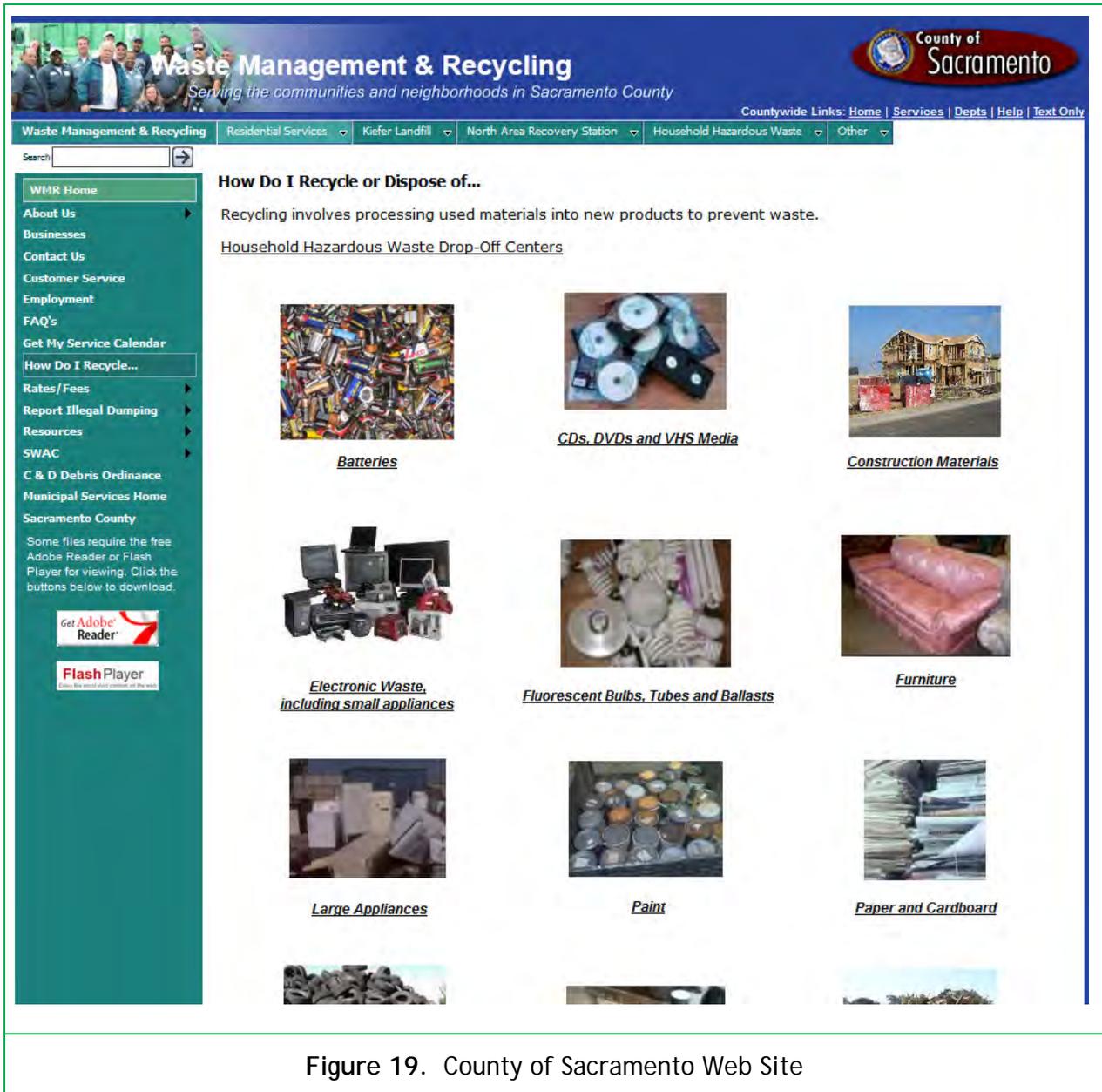


Figure 19. County of Sacramento Web Site

Other Media

Many sites provide tours and have videos to help customers and residents understand how the facility works before they arrive. The City of Phoenix sponsored an art piece which involved photographing materials brought to the transfer station and displaying it on an interactive web page. Although the intent was art, it provides a unique type of education in making the value of items brought to the facility for disposal visible and tangible to residents.

→ See <http://phoenixrecyclingproject.org/>

Metro in Portland also has an exceptional video about their transfer stations on their website. The website includes “rules” for use of the station, and the video addresses practical “how to” information for customers as well as background information about station design, where the materials go, the public-private partnership that operates the stations, and more.

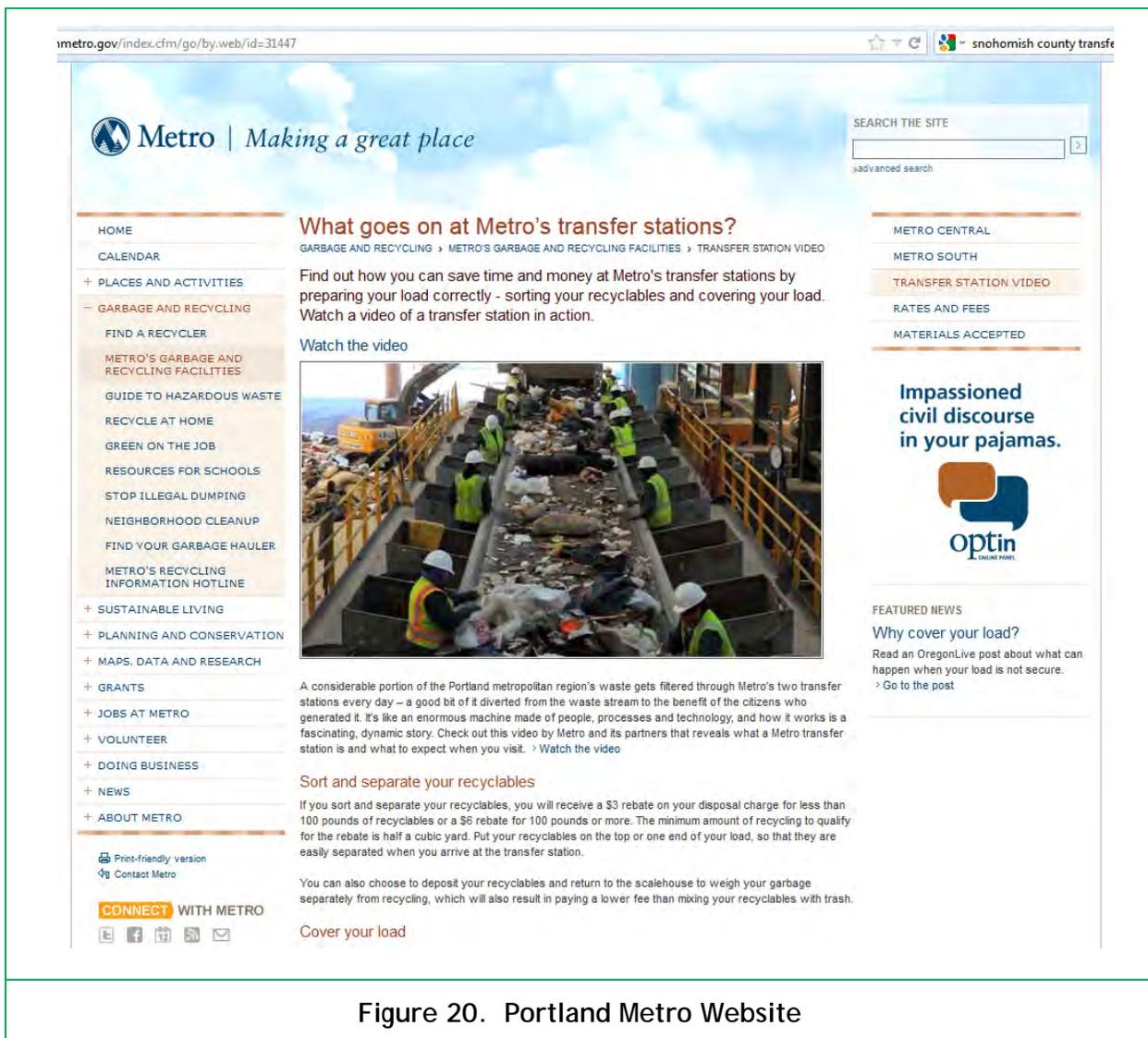


Figure 20. Portland Metro Website

→ See the *Portland Metro South Station Facility profile (#16)*

In Chicago, Allied Waste employs a video on their web site that features interviews with site staff of their new C&D recycling facility

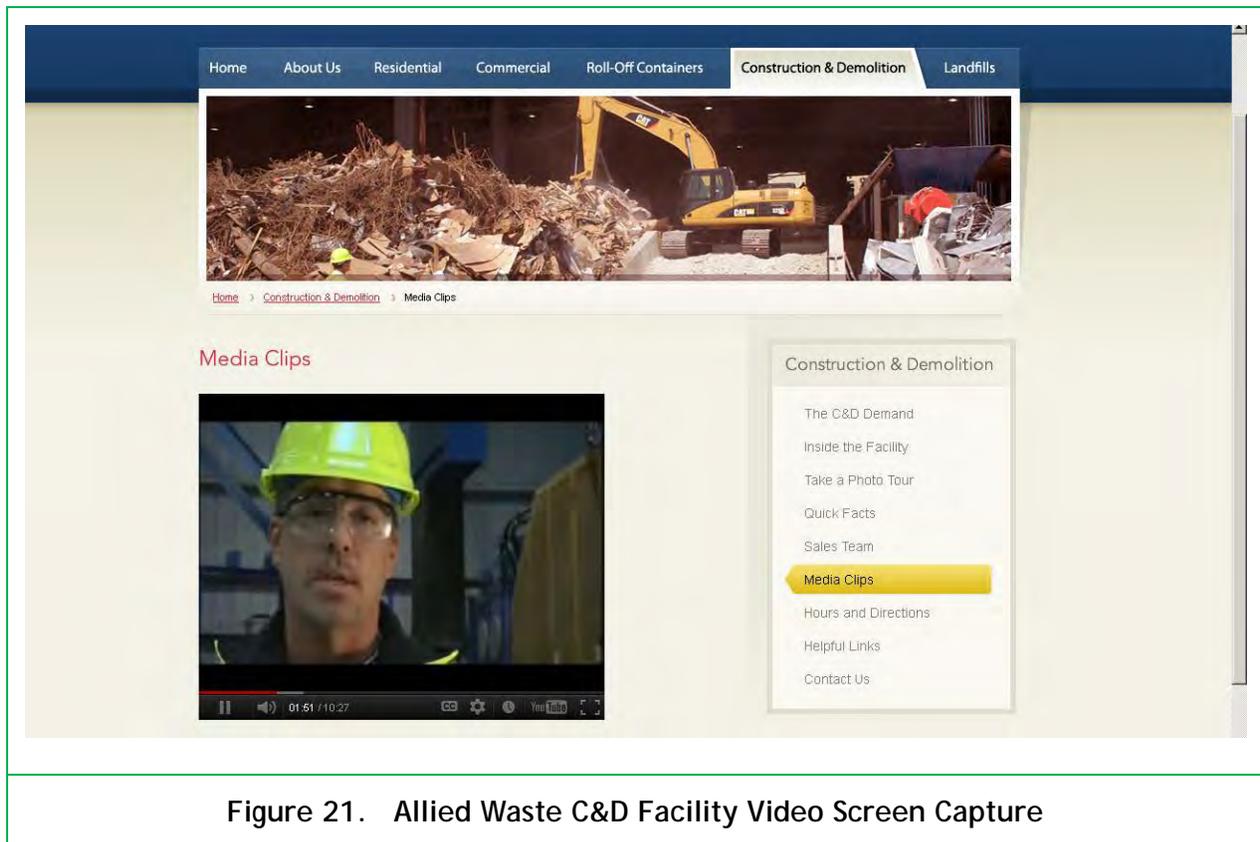


Figure 21. Allied Waste C&D Facility Video Screen Capture

➔ See <http://republicserviceschicago.com/construction-and-demolition/media-clips/>

The City of Austin website provides not just hours and directions (which is common), but a concise list of what you can and can't bring to the station—and something you can get for free! Nice and clean. They also have a “what do I do with” page that is organized alphabetically and has a large list of materials:

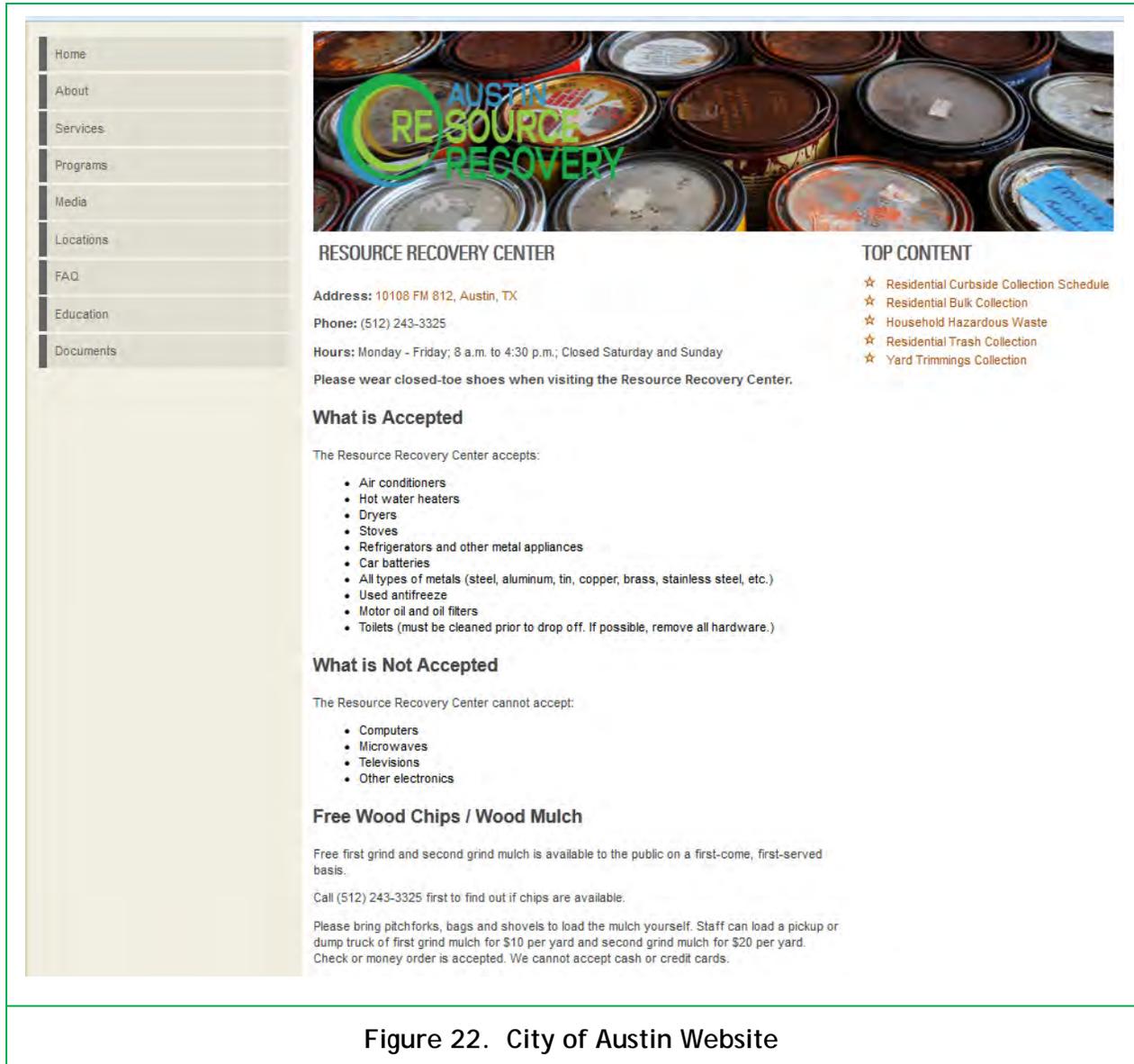


Figure 22. City of Austin Website

➔ See <http://austintexas.gov/department/resource-recovery-center>

The website for United Waste Management in Boston, Massachusetts outlines the step-by-step process of what happens to waste at the transfer station with photos on their web site. This is not aimed at residential customers, but could be an excellent strategy for preparing customers before their visit.

- ➔ *See the Hennepin County Recycling Center and Transfer Station
South Hennepin Recycling and Problem Waste Drop-off Center Profile*

- ➔ *See the North Gateway Transfer Station and Materials Recovery Facility profile
(#15)*

APPENDIX C-1

Facility / Best Practice Profiles

Alelyckan Re-use Park

1

Facility	
Facility/Jurisdiction Name: Alelyckan Re-use Park, Göteborg Sweden	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Public and Private Operation	Operator: Göteborg municipality
Facility/ Practice Type: Residential re-use and drop-off recycling facility	Location: Göteborg Sweden
Diversion	
<p>Diversion Method / Practice Description:</p> <p>Sweden has changed from a system based on land filling to a system based mainly on recycling and material/energy recovery. Since 2002 it is not allowed to landfill material that can be used for combustion and since 2005 it is also forbidden to put organic waste on landfills.</p> <p>The municipalities are responsible for the collection of household waste. Except for those fractions that fall under the producer responsibility where a large part of the paper, metal, glass and plastics are included. Producer responsibility is in place for packages, car tires, paper, cars, electric and electronic products (including light bulbs), batteries, medicines, radioactive products and orphan radiation sources. The system is financed by a fee put on packages, paid by the producers (and in turn by the customers). The municipality is also responsible for collecting bulky waste.</p> <p>The current system of collection has led to a rather complicated system with about 10-15 different waste fractions.</p> <p>The collection of household waste is financed by a mandatory fee paid by each household to the municipality. The fee covers all collection and no part is financed by taxes. Usually the fee differs depending on how much waste is thrown away by each household, leading to a good incentive to sort out the fractions from the producer responsibility – which is already paid for when the product is purchased! In this way the household gets a lower fee by sorting, and some municipalities also have an even lower fee if you compost the organic waste yourself, thus minimizing the amount collected by the municipality.</p> <p>The focus in Sweden has been much on recycling, and not so much on prevention, but lately the focus has shifted and many initiatives, as for instance this re-use park, has started. The new National Waste Management Plan (2012) also puts a major focus on prevention.</p> <p>Gothenburg (Swedish: Göteborg) is the second-largest city in Sweden (after Stockholm) and the fifth largest in the Nordic countries. Situated on the west coast of Sweden, the city proper has a population of 515,129, with 510,491 in the urban area and total of 928,629 inhabitants in the metropolitan area.</p> <p>Gothenburg has five recycling stations in addition to the recycling park where people can leave their bulky waste. In those other stations no collection for re-use takes place.</p>	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Household waste	
Diverted Target (Materials): Bulky or other	

Diversion Effectiveness (Moderate, High, Highest):

In 2010, total inflow to the park was 7,088 tons. The re-used amount was 395 tons, meaning that more than 5% of material that otherwise would have been thrown away were re-used.

	Recycling park [tons/year]	Conventional recycling center [Metric tons/year]
Total inflow of products and waste	545 (donated)	545
Of which:		
Re-use of products	395	57
Material recovery	93	149
Incineration with energy recovery	53	259
Recovered for landfill construction	4.4	79

This means that 70% of the donated products were re-used.

Requirements

Equipment:

Staffing Required:

10 FTE, with many voluntary and jobless people in training

Space Requirements:

Power Requirements:

Technology:

Staffing Required:

Space Requirements:

Power Requirements:

Costs / Revenues

Capital Costs:

€4 Million (\$5.5 Million in 2012)

Operating And Maintenance Costs:

Revenue Generation:

The park is owned by the municipality, and the thrift shops pay rent for their use.

Policies
Applicable Rates:
Applicable Policies:
Outreach or Education: During the start-up phase quite a lot of advertising took place, but now the park is mainly promoted by the homepage for Gothenburg city. The dedicated homepage for the park has been closed down.
Implementation
Implementation Timeline (Short, Long):
Risks:
Other Notes
Notes: One improvement could be that visitors were asked to pack their cars more wise so that things they were planning to give away came on top, and not under the material to be left for recycling later in the process. 30% of the goods handed in are disposed of as waste because they do not work properly, half directly in the sorting station and half in the shops. If more resources to repair goods existed, more probably could be salvaged.
Source
Source: Pål Mårtensson, Samordnare/Coordinator, Department of Sustainable Water and Waste Management Göteborg, Sweden

Facility		
Facility/Jurisdiction Name: Athens Services		
Arrangement (Public Only, Private Only, Public-Private): Private	Operator: Athens Disposal Company	
Facility/ Practice Type: Mixed Waste MRF	Location: City of Industry, CA	
Diversion		
Diversion Method/ Practice Description: The facility is a mixed waste MRF with transfer operations. Athens opted for 2-cart collection systems (wet/dry) rather than 3 carts (single stream, green waste, MSW). It saves on collection, but costs more to process. If they receive single stream recyclables, they mix them with MSW. Currently receives 2,400 TPD of MSW. Lines process 50 TPH. Claims to be largest mixed waste MRF in CA.		
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential (40%) and Commercial (60%)		
Diverted Target (Materials): Presort to remove wood, metals, OCC, oversized waste or waste that might foul up equipment. Vibrating finger screens (9" and 2"). <2" are fines are screened and sent to Athens' composting plant in the desert. <9" and >2" are sent to manual line. >9" goes to paper line. Residue is transported to 4 area landfills.		
Diversion Effectiveness (Moderate, High, Highest): 25%. Hopes to increase this to 60% with the addition of the Nihot system, which will recover an additional 14% of fines to compost.		
Requirements		
Equipment: 3 processing lines		
Staffing Required: Nearly 300, about 130 on MRF lines; 2 shifts	Space Requirements: 170,000 sq ft	Power Requirements:
Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs: \$9 Million in 2002. Considering \$12 million upgrade that will add 2 Nihot systems, switch finger screens to bar screens, as well as other upgrades.		
Operating And Maintenance Costs: High		

Revenue Generation: High
Policies
Applicable Rates:
Applicable Policies:
Outreach or Education:
Implementation
Implementation Timeline (Short, Long):
Risks:
Other Notes
Notes:
Source
Source: Pinellas. 2009. Materials Recovery Facility Technology Review. Pinellas County, Department of Solid Waste Operations, St. Petersburg, Florida. Prepared by Kessler Consulting, Inc., Tampa, Florida. September 2009.

Athens-Clarke County Recycling Facility

3

Facility		
Facility/Jurisdiction Name: Athens-Clarke County Recycling Facility		
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Private Operation	Operator: ReCommunity Recycling	
Facility/ Practice Type: Recovered Materials Processing Facility (RMPF)	Location: Athens, GA	
Diversion		
Diversion Method/ Practice Description: Public-private Partnership The Athens-Clarke County Recovered Materials Processing Facility (RMPF) opened August 31, 1995. The RMPF is a one-of-a-kind recycling facility in Georgia, as recycling at the RMPF is the effort of a public-private partnership between ReCommunity Recycling (formerly FCR of Charlotte, North Carolina), and the Unified Government of Athens-Clarke County. The facility was built with private funds. Athens-Clarke County owns the property and oversees the contract with ReCommunity.		
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential; Some Commercial		
Diverted Target (Materials): Recyclables are accepted at the RMPF in a single (mixed) stream: paper and bottles/cans mixed together. Over 30 different types of materials are accepted for recycling. No garbage is accepted at this facility.		
Diversion Effectiveness (Moderate, High, Highest): The RMPF has the capacity to process up to 120 tons of recyclables per day per eight-hour shift. Currently, the recycling facility processes about 75 tons per day or 1,500 tons per month.		
Requirements		
Equipment:		
Staffing Required: 64 FTE <i>for all of solid waste</i>	Space Requirements: 22,000 square feet with 2,000 square feet used for office and educational space	Power Requirements:
Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs: \$2.5 million		
Operating And Maintenance Costs: --		

Revenue Generation:

The Unified Government of Athens-Clarke County has a 10-year “put or pay” contract with the RMPF operator ReCommunity that came up for renewal on January 16, 2006. At that time ACC renewed the contract for a period of 5-years. ACC pays the operator processing or “tip” fees to process, sort and market the recyclables. The fee paid is based on a sliding or variable schedule, with lower processing fees per ton as tonnage increases. In addition, ACC receives 80% share of the revenues from the sale of recyclables processed at the RMPF. The revenues help to offset expenses.

As tonnage increased and market prices improved for recyclables, the cost of processing has declined dramatically. In Fiscal Year (FY) 1996 (July 1, 1995 – June 30, 1996), the net cost per ton (after revenues) to process recyclable material was \$78.61 compared with a net profit of \$20.35/ton in FY 2012, sixteen years later.

Policies

Applicable Rates:

Applicable Policies:

Outreach or Education:

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Berkeley Transfer Station

4

Facility	
Facility/Jurisdiction Name: Berkeley Transfer Station	
Arrangement (Public Only, Private Only, Public-Private): Public	Operator: City of Berkeley
Facility/ Practice Type: MRF	Location: Berkeley, CA
Diversion	
Diversion Method / Practice Description: Commingled C&D dumped onto open tipping floor; metal and concrete picked out and put in City's bins to recover that revenue. Remaining C&D is pushed off of tipping floor into long-haul trucks parked in adjacent back-in pit and sent to Waste Management's Davis Street C&D Processing facility. Loads of clean wood directed to dump with yard waste. Facility has annual capacity of 200,000 tons.	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential and Self-Haul	
Diverted Target (Materials): Metals; Clean and dirty wood; Roofing materials; Drywall; Tile, porcelain, brick, and concrete; Dirt and rock	
Diversion Effectiveness (Moderate, High, Highest): Highest (1,000 to 1,500 tons per month)	
Requirements	
Equipment: Rubber tired loaders, yard goals, long-haul trailers, colored coded magnetic cones placed on hoods of vehicles as loads are screened at the scale house. Staff inside the station direct vehicles to dumping destination based on colored cones.	
Staffing Required: Uses same staff that run the rest of the station. Extra staff at the scale house to screen loads. 2 spotters and 3 re-use staff	Space Requirements: ¼ of facility
	Power Requirements: Fuel for loader and trucks
Technology:	
Staffing Required:	Space Requirements:
	Power Requirements:
Costs / Revenues	
Capital Costs: Moderate – rubber tired loader, yard goats, and long-haul trucks	
Operating And Maintenance Costs: Low	

<p>Revenue Generation: City offsets costs by recovering as much metal and concrete from the tipping floor as possible. Metals go into City's metal bines. City has Expenditure Contract with WM.</p>
Policies
<p>Applicable Rates: Tipping fee is the same for MSW and mixed C&D. City actually pays Waste management \$5 more per ton for C&D delivered to the WM processing facility, but the City gets the much needed diversion credits.</p>
<p>Applicable Policies: The City is required to meet waste diversion t goals under the California Integrated Waste management Act of 1989 (AB 939)</p>
<p>Outreach or Education: City did very little to educate the public. Word spread virally once the City began accepting C&D material.</p>
Implementation
<p>Implementation Timeline (Short, Long):</p>
<p>Risks:</p>
Other Notes
<p>Notes: Very dependent on scale house to screen loads. Staff training is key ongoing challenge. City originally envisioned a pick line with conveyor belts, but did not pursue due to space, capital, and O&M costs. Would have required COVERED space to prevent contact with stormwater.</p>
Source
<p>Source: Andrew Schneider with City of Berkeley, 510-981-6357</p>

Facility	
Facility/Jurisdiction Name: Boulder County and Eco-Cycle	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Private Operation	Operator: Eco-Cycle
Facility/ Practice Type: Operational Partnership	Location: Boulder, CO
Diversion	
<p>Diversion Method / Practice Description:</p> <p>Eco-Cycle created the first MRF (Materials Recycling Facility) in Boulder County in 1979, and grew it as a private nonprofit until 2001 when, in partnership with Boulder County, a new, modern and public recycling facility was built with funds from a special short-term sales tax. Eco-Cycle basically handed over its “book of business” to the Government in exchange for a creative contract approach. While the government retained final say on operations and business decisions, Eco-Cycle was given full responsibility to operate the facility and achieve three benchmarks: (1) operate at low cost; (2) market material for high revenues; and (3) grow the amount of tons being recycling through the facility.</p> <p>Contractual arrangement</p> <p>Eco-Cycle’s contract was for five years, with two five year roll-over options. Eco-Cycle is currently in the second roll-over phase.</p> <p>Advantages</p> <p>The advantages to the Community are clear, they are being protected and serviced by a mission-driven organization (Eco-Cycle) who has a primary mission of growing recycling and a secondary mission of making a small profit. The contract with the County ensures a small profit, thus they are free to focus on creating new and innovative recycling programs, which Boulder, CO is famous for, primarily because of Eco-Cycle pushing the envelope here for over 30 years and the excellent coordination with the local governments. Eco-Cycle is a very experienced service provider in the area providing programs at a low profit level, plus, Eco-Cycle indicates that they return all those profits to the Community in the form of new programs.</p> <p>Disadvantages</p> <p>The disadvantages are from growing pains, and learning experiences. The biggest one so far has been the role of the government staff who oversees the contract and how involved they need to be in the “business side” of all the activities required to fulfill their mandate to protect the public interest. The fundamental challenges to solve are related to the fact that government is, appropriately, a “low risk taker” while successful entrepreneurs need to be high risk takers. Balancing those dynamics are an on-going process. The example that has been most challenging has been the process of facility upgrading and improvements. As a private entity, Eco-Cycle historically used their experience, knowledge and network of contacts to make any changes needed to facilities it owned. But under the new contract, they are forced to make change through the government procurement process. But most problematic of all is that Eco-Cycle, as a private entity, is not given control over this government procurement process since it must be done by government staff, and the flaw in this approach is that the private vendors don’t get to interact directly with Eco-Cycle but instead interact with the government staff who may not have the experience or knowledge to actually force the creation of the most cost-effective and technological result. The vendors that get chosen by the government staff have been selected because they fulfill the government criteria the best. This situation is an on-going challenge.</p>	

Diversion Target (Residential, Commercial, Industrial, Self-Haul):		
Diverted Target (Materials):		
Diversion Effectiveness (Moderate, High, Highest):		
Requirements		
Equipment:		
Staffing Required:	Space Requirements:	Power Requirements:
Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs:		
Operating And Maintenance Costs:		
<p>Revenue Generation:</p> <p>Revenues from sales of materials belong to the County each month. From those revenues monthly payments are as follows:</p> <ul style="list-style-type: none"> ▪ Eco-Cycle receives a fee over and above operating costs that fluctuates between 7-9% of sales revenues; ▪ Payment back into the County Recycling Fund that funded the construction of the single-stream MRF – \$50,000 per month; ▪ Payment of \$10 per ton on every ton processed into a new equipment fund; ▪ Payment equivalent to two percent of monthly sales into a Bad Markets Fund. This fund ensures that Eco-Cycle will never have to charge haulers who bring in materials; ▪ Payment to private haulers according to what markets are paying and/or according to any policy goals that Eco-Cycle supports. For example, now that they are operating a single-stream MRF, Eco-Cycle would like haulers to collect single-stream recyclables from local businesses. To encourage this, Eco-Cycle is paying premium rates to haulers bringing in commercial single-stream recyclables. No formula has been established for payments to private haulers and the payments fluctuate. 		
Policies		
Applicable Rates:		
Applicable Policies:		

Outreach or Education:
Implementation
Implementation Timeline (Short, Long):
Risks:
Other Notes
Notes:
Source
Source: Eric Lombardi, Eco-Cycle Executive Director, 303-444-6634, eric@ecocycle.org

Center for Hard to Recycle Materials (CHaRM)

6

Facility	
Facility/Jurisdiction Name: Center for Hard to Recycle Materials (CHaRM)	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Private Operation	Operator: Eco-Cycle
Facility/ Practice Type: Operational Partnership	Location: Boulder, CO
Diversion	
Diversion Method / Practice Description: <p>Eco-Cycle, a non-profit recycling organization under contract with the City of Boulder, operates CHaRM to address the need to manage new products that enter the discard stream and are not readily recyclable or reusable. The CHaRM Center accepts computers, printers, TVs, cell phones, textiles, plastic bags, white block foam, and other hard-to-recycle materials. CHaRM ensures that electronic components are dismantled in the US and that toxics are handled in a responsible manner. The program is funded through a local “trash tax” on the private waste haulers and a \$3 facility fee for every vehicle visiting CHaRM. In an effort to put the responsibility for hard-to-recycle materials back on manufacturers, CHaRM has launched the Partners for Responsible Recycling that encourages retailers and brand manufacturers to assist CHaRM in developing in-store take back programs. Eco-Cycle now gets financial support from manufacturers for recycling electronics and expanded polystyrene blocks.</p> <p>The drop-off area includes a drive-up office, signs, bunkers, awnings, drop-off windows and direction striping.</p>	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential	
Diverted Target (Materials): Electronic scrap, expanded polystyrene, plastic bags and bubble wrap, small plastic appliances, durable #2 plastics, corrugated plastic yard signs, bicycles and bike tires, books and manuals, cooking oil, fire extinguishers, toilets and other ceramics, yoga mats, textiles, scrap metal, single stream recycling	
Diversion Effectiveness (Moderate, High, Highest): High	
Requirements	
Equipment: CHaRM has two downstroke balers for textiles and plastic bags and an expanded polystyrene grinder/densifier. Other equipment includes seven 40-yard roll-off boxes: two for scrap metal, one each for clean ceramics, wood pallet scrap, bike tires, mixed durable plastics and landfill residuals. The facility also has five semi-trailers for storage and shipping: one for books, three for electronic scrap, one for baled plastic, and one for expanded polystyrene.	

<p>Staffing Required: 1.2 drive up window 3 processing crew 0.75 manager Administration, commercial customer pickup service, and outreach for CHaRM are all supported by other Eco-Cycle departments. Allocations for that support are roughly 12% of \$560K budget</p>	<p>Space Requirements: CHaRM is located on a 1.5-acre light industrial site with an asphalt hardscape and a 10,000 square foot warehouse with minimum 14' ceiling and 2 dock bays.</p>	<p>Power Requirements: 3 phase power</p>
<p>Technology:</p>		
<p>Staffing Required:</p>	<p>Space Requirements:</p>	<p>Power Requirements:</p>
<p>Costs / Revenues</p>		
<p>Capital Costs: Total capital costs was \$2.25 million; drop-off area (drive-up office, signs, bunkers, awnings, drop-off windows, directional striping) = approx. \$250K</p>		
<p>Operating And Maintenance Costs:</p>		
<p>Revenue Generation: The program is funded through a local “trash tax” on the private waste haulers and a \$3 facility fee for every vehicle visiting CHaRM. Eco-Cycle also gets financial support from manufacturers for recycling electronics and expanded polystyrene blocks.</p>		
<p>Policies</p>		
<p>Applicable Rates: \$3 per vehicle plus some material-specific fees (\$0.50 to \$10 for some items); scrap metal drop-off for free</p>		
<p>Applicable Policies:</p>		
<p>Outreach or Education:</p>		
<p>Implementation</p>		
<p>Implementation Timeline (Short, Long):</p>		
<p>Risks:</p>		
<p>Other Notes</p>		
<p>Notes:</p>		

Source

Source:

Eric Lombardi, Eco-Cycle Executive Director, 303-444-6634, eric@ecocycle.org

City and County of San Francisco Disposal & Recycling and Recology

Facility	
Facility/Jurisdiction Name: City and County of San Francisco Disposal & Recycling and Recology	
Arrangement (Public Only, Private Only, Public-Private): Private Ownership; Private Operation	Operator: Recology
Facility/ Practice Type: Operational Partnership	Location: San Francisco, CA
Diversion	
<p>Diversion Method / Practice Description:</p> <p>The City and County of San Francisco and Recology have an unusual partnership arrangement. Recology has the exclusive right to provide refuse collection for a fee within the City. However, since Recology does not have a contractual agreement with the City, the City influences Recology's activities through regular communications, the ratemaking process described below and other means. Since the City and Recology must work together (unless the 1932 ordinance is changed by a vote of the people), the City and Recology have developed mechanisms to work cooperatively to implement the City's goals of 75 percent diversion by 2010 and zero waste by 2020:</p> <ul style="list-style-type: none"> ▪ Senior program managers from the City's Department of the Environment and Recology meet weekly to review ongoing tasks and resolve outstanding issues; ▪ The City provides commercial technical assistance and outreach to commercial businesses through third party contractors who work closely with Recology staff to provide services to commercial customers; ▪ The City provides Environment Now interns and volunteers to provide outreach to businesses and multifamily buildings; ▪ Recology develops recycling processing and composting infrastructure, construction and demolition debris processing, public area drop-off diversion, and new anaerobic digestion technology based on investments approved by the City through the ratemaking process. <p>Contractual arrangement</p> <p>SF Recycling & Disposal, Inc., Sunset Scavenger Company and Golden Gate Disposal & Recycling Company (the Companies) are subsidiaries of Recology providing recycling, composting, and trash collection and processing services to residents and businesses in San Francisco. The Companies are regulated according to the terms of the 1932 Refuse Collection and Disposal Initiative Ordinance. The 1932 Ordinance divided the City into 97 exclusive collection routes serviced by licensed refuse collectors. Over time, all of these collection routes were assumed by the Companies.</p> <p>Under the 1932 Ordinance, the City approves and sets residential garbage rates about every five years. The ratemaking approach is outlined in the 1932 Ordinance.</p> <p>In the 2006 Rate Application, the Companies submitted what they call an "Alternative Combined Presentation," which combined the revenues and expenses of the two collection companies: Sunset Scavenger Company and Golden Gate Disposal & Recycling Company. The Companies have stated that the Combined Presentation was submitted in response to past City and ratepayer requests to see financial and program information for both companies so as to improve the transparency of the ratemaking process.</p> <p>The 2006 commercial rates use the customers diversion rate as the discount on the volume-based collection bill (i.e., one black, one green, and one blue container = 67 percent discount).</p>	

<http://library.municode.com/HTML/14131/level1/A1.html>

Advantages

There are several advantages to this arrangement:

- Close coordination and weekly meetings allow City staff and Recology staff to develop good working relationships which help them to align their strategies and programs.
- The ratemaking process is resource-intensive, but it is initiated only about once every five years. This allows the City and Recology to work collaboratively for several years between ratemaking processes (which can be confrontational).
- Strong political leadership and staff expertise have resulted in innovative policy initiatives (mandatory recycling and composting, plastic bag ban, cigarette butt fee) and state-of-the-art programs (“fantastic three” – green, blue, black collection carts, restaurant and apartment food scrap diversion, comprehensive school recycling and composting program).
- The Companies are highly motivated to please the City and ratepayers to maintain their profitable, evergreen monopoly.
- Not having to conduct procurement processes or manage contracts and dealing primarily with one service provider simplifies City administration, communications and information gathering.
- The system is very flexible and engenders long-term relationships and planning.

Disadvantages

There are some disadvantages to the current arrangement:

- Since there is no contractual agreement between the City and Recology, the City must compel Recology to provide the services it wants in other ways. Management is dependent on the relationships built between the senior managers at the City and at Recology. Changes in staffing can affect the City’s ability to get what it wants from Recology.
- Only Recology may provide refuse and recycling collection for a fee in San Francisco. There are some specialty recyclable materials that are not efficiently or effectively handled by Recology. Therefore, generators and specialty recyclers must sometimes operate “under the radar” or Recology and the City must “look the other way”, require the material to be handled through Recology (where, depending on the material, it may not be diverted effectively) or the material doesn’t get recovered.
- Since only Recology may provide refuse and recycling collection for a fee in San Francisco, some generators may be paying more for collection services than they would pay on the open market.

Diversion Target (Residential, Commercial, Industrial, Self-Haul):

Residential and Commercial

Diverted Target (Materials):

The **City** is a leader in zero waste and in 2002 established a goal of 75 percent diversion by 2010 and zero waste by 2020. The citywide diversion rate was 78 percent in 2009.

Diversion Effectiveness (Moderate, High, Highest):

High

Requirements

Equipment:

Staffing Required:

Space Requirements:

Power Requirements:

Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs:		
Operating And Maintenance Costs: City Recycling Budget for 2010-2011 was 3,887,663 City Solid Waste Management for 2010-2011 was 191,290		
Revenue Generation:		
Policies		
Applicable Rates:		
Applicable Policies:		
Outreach or Education:		
Implementation		
Implementation Timeline (Short, Long):		
Risks:		
Other Notes		
Notes:		
Source		
Source: http://www.sfenvironment.org/ and http://www.recology.com/ Contact name and contact information: Robert Haley, Zero Waste Manager, San Francisco Department of the Environment 415-355-3752 Robert.Haley@sfgov.org http://sfdpw.org/modules/showdocument.aspx?documentid=2234 http://www.sfcontroller.org/Modules/ShowDocument.aspx?documentid=991		

Nantucket Materials Recovery Facility

8

Facility		
Facility/Jurisdiction Name: Nantucket Materials Recovery Facility		
Arrangement (Public Only, Private Only, Public-Private): Public-private	Operator: Waste Options, Inc.	
Facility/ Practice Type: MRF	Location: Nantucket, MA	
Diversion		
Diversion Method / Practice Description: Commingled C&D dumped onto open tipping floor and kick sorted into two piles: 1) difficult to manage materials, and 2) recyclable materials. Metal, concrete, clean wood, clean gypsum sorted out. Difficult to manage materials are shipped to the mainland to be incinerated. Clean wood is chipped and used for the facility's biofilter. Good lumber taken to Take-it-or-leave-it reuse center.		
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential, commercial, self-haul		
Diverted Target (Materials): Metals Clean and dirty wood Roofing materials Gypsum Tile, porcelain, brick, and concrete Dirt & rock		
Diversion Effectiveness (Moderate, High, Highest): High 70% of C&D recycled @ 50 tons per day for an island of 10,000 residents.		
Requirements		
Equipment: Excavator with thumb, rubber tired loader, top load trucks.		
Staffing Required: 1.5 FTE	Space Requirements: 80 x 100 feet	Power Requirements: Fuel for loader and trucks
Technology: They are considering mining the City landfill to capture the soil. Considering gasification and pyrolysis of plastic wastes.		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs:		
Operating And Maintenance Costs:		

Revenue Generation:

No fee for MWS - tipping fees covered by Town of Nantucket/resident's tax bill - Waste Options gets handling fee and fee for transportation and disposal of materials off island. C&D tipping fee is \$360 /ton and clean wood tipped at \$30 per ton.

Policies

Applicable Rates:

Applicable Policies:

Outreach or Education:

Little education or outreach needed. Knowledge of facility and acceptance criteria spread quickly, virally, word of mouth.

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Waste Options, Inc. was hired to build and run a new City MRF and C&D processing building.

Source

Source:

Steve Winzel of Waste Options, Inc. 508.922.4825

Facility	
Facility/Jurisdiction Name: City of Napa and Napa Recycling and Waste Services	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Private Operation	Operator: Napa Recycling and Waste Services; then City of Napa
Facility/ Practice Type: Material Recovery Facility / Shared use of facilities	Location: Sunnyvale, CA
Diversion	
<p>Diversion Method / Practice Description:</p> <p>The MRF was built in the early 1990s with an equity share agreement between the City and a local recycling company, Napa Garbage Service. At the end of the term (2005), the City and Napa Garbage Service would each have 50% ownership in the facility and the City would have the right of first refusal to purchase entire ownership in the MRF which they did. In January of 2004 the City closed escrow and had 100 % ownership of the MRF.</p> <p>Having complete ownership of the MRF put the City in a very competitive position to negotiate a contract with an operator. The bidders submitted on a collection contract and also a processing contract; the City could have chosen a separate contractor for each aspect but they chose to have only one contractor. The City allowed for partnerships within those bidding because they asked for experience and expertise in all of the following areas of solid waste management: 1) Unions, 2) Collection services, 3) Operating a MRF, 4) Composting, 5) Construction and demolition, 6) Financial.</p> <p>The City selected a four company partnership composed of four family operated businesses that formed a LLC. The City laid out the contract in the solicitation and two of the key factors in their selection were 1) cost and 2) companies had to provide written exceptions to the contract in their bid, the winning company had no exceptions. The City’s technical staff summarized the bids and advised the City Council however, all decisions were ultimately made by the City Council in open council sessions. Companies bidding on the contract could have been eliminated if they contacted elected officials and there were no negotiations, all promises were made in writing. The initial contract was for 10 years with four one-year renewal options.</p> <p><u>Contractual arrangement</u></p> <p>Contractor is guaranteed three (3) percent indexed for inflation. They also get:</p> <ul style="list-style-type: none"> ▪ Share of materials sales. 100% of money goes to City; they give 30% of materials sales to the contractor. ▪ A base number of tons was established in the initial contract in each of the four primary processing areas (wood, MRF, composting and C&D) which totaled to 80,000 tons per year. The Contractor incurs costs for exceeding the base tonnage and costs for operating each of the processing areas but for whatever tonnage they exceed the 80,000 tons base the cost/unit went down. The City pays the contractor a per unit cost for exceeding the base. For example in 2009 the contractor processed 95,000 tons and received \$750,000. ▪ In the contract it states that 50% of materials have to be diverted. If less than 50% is diverted then the Contractor incurs a financial penalty but they receive incentive pay for diverting more than 50%. The incentive pay escalates based on how much above 50% diversion they are. ▪ Every third year of the contract the City and Contractor go through a cost review to “reset” the base. For example, contract was based on Contractor servicing 21,000 residential customers but in 2008 they serviced 21,500 residential customers. During contract review, the City awarded them 500 	

more units of cost since the customer base had grown.

Advantages and disadvantages

Advantages

- Transparency – The City is the gatekeeper and maintains operations of the scale.
- Aligned interests – There is a mutual interest in expanding recycling. If there are max rates for provider than more recycling erodes their customer base since recycling is free to customers. Napa wanted to change this so they increased the financial stake the contractor has in recycling.
- New ideas - Contract allows City and Contractor to change the scope in mid-contract. For example, the Contractor noticed a lot of whole colored bottles would go through the pre-sort area (not broken pieces) so they came up with a proposal to add two more sorters to separate bottles by color making them more valuable. The City paid 70%, the Contractor paid 30% for new equipment and they split profits 70% and 30%, respectively, on materials sold.

Disadvantages

- Incentive structure for a mixed C&D transfer station. The Contractor just started operating a transfer station for C&D and the City is not the gatekeeper. They are in the process of revising the incentive structure so the City can maintain transparency and trust with the Contractor that they value.

Diversion Target (Residential, Commercial, Industrial, Self-Haul):
Residential, Commercial

Diverted Target (Materials):
Residential recyclables, wood, organics, C&D

Diversion Effectiveness (Moderate, High, Highest):
At least 50% per the contract.

Requirements

Equipment:

Staffing Required:

Space Requirements:

Power Requirements:

Technology:

Staffing Required:

Space Requirements:

Power Requirements:

Costs / Revenues

Capital Costs:

Operating And Maintenance Costs:

Revenue Generation:

From above: a base number of tons was established in the initial contract in each of the four primary processing areas (wood, MRF, composting and C&D) which totaled to 80,000 tons per year. The Contractor incurs costs for exceeding the base tonnage and costs for operating each of the processing areas but for whatever tonnage they exceed the 80,000 tons base the cost/unit went down. The City pays the contractor a per unit cost for exceeding the base. For example in 2009 the contractor processed 95,000 tons and received \$750,000.

Policies

Applicable Rates:

Applicable Policies:

Outreach or Education:

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Kevin Miller 707-257-9200 ext. 7291, kmiller@cityofnapa.org

Cold Canyon Resource Recovery Park

Facility	
Facility/Jurisdiction Name: Cold Canyon Resource Recovery Park	
Arrangement (Public Only, Private Only, Public-Private): Private Ownership; Private Operation	Operator: Waste Connections
Facility/ Practice Type: Self-Haul Drop off area	Location: San Luis Obispo, CA
Diversion	
Diversion Method / Practice Description: The Cold Canyon Resource Recovery Park is owned and operated by Waste Connections and is supported by the San Luis Obispo Integrated Waste Management Authority. Resource Recovery Parks are places where materials can be dropped off for donation or buyback and co-locates reuse, recycling and composting, processing, manufacturing, and distribution activities. Typically, these facilities are located in industrially zoned areas that are reserved for companies that process secondary materials or make other products from these materials. The Resource Recovery Park concept has been evolving naturally at landfills and transfer stations. These facilities have continued to provide additional recycling opportunities for self-hauled loads. Landfills and transfer stations have been near the centers of waste generation. A Resource Recovery Park can make the landfill or transfer station more sustainable by diversifying revenue, conserving capacity, and extending the useful life of those facilities. Self-haul customers are typically charged by the load. For example, at the Cold Canyon Landfill in San Luis Obispo County, self-haul customers are charged \$25 per load (which equates to \$70 per ton). At this facility, customers must separate recyclables at the resource recovery park or pay an additional \$20 fee if they are unwilling to sort their loads. Self-haulers directed to bunkers for separating materials including metal, yard trimmings and C&D. The Resource Recovery Park confirms that over 97 percent of self-haulers separate their materials.	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential and Commercial	
Diverted Target (Materials): Scrap metal, glass, plastic containers, newspapers, cardboard, mixed paper, appliances, yard trimmings	
Diversion Effectiveness (Moderate, High, Highest): High	
Requirements	
Equipment: Bunkers and Bins	
Staffing Required: 1 Spotter	Space Requirements: Power Requirements:
Technology:	

Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs:		
Operating And Maintenance Costs:		
Revenue Generation:		
Policies		
Applicable Rates: \$25 minimum; \$70 per ton pro rated		
Applicable Policies:		
Outreach or Education:		
Implementation		
Implementation Timeline (Short, Long):		
Risks:		
Other Notes		
Notes:		
Source		
Source:		

Facility																										
Facility/Jurisdiction Name: Davis Street Transfer Station																										
Arrangement (Public Only, Private Only, Public-Private): Private Ownership; Private Operation	Operator: Waste Management																									
Facility/ Practice Type: Public Areas for Self-Haul Recovery	Location: San Leandro, CA																									
Diversion																										
<p>Diversion Method / Practice Description:</p> <p>The Davis Street Transfer Station is owned and operated by Waste Management and receives solid waste and recyclable materials from franchised solid waste haulers, construction and demolition contractors and commercial and residential self-haul customers. It is located on the site of a former landfill in an urban area adjacent to the City of Oakland.</p> <p>In 2008, Waste Management filled in its public area pit and created a flat floor area for unloading self-haul materials. In 2009, Waste Management opened its public area materials recovery facility (MRF). All self-haul is now processed for recovery. There are four areas for self-haul customers to unload based on the materials they have in their loads. All self-haul drop-off and processing areas are located after the fee gate.</p> <p>Waste Management also operates a public reuse and recycling zone for shoes, belts, clothing, compact disks, VHS tapes, magazines, paper and cardboard. Self-haul customers with these targeted materials are directed to the reuse and recycling zone prior to off-loading at the public area MRF.</p> <p>Self-haul customers with clean loads of yard trimmings and wood waste are directed to the organics processing area and customers with mattresses, carpet or electronic scrap are directed to a separate staging area.</p>																										
<table border="1"> <thead> <tr> <th>Self-Haul Recovery</th> <th>Staffing (full-time equivalent)</th> <th>Equipment</th> <th>Targeted Materials</th> <th>Rates</th> </tr> </thead> <tbody> <tr> <td>Public area reuse & recycling</td> <td>1.5 helpers</td> <td>Cubic yard dumpsters</td> <td>Shoes, belts, clothing, CDs, VHS tapes</td> <td>\$121.43 per ton \$35 per cubic yard</td> </tr> <tr> <td>Public area MRF</td> <td>2 shifts of 12 sorters Loader operator</td> <td>Sorting line Loader</td> <td>Cardboard, wood, metal and mixed rigid plastic</td> <td>\$121.43 per ton \$35 per cubic yard</td> </tr> <tr> <td>Organic processing</td> <td>Loader operator</td> <td>Loader</td> <td>Yard trimmings, wood</td> <td>\$60 per ton \$26 per cubic yard</td> </tr> <tr> <td>Mattresses, carpet and electronic scraps recycling</td> <td>1.5 helpers</td> <td>Roll-off containers Electronic scrap boxes</td> <td>Mattresses, carpet, electronic scrap</td> <td>\$21.70 per mattress \$7.50 per carpet \$12.18 everything with a plug Free for everything with a screen</td> </tr> </tbody> </table>		Self-Haul Recovery	Staffing (full-time equivalent)	Equipment	Targeted Materials	Rates	Public area reuse & recycling	1.5 helpers	Cubic yard dumpsters	Shoes, belts, clothing, CDs, VHS tapes	\$121.43 per ton \$35 per cubic yard	Public area MRF	2 shifts of 12 sorters Loader operator	Sorting line Loader	Cardboard, wood, metal and mixed rigid plastic	\$121.43 per ton \$35 per cubic yard	Organic processing	Loader operator	Loader	Yard trimmings, wood	\$60 per ton \$26 per cubic yard	Mattresses, carpet and electronic scraps recycling	1.5 helpers	Roll-off containers Electronic scrap boxes	Mattresses, carpet, electronic scrap	\$21.70 per mattress \$7.50 per carpet \$12.18 everything with a plug Free for everything with a screen
Self-Haul Recovery	Staffing (full-time equivalent)	Equipment	Targeted Materials	Rates																						
Public area reuse & recycling	1.5 helpers	Cubic yard dumpsters	Shoes, belts, clothing, CDs, VHS tapes	\$121.43 per ton \$35 per cubic yard																						
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<p>Diversion Target (Residential, Commercial, Industrial, Self-Haul):</p> <p>Self-haul customers include:</p> <ul style="list-style-type: none"> • 12 to 15 percent residential customers • 85 to 88 percent contractors and commercial customers 																										

Diverted Target (Materials):
See Above

Diversion Effectiveness (Moderate, High, Highest):
The public area MRF processes 200 tons per day of self-haul diverting approximately 60 percent of materials processed.

Requirements

Equipment:

See Above

Staffing Required:

See Above

Space Requirements:

Organics Processing and Transfer Facility: 35,000 sq. ft.
Public Area Materials Recovery Facility (PAM): 1.5 acra

Power Requirements:

Technology:

Staffing Required:

Space Requirements:

Power Requirements:

Costs / Revenues

Capital Costs:

Organics Processing and Transfer Facility: 35,000 sq. ft.
Public Area Materials Recovery Facility (PAM): \$1.5 Million

Operating And Maintenance Costs:

Castro Valley Sanitary District's *total* operational expense for 2012/2013 for was \$7,519,620.

Revenue Generation:

Policies

Applicable Rates:

See Above

Applicable Policies:

Outreach or Education:

This site relies heavily on personal instructions to visitors to direct them to the right area, although they do have signage specific to the "re-use" area which customers sort themselves. All other materials are sorted by staff.

Their web site has a video that explains how the facility operates. Notably, the video features an aerial shot of the facility which shows now only what is accepted but gives visitors a sense of where it goes.

<http://www.dsgardencenter.com/>





- DAVIS STREET
- CURBSIDE RECYCLING
- C AND D RECYCLING
- ORGANICS RECYCLING
- RESIDUALS
- RECYCLING FACTS
- WM EARTHCARE
- IRECYCLE@SCHOOL
- IN THE COMMUNITY
- ENVIRONMENTAL PERFORMANCE
- RATES
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Davis Street Resource Recovery Complex

The Davis Street Resource Recovery Complex offers the Bay Area a safe and reliable recycling, organics processing and residual transfer facility. Through state-of-the-art technology and nearly 300 green jobs, we are helping local communities reach their diversion goals. Currently we process and divert over 2 million pounds of materials per day. Thanks to innovative technology and accurate customer sorting of materials at home, the office and construction sites, more materials are recovered each day for recycling, reuse and renewal.



Video:

WM Davis Street Resource Recovery Complex Videos
Where does it all go?

Did You Know:

More than 2 million pounds of materials are processed for...

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Rebecca Jewell, Recycling Programs Manager, Davis Street Transfer Station

http://www.cvsan.org/sites/default/files/DH%20budget%20with%20Cost%20Accounting%20Numbers%20FINAL_%202011-01-10_0.pdf

Facility	
Facility/Jurisdiction Name: El Cerrito Recycling Center	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Public Operation	Operator: City of El Cerrito
Facility/ Practice Type: Self-Haul Recovery	Location: El Cerrito, CA
Diversion	
Diversion Method / Practice Description: <p>The El Cerrito Recycling Center is owned and operated by the City of El Cerrito. It was built in 1972 as one of the first recycling centers in the United States. The Recycling Center was rebuilt in 2011-2012 at a cost of \$2 million to serve as the sustainability hub for the City's environmental mission and programs, and is home to the City's Environmental Services Division and curbside recycling operation.</p> <p>Throughout its 41-year history, the El Cerrito Recycling Center has been a resource to the communities throughout the East Bay as a recycling drop-off center. Prior to the expansion of residential curbside and commercial recycling programs, the El Cerrito Recycling Center was one of only a few centers in the East Bay for drop-off recycling. It still serves a key role in the community for generators who are underserved by recycling programs, including multi-family buildings and small businesses.</p> <p>The El Cerrito Recycling Center has continued its leadership in sustainable materials management by filling the gaps left by traditional recycling programs. In recent years, it has expanded its mission to cover an increasing list of reusable and recycle materials that cannot be handled through traditional recycling programs including: compact fluorescent lamps and tubes, cooking oil, motor oil, oil filters, pharmaceuticals and sharps, large block expanded polystyrene, plastic wrap and plastic bags, carpet, reusable building materials, reusable clothing, household goods, books, art and office supplies.</p>	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential, Commercial, Self-Haul	
Diverted Target (Materials): Cartons and aseptic packaging, batteries, scrap metal, clothing, collectibles, building materials, sport equipment, furniture, house wares, insulation, lumber, plate glass, expanded polystyrene, used cooking oil, used motor oil, pharmaceuticals and sharps, electronics scrap and small appliances, books, glasses, garden pots, tools, corks, magazines, and all curbside recyclables	
Diversion Effectiveness (Moderate, High, Highest): High	
Requirements	
Equipment: Drop-Off Area: 1 horizontal baler, 3 forklifts, densifier, 30 3 to 7 cubic yard bins and 40 cubic yard roll-off boxes	
Staffing Required: .5 manager 1-2 spotter/helpers	Space Requirements: Power Requirements:

Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs: Retrofit cost \$2 million.		
Operating And Maintenance Costs:		
Revenue Generation:		
Policies		
Applicable Rates: Funded through a surcharge on the collection rate (approximately \$4 per customer per month). Some material-specific fees.		
Applicable Policies: Recycling Center is open to all.		
Outreach or Education:		
Implementation		
Implementation Timeline (Short, Long):		
Risks:		
Other Notes		
Notes:		
Source		
Source:		

Hennepin County Recycling Center and Transfer Station

South Hennepin Recycling and Problem Waste Drop-off Center

13

Facility		
Facility/Jurisdiction Name: Hennepin County Recycling Center and Transfer Station South Hennepin Recycling and Problem Waste Drop-off Center		
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Private Operation	Operator: Waste Management	
Facility/ Practice Type: Outreach and Education	Location: Minneapolis, MN	
Diversion		
Diversion Method / Practice Description: Use a Transfer Station voucher program supported by a customer service hotline to address transfer station questions. Because residents are required to call to get a voucher to come to the facility, everyone has an opportunity to speak one-on-one with customer service staff and get all of the relevant information they need. Also do mailings “We have the scale house right by the scale. The attendant can talk to them while they’re on the scale.” Signage shows where to drive in, where to stop; have signage at the proper locations. Appliances, separate out mattresses, mix of movable and permanent signage. Have moved it around. Generally they’re pretty much fixed. Tires & Mattresses get moved around by volume. Garbage always goes in one spot. Detailed information on what materials are accepted—and how to prepare them—are also clearly displayed on their web site. Staff assistance is not to help unload, but rather a safety focus, putting items in the right spot. No dumping stuff that’s not accepted. Staff operates front-loader and bobcat. Sometimes staff will pull, but not typically—hazardous materials get pulled. Customers are not allowed to put things right into the pit. Not a lot of staff turn-over. Same person for 10 years. No training, but when they first start, policies, rates, rules, and customer service are reviewed.		
Diversion Target (Residential, Commercial, Industrial, Self-Haul): x		
Diverted Target (Materials): Appliances/bulk goods, scrap metal, matt, tires, construction debris. Looking at adding curbside for more materials.		
Diversion Effectiveness (Moderate, High, Highest):		
Requirements		
Equipment: x		
Staffing Required: Eight customer service reps	Space Requirements: x.	Power Requirements:

Technology:

Staffing Required:

Space Requirements:

Power Requirements:

Costs / Revenues

Capital Costs:

x

Operating And Maintenance Costs:

Revenue Generation:

Policies

Applicable Rates:

Applicable Policies:

Outreach or Education:

Minneapolis City of Lakes
Official Website of the City of Minneapolis

CITY SERVICES RESIDENTS BUSINESS GOVERNMENT VISITORS *Need help? Contact 311*

SEARCH: [input] ALL CITY DEPARTMENTS [dropdown]

Text -A A +A Translate

Home > Solid Waste & Recycling

What To Do List - A

This alphabetical list helps you determine the best way to dispose of everyday things. Click an item for instructions on how to dispose, recycle, or drop off your items. Click on the icon for more information.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

- [Acid](#)
- [Acorns](#)
- [Adhesives](#)
- [Aerosol Cans](#)
- [Air Compressors](#)
- [Air Conditioners](#)
- [Aluminum Cans](#)
- [Aluminum Foil/Trays](#)
- [American Flag](#)
- [Ammunition](#)
- [Animals, Deceased](#)
- [Answering Machines](#)
- [Ant Poison](#)
- [Antifreeze](#)
- [Appliances](#)
- [Arm Chair](#)
- [Asbestos](#)
- [Ashes, Fireplace, Fire pit](#)
- [Asphalt](#)
- [Asphalt Sealer](#)
- [Asphalt Shingles](#)
- [Automobiles](#)
- [Automobile Engines](#)
- [Automobile Fluids](#)
- [Automobile Parts](#)
- [Automobile Tires](#)

Solid Waste & Recycling
309 2nd Ave S., Room 210
Minneapolis, MN 55401-2281

Contact Information

- Solid Waste & Recycling
- Holiday Schedule
- Customer Service +
- Garbage +
- Recycling +
- >>What To Do List -
- Donate Reusable Items
- Yard Waste +
- Voucher Program +
- About Us +
- Clean City +

Item	What to do	Handle As	Donate
Acid	Do NOT place in the garbage cart. This item NOT collected by Solid Waste & Recycling or accepted at the South Transfer Station. Disposal with garbage is prohibited.		
Acorns	Acorns can be included with grass clippings and leaves. Place in bags. Each bag must weigh less than 40 lbs. Do not use bags larger than 33 gallons. State law prohibits disposing of yard waste with the garbage. South Transfer Station does not accept yard waste. Yard waste collected mid-April through mid-November, weather permitting.		

<http://www.minneapolismn.gov/solid-waste/whattodo/index.htm>

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Jeff Jenks, Business Application Manager (previous Interim Director for Solid Waste and Recycling)

Facility	
Facility/Jurisdiction Name: Last Chance Mercantile	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Public Operation	Operator: The Monterey Regional Waste Management District
Facility/ Practice Type: Public-only ownership model; reuse and salvage from self-haul and citizen drop-off.	Location: Marina, CA
Diversion	
Diversion Method / Practice Description: <p>The Monterey Regional Waste Management District operates the Last Chance resale store as part of its Regional Environmental Park in Marina, Calif. The environmental park includes a 315-acre landfill, MRF, public recycling drop-off bins, household hazardous waste management facility, construction and demolition (C&D) recycling operations, composting facilities, soils blending facility, landfill gas recovery power plant, and water pollution control facility.</p> <p>Initially, staff salvaged materials from the face of the landfill and accumulated them until they had enough for an auction or a sale. The district held quarterly sales, then monthly sales, then weekly sales, and then sales two days per week. By 1991, the district had dedicated a shed in a corner of the district property to store these salvaged materials. In 1996, the district upgraded its salvaging activities and constructed the Last Chance facility as part of a variety of site improvements, including a state-of-the-art \$9 million MRF. Public self-haul vehicles and rolloff trucks now dump their materials on the MRF tipping floor. District staff then salvages materials from the tipping floor. Salvaging at the MRF guarantees a steady flow of resale items for the Last Chance store.</p> <p>The Last Chance includes a room for processing materials for resale; indoor space for displaying items such as books, clothing, sporting goods, household items, and furniture; office space for the store manager; and restrooms. Building materials, plumbing fixtures (for example, tubs and sinks), patio furniture, and other items not affected by the weather are displayed outside.</p>	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential and Commercial; Self Haul	
Diverted Target (Materials): Furniture; Lumber; Used building materials; Housewares; Garden; Hardware/electrical; Clothes and textiles; Sporting goods; Reusable paints, cleaners, and pesticides; Automotive parts. Accepts free of charge electronic items for recycling including: televisions, computers, printers and faxes.	
Diversion Effectiveness (Moderate, High, Highest):	
Requirements	
Equipment: The district uses a Caterpillar 315L track excavator at the MRF with grapple attachment and RC60 CAT forklift, two 16-ft. flatbed trailers, and a district pickup truck to sort and move salvaged materials around the property.	

Staffing Required: 12	Space Requirements: 8,000 square foot building; 2- acre yard.	Power Requirements:
Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs: The 8,000-square-foot building and paved 2-acre yard for the Last Chance were constructed in October 1996 at a cost of \$739,000.		
Operating And Maintenance Costs: The store's income fully covers the annual operating cost of the facility, including staff, materials, equipment, repairs and maintenance, and utilities (but excluding financing). The payroll budget of about \$200,000 (1999) includes the Last Chance/HHW manager, assistant manager, ten sales clerks (hourly personnel) and related benefits.		
Revenue Generation: All income from the Last Chance Mercantile is used to operate the store and to fund other MRWMD recycling activities		
Policies		
Applicable Rates:		
Applicable Policies:		
Outreach or Education: The district has a comprehensive public education program to actively support member cities in reaching the 50 percent waste reduction goal of the IWMA. District staff members produce numerous brochures and media campaigns throughout the year to inform the public about specific district programs and to share information on how to reduce, reuse, and recycle. The general manager and other staff also join with two public education staff members to participate in local committees and community groups.		
Implementation		
Implementation Timeline (Short, Long):		
Risks:		
Other Notes		
Notes:		

Source

Source:

CalRecycle (formerly California Integrated Waste Management Board), Publication # 310-02-01, July 2002

Facility		
Facility/Jurisdiction Name: North Gateway Transfer Station and Materials Recovery Facility		
Arrangement (Public Only, Private Only, Public-Private): Public Ownership & Operation	Operator: City of Phoenix Public Works	
Facility/ Practice Type: Outreach and Education	Location: Phoenix, AZ	
Diversion		
Diversion Method / Practice Description: <p>Extensive education program related to recycling in general, with 6 staff educators who get 2-3 weeks of training on City’s recycling programs. Then they present in schools, showing videos of separating that happens at transfer stations and they take students on tours. Staff even stay at the school for a full week, monitoring adoption of new recycling habits and providing course-correcting information as needed. The curriculum is state certified for multiple grade levels and they find that repetition is effective.</p> <p>They don't necessarily do the education at the transfer station, but rely on signage. Provide magnet sheets to whomever asking. Most educational materials are available in English and Spanish, which is particularly important to Phoenix where the population is 40% Hispanic.</p> <p>Have made creative use of community art projects to increase awareness of transfer stations and recycling: http://phoenixrecyclingproject.org/</p> <p>All signage at transfer station is in English and Spanish. PIOs do the other languages. Welcome packet when people move in--includes transfer station info. Call center distributes that when we see utility changes.</p>		
Diversion Target (Residential, Commercial, Industrial, Self-Haul): x		
Diverted Target (Materials):		
Diversion Effectiveness (Moderate, High, Highest): 30%+ diversion rate at transfer station		
Requirements		
Equipment: x		
Staffing Required:	Space Requirements: x.	Power Requirements:
Technology:		
Staffing Required: 6 staff educators	Space Requirements:	Power Requirements:

Costs / Revenues

Capital Costs:

x

Operating And Maintenance Costs:

Revenue Generation:

Policies

Applicable Rates:

Applicable Policies:

Outreach or Education:

Excellent consumer-facing web site with information about using transfer stations on Public Works homepage:

The screenshot shows the City of Phoenix Public Works Department website. The browser address bar displays phoenix.gov/publicworks/index.html. The page features a navigation menu with links for Residents, Businesses, Visitors & Newcomers, Public Safety, Transportation, Culture & Recreation, City Government, Employment, and Sustainability. A purple banner at the top of the main content area states: "City of Phoenix Human Resources online services, such as job listings and job applications, will be intermittently unavailable from 6 a.m. to noon Saturday, Dec. 15, during scheduled maintenance." The main heading is "Public Works Department" with a breadcrumb trail "Home > Public Works". A large banner image shows a woman in a red shirt looking thoughtful, with a speech bubble that says "I'm cleaning my garage. Where can I take the garbage?". The banner also includes the text "Questions? Public Works has answers." and an icon navigation bar with symbols for a recycling bin, a trash truck, a recycling bin, a recycling bin, and a recycling bin. Below the banner, the text reads "Public Works... for you!" followed by a welcome message: "Welcome to the new Public Works Department home page. This website was designed just for you, our customers. At the top of the page you'll find commonly asked questions related to garbage collection and recycling. Just click on the image and you'll be directed to the information you need. You also may access this information using the icon navigation bar in the center of the page." Below this, it states: "The Public Works Department also is home to the city's Sustainability efforts. Public Works is committed to providing the highest quality, cost-effective, timely, environmentally and diversity sensitive management of solid waste services, city equipment and facilities, and energy programs." and "Explore this website and you'll discover all the ways Public Works, works for you!". A section titled "Watch the latest Talking Trash Show!" is partially visible. On the right side, there are two vertical banners: "Transfer Station Rate Changes" and "New to Blue" with the text "Is your trash collected by the city, but you don't yet recycle? Start today!". At the bottom right, there is a section titled "In the News" with the text "Read the latest news and learn how Public Works for you! >>".

<http://phoenix.gov/publicworks/index.html>

Implementation
<p>Implementation Timeline (Short, Long):</p> <p style="padding-left: 20px;">x</p>
<p>Risks:</p> <p style="padding-left: 20px;">x</p>
Other Notes
<p>Notes:</p> <p style="padding-left: 20px;">x</p>
Source
<p>Source:</p> <p style="padding-left: 20px;">Robert Amaya, Solid Waste Education Office, City of Phoenix</p>

Facility		
Facility/Jurisdiction Name: Portland Metro South Station		
Arrangement (Public Only, Private Only, Public-Private): Public-Private. Public owns facility and contracts to private sector for operation		Operator: Recology (1 st station); Allied Waste (subsidiary of Republic Services) (2 nd station).
Facility/ Practice Type: MRF		Location: Portland, OR
Diversion		
Diversion Method / Practice Description: Drop-off bins/boxes for self-haul source separated, Conveyor Sort line (4 station).		
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Acceptance and handling of solid waste collected by commercial haulers and acceptance and handling of solid waste and recyclables delivered by self-haulers and small businesses.		
Diverted Target (Materials): Metals: Aluminum, Tin cans, scrap, and appliances; Fibers: OCC, ONP, magazines, catalogs, scrap paper; Glass containers; Motor oil and antifreeze; Plastics: film, milk jugs, bottles, tubs; Carpet; Electronics; Wood waste.		
Diversion Effectiveness (Moderate, High, Highest): Moderate. Waste diversion rates in 2009 were 15% at MSS.		
Requirements		
Equipment: Rubber-tired Loader, Excavator, Rubber-Tired backhoe, skid steer loader, Bunkers, Small carts.		
Staffing Required:	Space Requirements:	Power Requirements:
Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs:		

Operating And Maintenance Costs:

Revenue Generation:

Policies

Applicable Rates:

Applicable Policies:

Station operators are required by contract to divert and recover materials from disposal.

Outreach or Education:

Metro has a recycling information line (1-800 number) that customers can call about any kind of material and learn about their recycling or disposal options.

Metro has a very robust staff education program. Most notably they exchange staff from the transfer stations through their recycling education office to help all develop better customer service and communication skills. This is repeated every few years or when programs change.

They have video devoted to the transfer station that explains “how to” information for customers as well as background information about station design, where the materials go, the public-private partnership that operates the stations, and more.

<http://www.oregonmetro.gov/index.cfm/go/by.web/id=31447> the video is also featured prominently on their web site (pictured below).

The screenshot shows the Metro website interface. The main content area features a video titled "What goes on at Metro's transfer stations?" with a description: "Find out how you can save time and money at Metro's transfer stations by preparing your load correctly - sorting your recyclables and covering your load. Watch a video of a transfer station in action." Below the video is a "Watch the video" link. To the right of the video is a sidebar with navigation links: "METRO CENTRAL", "METRO SOUTH", "TRANSFER STATION VIDEO", "RATES AND FEES", and "MATERIALS ACCEPTED". Below the sidebar is a featured news section titled "Impassioned civil discourse in your pajamas." with the Optin logo. The bottom of the page has a "CONNECT WITH METRO" section with social media icons.

They are currently upgrading their signage, which is close to 20 years old, to improve wayfinding and safety.



Metro Transfer Stations

from Uncage the Soul Productions PRO 5 months ago

Staff is very motivated. They will often encourage someone to go to another location because it is more likely to be recycled or save the customer weight. They are competing against the private sector but we're trying to do the right thing.

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Penny Erickson, Solid Waste Operations at Metro Regional Government

Facility	
Facility/Jurisdiction Name: Puente Hills	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Public Operation	Operator: The Sanitation Districts of Los Angeles County, which is a partnership of 24 independent special districts encompassing 78 cities
Facility/ Practice Type: The Puente Hills facility includes a transfer station and mixed waste MRF, with a landfill located behind the facility. The transfer station was established as a condition of the landfill extension permit to provide disposal capacity when the landfill closes in 2013. A decision was made to turn the transfer station into a hybrid MRF/transfer station. The Sanitation Districts own and operate a MRF at a different location for processing curbside recyclables.	Location: Whittier, CA
Diversion	
Diversion Method / Practice Description: Currently, incoming waste that appears to be rich in recyclables (primarily fiber) is pushed to the side, sorted on the floor to some extent, and then held until the MRF line operates on Wednesdays. Wood waste and carpet are also separated on the tip floor and pushed to the side in piles, and then loaded into transfer trailers and sent for grinding. All other waste is pushed into transfer trailers and disposed of in the landfill behind the facility.	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential and commercial	
Diverted Target (Materials):	
Diversion Effectiveness (Moderate, High, Highest): In 2008, the MRF line achieved a 48% average diversion rate and the facility as a whole averaged 23% diversion, but the MRF is operating only 1 day per week now.	
Requirements	
Equipment: <ul style="list-style-type: none"> • Initial sorting on the tip floor, and then in-feed conveyor. • Presort line where film plastics and anything that will jam up the equipment are pulled off. • Disk screen to capture OCC; fines are disposed. • Mid-sized materials go to manual sorting line where paper, OCC, containers, and film plastics are pulled off. 	

Staffing Required: MRF line used to have 25 FTE, but now down to 12.	Space Requirements: MRF and transfer station combined are 217,000 sq. ft. MRF alone is 35,000 sq. ft. Entire processing facility is under roof.	Power Requirements:
Technology:		
Staffing Required:	Space Requirements:	Power Requirements:
Costs / Revenues		
Capital Costs: \$45 million (2004/05) for the MRF/transfer station, not including the land		
Operating And Maintenance Costs:		
Revenue Generation:		
Policies		
Applicable Rates: The tip fee for either facility is \$39 per ton.		
Applicable Policies: Tip fees at the landfill subsidize operations at the MRF/transfer station.		
Outreach or Education:		
Implementation		
Implementation Timeline (Short, Long):		
Risks:		
Other Notes		
Notes: The landfill had been receiving near its permitted capacity of 13,200 TPD, but tonnage is down to about 7,500 TPD. Because of the drop in tonnage, the MRF/transfer station was extremely underutilized. Permitted for 4,400 TPD of solid waste. Throughput: Currently receives 400-500 TPD of solid waste.		
Source		
Source: Pinellas. 2009. Materials Recovery Facility Technology Review. Pinellas County, Department of Solid Waste Operations, St. Petersburg, Florida. Prepared by Kessler Consulting, Inc., Tampa, Florida. September 2009.		

Salisbury-Sharon Transfer Station

Facility	
Facility/Jurisdiction Name: Salisbury – Sharon Transfer Station	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Public Operation	Operator: City of Salisbury
Facility/ Practice Type: Self-Haul Recovery	Location: Salisbury, CT
Diversion	
Diversion Method / Practice Description: The Salisbury-Sharon Transfer Station is owned and operated by the City of Salisbury. The transfer station has an extensive area for separating materials for recycling. They also host a Swap Shop for reusable toys and household items. The facility achieved a 42 percent diversion rate in fiscal year 2011-2012, the highest rate per capita in the region.	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential, Commercial, Self-Haul	
Diverted Target (Materials): Mixed paper, commingle containers, scrap metal, electronics, and C&D debris. The transfer station also diverts leaves and Christmas trees for mulch and composting. Specialty materials including batteries, used motor oil, paint, printer cartridges, and cell phones are collected separately.	
Diversion Effectiveness (Moderate, High, Highest): High	
Requirements	
Equipment: Drop-off bins, boxes and bunkers	
Staffing Required: 1 manager 1-2 spotters/helpers	Space Requirements: Power Requirements:
Technology:	
Staffing Required:	Space Requirements: Power Requirements:
Costs / Revenues	
Capital Costs:	
Operating And Maintenance Costs:	

Revenue Generation:

Residents of the towns of Salisbury and Sharon pay an annual fee of \$80 per vehicle for the first vehicle and \$40 for each additional vehicle to drop-off recyclable materials and trash at the transfer station. Material-specific charges for commercial customers

Policies

Applicable Rates:

Funded through a surcharge on the collection rate (approximately \$4 per customer per month). Some material-specific fees.

Applicable Policies:

Recycling Center is open to all.

Outreach or Education:

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Facility				
Facility/Jurisdiction Name: San Francisco Disposal & Recycling Facility				
Arrangement (Public Only, Private Only, Public-Private): Private Ownership; Private Operation			Operator: Recology	
Facility/ Practice Type: Transfer Station Self Haul Recovery			Location: San Francisco, CA	
Diversion				
Diversion Method / Practice Description:				
<p>SF Disposal & Recycling is the transfer station owned and operated by Recology and used primarily by Recology to process materials collected from its residential and commercial collection programs in San Francisco. The facility includes a drop-off area for self-haul customers. The Public Disposal and Recycling Area (PDRA) at SF Disposal & Recycling has evolved over time from an outdoor area where most materials were disposed to an indoor area focused on recovery. Recology converted 60,000 square foot building into the staging area for the PDRA.</p> <p>Self-haul customers proceed through the inbound scales and unload materials into bunkers and on the tipping floor. Four staff members recover materials via floor sort, including reusable items, carpet, universal waste, hazardous waste, porcelain and expanded polystyrene blocks. Approximately, 10 to 15% of the self-haul materials are diverted through floor sort. The remaining materials are loaded onto a conveyor and processed on a Ptarmigan sort line, which is located under a canopy immediately outside of the building. Ten to 12 sorters then separate additional materials, including cardboard, wood, metal, plastics, sheetrock, inerts, fines for diversion. An additional 50 to 70% recovery is achieved through sorting. Customers then proceed through the outbound scales and pay by weight. All self-haul materials are processed and the facility achieves a high 70+% diversion rate.</p>				
Self-Haul Recovery	Staffing (full-time equivalent)	Equipment	Targeted Materials	Rates
Self-haul floor sort area	4 sorters/helpers 1 loader	Loader	Reusable items (furniture, mattresses), carpet, building materials, Universal Waste, Hazardous Waste, porcelain, expanded polystyrene	\$140.76 per ton - site minimum of \$25 per load
Processing line	10-12 sorters	Conveyor and sort line	cardboard, wood, metal, plastics, sheetrock, inerts, fines	\$140.76 per ton - site minimum of \$25 per load
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential and Commercial				
Diverted Target (Materials): Floor Sort Area: Reusable items (furniture, mattresses), carpet, building materials, Universal Waste, Hazardous Waste, porcelain, expanded polystyrene Processing Line: cardboard, wood, metal, plastics, sheetrock, inerts, fines				

Diversion Effectiveness (Moderate, High, Highest):

Approximately, 10 to 15% of the self-haul materials are diverted through floor sort.

Requirements

Equipment:

Bunkers, bins, roll-off containers, loader, conveyor, sort line

Staffing Required:

4 sorters; 1 loader for floor
sort; 10-12 sorters for sort line

Space Requirements:

Power Requirements:

Technology:

Staffing Required:

Space Requirements:

Power Requirements:

Costs / Revenues

Capital Costs:

Operating And Maintenance Costs:

Revenue Generation:

Policies

Applicable Rates:

\$140.76 per ton - site minimum of \$25 per load

Applicable Policies:

Outreach or Education:

Implementation

Implementation Timeline (Short, Long):

Risks:

Other Notes

Notes:

Source

Source:

Facility	
Facility/Jurisdiction Name: Sunnyvale SMaRT Station	
Arrangement (Public Only, Private Only, Public-Private): Public Ownership; Private Operation	Operator: Bay Counties Waste Services
Facility/ Practice Type: The facility includes a mixed waste MRF, dual stream MRF, transfer station, yard waste grinding operation, and citizen drop-off.	Location: Sunnyvale, CA
Diversion	
Diversion Method / Practice Description: Mixed Waste MRF	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential - Waste from 3 participating cities – Sunnyvale (55%), Mountain View (24%), and Palo Alto (21%).	
Diverted Target (Materials):	
Diversion Effectiveness (Moderate, High, Highest): Old system diverted about 18- 22%. Current system is designed for 25% diversion, but can achieve 33-35%. Processing contract is structured to encourage increased diversion. If contractor diverts 25% of MSW, it receives 50% of all material revenue, including revenue for dual stream recyclables.	
Requirements	
Equipment: Enclosed presort area to recover wood, concrete, bulky metals, rejects (carpet, tires, clothing, leather, etc.), OCC. Rotating trammels with knives to cut open bags - <2" fines go through magnet and on to composting; >9" go to 2 fiber sort lines; and middlings (2"-9") go to disk screens. Overs from disk screens are primarily paper that goes to sort lines. Unders are primarily containers that go to magnet and eddy current, then sort line. Remaining waste is transported to landfill 27 miles away (tip fee is \$55.34/ton).	
Staffing Required:	Space Requirements: MRF is 50,000 sq. ft.; transfer station is 50,000 sq. ft.
	Power Requirements:
Technology:	
Staffing Required:	Space Requirements:
	Power Requirements:
Costs / Revenues	
Capital Costs: Retrofit cost \$14.7 million with contingencies.	

Operating And Maintenance Costs:
Revenue Generation:
Policies
Applicable Rates:
Applicable Policies:
Outreach or Education:
Implementation
Implementation Timeline (Short, Long):
Risks:
Other Notes
Notes: Permitted for 1,500 TPD. Currently receives about 1,000 TPD of materials, including 800 TPD of MSW. Mixed waste MRF should be capable of processing 50 TPH.
Source
Source: Pinellas. 2009. Materials Recovery Facility Technology Review. Pinellas County, Department of Solid Waste Operations, St. Petersburg, Florida. Prepared by Kessler Consulting, Inc., Tampa, Florida. September 2009.

Facility	
Facility/Jurisdiction Name: Urban Ore and the City of Berkeley	
Arrangement (Public Only, Private Only, Public-Private): Public-Private Partnership	Operator: Urban Ore (private company) and City of Berkeley (public agency)
Facility/ Practice Type: The City of Berkeley contracts with Urban Ore to scavenge reusable materials from the public drop-off area on transfer station floor.	Location: Berkeley, CA
Diversion	
Diversion Method / Practice Description: <p>Urban Ore operates a reuse and recycling transfer facility on a 3 acre site formerly used by a steel pipe manufacturer. Urban Ore leased the land and four buildings starting in 2000, invested \$1 M in upgrades by 2002 to bring the facility's main building up to code for mercantile use, and purchased most of the property from the pipe company in 2009.</p> <p>Urban Ore has two specialized retail areas, each with its own expert staff. These are the Building Materials Exchange and the General Store. Within each of these two retail environments there are a number of specialized departments dealing in a more limited range of goods. Examples are doors, windows, and lumber for Building Material Exchange, and furniture, hardware, and arts and media for General Store.</p> <p>Four departments' source, clean, and sort material that the retail operations convert into income. Salvage and Recycling scavenges materials under license to the City from the flat floor of the City's refuse transfer station. Outside Trader makes house and business calls to pick up materials by appointment. Both Building Materials and General Store are fed by two separate receiving departments that are empowered to buy, accept drop-offs, and write trade credits that are treated as money when they are spent. Urban Ore has developed markets for many materials often deemed "hard to recycle", such as window glass, aluminum window frames, and broken ceramics from toilets and dishes. It also handles more conventional recyclables such as cardboard. The Salvage and Recycling Department handles all recycling and trash preparation. Urban Ore believe it sends to landfill only about 2- 3% of what it takes in from all sources.</p> <p>About a mile to the north of Urban Ore, the City of Berkeley operates a 9.6 acre transfer station complex that features a "clean MRF" where most of the sorting and processing is done upstream by customers. Two private nonprofit recycling companies share about half the land area with several City collection entities managed under an "Enterprise Fund" structure. Ecology Center picks up residential recyclables weekly from the entire city. The City itself has a set of commercial recycling trucks that pick up recyclables from restaurants and businesses. Finally, Community Conservation Centers processes recyclables from these three entities as well as from its own buyback and drop-off facility.</p> <p>The City also collects plant debris and food at curbside with specialized packer trucks and offers self-haulers lower rates for clean plant debris and wood loads brought through the transfer station fee gate, which the City owns and operates. The City hauls these organics to a clean composting facility located east of the Bay Area in the San Joaquin watershed. Trash is delivered to several local landfills by City long-haul trucks. The City has not owned a landfill since 1983.</p> <p>The City of Berkeley contracts with Urban Ore to scavenge reusable materials from the public drop-off area on transfer station floor. City of Berkeley crews also do some floor salvaging, mostly of mixed</p>	

<p>metals. Urban Ore loads reusables onto trucks and transports them across town to the Urban Ore Resource Recovery Park for resale.</p> <p>Urban Ore stations three staff persons at the transfer station every day; these people are trained to know which potentially reusable materials are resalable. All Urban Ore staff members participate in a pay system that through income- and profit-sharing incentivizes them to divert as much material as possible from wasting and to feed it into the highest paying markets available.</p> <p>For perspective, the 7,000 tons per year that Urban Ore diverts is about the same as what the residential curbside program diverts, and also equals diversion from the combination drop-off/buyback system that Community Conservation Centers operates. The City's compost collections handle the most tonnage.</p>		
<p>Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential, Commercial, Self-Haul</p>		
<p>Diverted Target (Materials): Reusable materials</p>		
<p>Diversion Effectiveness (Moderate, High, Highest): During fiscal year 2008, Urban Ore removed approximately 820 tons of reusable material from the transfer station. This is about 12% of its total estimated diversion of 7,000 tons per year; the rest comes to the company from a combination of the Outside Trader and from the 50 - 100 vehicles that bring in loads each day to the onsite receiving departments. Official diversion estimates for Berkeley in 2009 were about 68%. None of that tonnage claimed for recycling was used as alternative daily cover (ADC) at landfills.</p>		
Requirements		
<p>Equipment:</p>		
<p>Staffing Required: Urban Ore stations three staff persons at the transfer station every day</p>	<p>Space Requirements:</p>	<p>Power Requirements:</p>
<p>Technology:</p>		
<p>Staffing Required:</p>	<p>Space Requirements:</p>	<p>Power Requirements:</p>
Costs / Revenues		
<p>Capital Costs:</p>		
<p>Operating And Maintenance Costs: The City has budgeted \$48,000 per year in 2010 to divert up to 1,200 tons per year.</p>		
<p>Revenue Generation: The City of Berkeley pays Urban Ore \$40 per ton for every ton of reusable materials that are removed from the transfer station. This represents a landfill cost savings to the City of approximately \$20 per ton, because the City must otherwise haul these materials to the landfill at a cost, including transportation and tipping fee, of about \$60 per ton. However, the actual benefit to the City is greater, because each ton Urban Ore takes in is paid for at the fee gate at the rate of \$126 per ton, making the total fiscal advantage \$86 per ton.</p>		

Policies
Applicable Rates:
Applicable Policies:
Outreach or Education:
Implementation
Implementation Timeline (Short, Long):
Risks: Includes labor negotiations
Other Notes
<p>Notes:</p> <p>Advantages</p> <p>There are several advantages to this arrangement:</p> <ul style="list-style-type: none"> ▪ The City of Berkeley can rely on the expertise of the Urban Ore staff to recover nearly all potentially resalable materials that would otherwise be landfilled. Since reusable goods may account for at least 5% of the tonnage received by wasting facilities that do not have access to a materials recovery enterprise like Urban Ore, this tonnage can be considerable. A transfer station floor study conducted by Cal Recovery years ago confirmed that Urban Ore's floor salvage reduced reusable goods going to the landfill to nearly zero. ▪ The City saves \$20 per ton in direct disposal costs for every ton of reusable materials that Urban Ore removes from the transfer station, and it gets to keep an additional \$66 dollars per ton in tipping fees paid by self-haul customers. ▪ Urban Ore collects and pays sales taxes, payroll taxes, and property taxes. Sales taxes amount to over \$200,000 per year; payroll taxes a similar amount; property taxes about \$95,000 per year currently. It provides 38 jobs at more than \$12 per hour. It supplies millions of dollars per year in construction and other materials to local artisans, contractors, property managers, and the like. It receives no subsidies. ▪ Urban Ore is fully insured to city specifications, and its safety record is outstanding. Urban Ore specializes in assisted unloading, which speeds the dumping process and generates good will from the haulers. ▪ Urban Ore staff assists City staff in segregating recyclable materials from the public drop-off area that are then recycled by the City. <p>Disadvantages</p> <p>There are some disadvantages to the current arrangement:</p> <ul style="list-style-type: none"> ▪ In 2000, Urban Ore moved from a site three blocks from the transfer station to a site over a mile away from the transfer station. This made it harder for customers to visit both facilities in the same pass. ▪ Customers must pay to tip their loads at the transfer station but they may be able to drop-off the material at Urban Ore for free, for cash, or for store credit. ▪ The current configuration of the transfer station is not efficient because it was built to feed an incinerator that was rejected by Berkeley voters. It is old, dilapidated in parts, and cluttered with incompatible uses. Customer access to the facility is restricted. Both the City of Berkeley and Urban

Ore have invested cash toward redesigning and rebuilding the transfer station to make it more friendly to the City's announced goal of zero waste.

Source

Source:

Dan Knapp and Mary Lou Van Deventer, Owners (510) 841-SAVE (7283) dr.ore@urbanore.net and marylouvan@urbanore.net

Facility	
Facility/Jurisdiction Name: Western Placer Waste Management Authority (WPWMA)	
Arrangement (Public Only, Private Only, Public-Private): Public	Operator: Nortech operates all processing and composting facilities. WPWMA retains control of the scale-house and all money exchanges.
Facility/ Practice Type: Mixed Waste MRF	Location: Lincoln, CA
Diversion	
Diversion Method / Practice Description: The facility includes a mixed waste MRF, composting operation, C&D recovery, citizen drop-off, and landfill. Since recyclables are not collected separately, they have initiated the “1 Big Bin” public education campaign to educate residents that their 90-gallon cart is actually a recycling can because of the MRF. Green wastes (food and yard wastes) are collected separately and composted. Participating cities entered into agreements with the county in 1978, which lasted until the landfill bonds were paid off. Because the MRF contract was based on the value of commodities, the cities were required to send a consistent waste stream to the facility during the term of the agreement (i.e. they could not initiate curbside recycling). When the landfill bond was paid off, the county and cities renegotiated these agreements. For example, Roseville is now allowed to market materials collected at its drop-offs and segregated loads of commercial OCC.	
Diversion Target (Residential, Commercial, Industrial, Self-Haul): Residential and Commercial It consists of unincorporated Placer County (40% of waste stream), Roseville (40%), Rocklin (10%), and Lincoln (10%).	
Diverted Target (Materials): All residential and commercial waste from member communities, which have a combined population of about 270,000. MSW and green wastes are collected in separate 90-gallon carts. MSW – 250,000 TPY, all except about 10% (bulky waste, food waste, and sludge) is processed at MRF. Green waste (yard waste and food waste) – 50-55,000 TPY. C&D – 16-18,000 TPY.	
Diversion Effectiveness (Moderate, High, Highest): Site-wide diversion rate is 50%. MRF diversion rate is 28-30%, but has performance tested at 37-38%. A large percentage of the diversion comes from C&D, green waste, and sludge, but the MRF was a key factor in achieving 50% diversion.	

Requirements

Equipment:

Floor sort and in-feed conveyors (2).

Presort for bulky waste, contaminants, and bagged waste, which is diverted to a debagger.

Trammel screen (10") – overs (paper) go to sort lines in the old facility to be cleaned and baled.

Unders go to a triple deck disk screen – overs (paper) go to a sort line to be cleaned and baled.

Unders go to a 12' wide slanted disk screen – overs (paper) go to a sort line to be cleaned and baled.

Unders go to container line, which includes magnet, eddy current, and sort line.

Optical sorter is being tested at the end of 1 paper line. The line is negatively sorted for paper and the optical sorter is being used to remove any remaining contaminants.

Staffing Required:

The WPWMA is staffed by county employees

Nortech has about 240 staff overall, about 80-100 of which work in the MRF. Operating hours: Currently operating 1 shift per day, but the facility is staffed 24 hours per day. To achieve design capacity, a second shift will be added when needed.

Space Requirements:

Total site is 320 acres. MRF, composting, and C&D areas combined are 40 acres.

Power Requirements:

Technology:

Staffing Required:

Space Requirements:

Power Requirements:

Costs / Revenues

Capital Costs:

Original MRF cost \$22M. MRF retrofit and C&D line cost \$26M. Some of the old MRF equipment was used in C&D line. All capital costs were paid for with reserves.

Operating And Maintenance Costs:

WPWMA has an annual budget of \$20-25 million; about \$10 million (~50% of budget) is for recovery operations (MRF, composting, C&D). Nortech is paid \$31/ton and retains all commodity revenue except revenue for source separated recyclables that it negotiates with individual communities.

Revenue Generation:

Policies

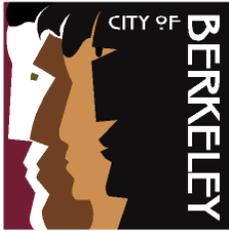
Applicable Rates:

Applicable Policies:

Outreach or Education:
Implementation
Implementation Timeline (Short, Long):
Risks:
Other Notes
Notes: Green Waste (yard and food waste): Ground and windrowed. C&D Recovery: Initial sorting on the ground, and then sent through a line consisting of a conveyor, grinder, trammel and shaker screen.
Source
Source: Pinellas. 2009. Materials Recovery Facility Technology Review. Pinellas County, Department of Solid Waste Operations, St. Petersburg, Florida. Prepared by Kessler Consulting, Inc., Tampa, Florida. September 2009.

APPENDIX C-2

Contract Between The City Of Berkeley and Urban Ore



Office of the City Manager

CONSENT CALENDAR
September 16, 2008

To:  Honorable Mayor and Members of the City Council

From:  Phil Kamlarz, City Manager

Submitted by: Claudette Ford, Director, Public Works

Subject: Contract: Urban Ore for Recycling Services

RECOMMENDATION

Adopt a Resolution authorizing the City Manager to execute a Contract with Urban Ore for salvage of reusable and recyclable items at the City's transfer station, for a total amount not to exceed \$144,000 for the term July 1, 2008 through June 30, 2011.

FISCAL IMPACTS OF RECOMMENDATION

\$48,000 is available for FY 2009 in the Refuse Fund account 820-5607-432-3038. Funds are routinely budgeted in this account for this service. The City will pay Urban Ore \$40 per ton for salvaged materials, which is offset by a savings of over \$60/ton in trucking and disposal costs for each ton not sent to landfill. The contract total assumes salvage of up to 1,200 tons per year. The CMS number is BR3Y2.

CURRENT SITUATION AND ITS EFFECT

Urban Ore's current contract expires September 30, 2008. As part of the Solid Waste Division's efforts to reach 75 percent waste reduction, the City is sending construction and demolition waste from the transfer station to sorting facilities. Urban Ore plays a vital role of salvaging reusable materials for resale before they are sent to recycling. Urban Ore will increase its activity at the transfer station, to recover more tons, including material of lower net resale value.

BACKGROUND

The current contract with Urban Ore for \$67,500 that commenced on July 1, 2005 will expire on September 30, 2008.

On May 6, 2008 Council passed Resolution No 64,059–N.S. and Resolution No. 64,060–N.S. authorizing contracts to sort construction materials and dry rubbish from the Transfer Station and recycle 50 percent of those tons. The selected companies do not have a reuse component. At that time, Council directed the Solid Waste Division to revise the contract with Urban Ore to increase salvage activity. Staff has since worked with Urban Ore to add two more salvagers to their team, add equipment, and recover more material. Some of the additional materials will have lower sales value or need more preparation for re-sale than items currently salvaged, and therefore cost Urban

Ore more to handle. A new contract will include performance measures, quarterly reporting, and training requirements for Urban Ore workers that are not in the current scope.

During FY 2008, Urban Ore removed approximately 820 tons of reusable material from the transfer station. The current fee of \$28.84/ton has been in place since FY 2005. Since then, the landfill disposal fee has increased from \$28 to \$40 per ton. The proposed increase for Urban Ore to \$40 per ton will fund recovery of up to 1,200 tons per year, while still avoiding the City's cost and fuel expenditure of transporting it to a landfill or sorting facility.

This contract would be sole source. Urban Ore is the only local company that practices landfill or transfer station salvage of reusable materials. Its resale store is located in Berkeley, and is the only local facility carrying a wide range of household and construction materials. Urban Ore further supports the City's waste reduction efforts by being a convenient place for contractors to drop-off of reusable construction and demolition items from local projects.

RATIONALE FOR RECOMMENDATION

Reusing materials saves more resources than recycling them. Urban Ore's work helps the City meet its "highest and best use" goals. This contract allows salvage of reusable items to continue and expand, while expanding the scope to include more performance and safety measures. This activity reduces the City's cost because the cost to salvage is less than the cost of trucking the same material to a sorting yard or landfill.

ALTERNATIVE ACTIONS CONSIDERED

None. Discontinuing the contract would mean a loss of environmental and financial benefits.

CONTACT PERSON

Peter Holtzclaw, Manager, Division of Solid Waste and Recycling, 981-6359

Attachments:

1: Resolution

RESOLUTION NO. ##,###-N.S.

CONTRACT WITH URBAN ORE FOR RECYCLING SERVICES

WHEREAS, the City has a contract with Urban Ore to salvage reusable and recyclable materials at the City's transfer station; and

WHEREAS, the current contract with Urban Ore for \$67,500 that commenced on July 1, 2005 will expire on September 30, 2008; and

WHEREAS, the contract is sole sourced because Urban Ore is the only local company that practices landfill or transfer station salvage of reusable materials; and

WHEREAS, the City of Berkeley is committed to a 75% diversion rate by 2010 and to Zero Waste by 2020 and the services performed by contractor are an essential part of the City's waste reduction efforts: and

WHEREAS, \$48,000 for this contract amendment is available in the FY 2009 Refuse Fund account 820-5607-432-3038. The CMS number is BR3Y2.

NOW THEREFORE, BE IT RESOLVED by the Council of the City of Berkeley that the City Manager is authorized to execute a contract amendment with Urban Ore for salvage of reusable and recyclable items at the City's transfer station, for a total amount not to exceed \$144,000 for the term July 1, 2008 through June 30, 2011.

APPENDIX C-3

Example Brochures



Yard Waste Disposal Fees

Vehicle Type	Fee
Automobiles (2 or 4 door sedans, station wagons)	No Charge
Pick-up Trucks (without built-up sides*); SUVs, minivans, vans, trailers less than 10 feet in length with a load less than 2 feet high	\$8.50
Pick-up Trucks (with built-up sides*); trailers over 10 feet in length or with a load over 2 feet high	Sites without scales (or scales out of operation) \$3.80 per cubic yard / \$8.50 minimum charge
All other vehicles	Sites with scales: \$19.00 per ton / \$8.50 minimum charge
	Sites without scales (or scales out of operation) \$3.80 per cubic yard / \$8.50 minimum charge
Compactors	Sites with scales: \$19.00 per ton / \$8.50 minimum charge
	Sites without scales (or scales out of operation) \$4.75 per cubic yard / \$8.50 minimum charge
	Sites with scales: \$19.00 per ton / \$8.50 minimum charge
	Sites without scales (or scales out of operation) \$4.75 per cubic yard / \$8.50 minimum charge

* Built-up sides are any means (permanent or temporary) used to increase vehicle's capacity.
No roots, dirt, stumps or sod accepted. Yard waste must be less than 5 feet in length



Compost and Mulch Prices

Product	Fee
Compost	\$23.00 per cubic yard plus sales tax
Mulch	\$10.00 per cubic yard plus sales tax
Mulch Nuggets (sold only at Compost Central location)	\$10.00 per cubic yard plus sales tax
Dump Truck Delivery (within 40 miles of Compost Central)	\$60.00 per load plus cost of product
Tractor Trailer Delivery (within 40 miles of Compost Central)	\$150.00 per load plus cost of product

*One yard minimum purchase.
All products are sold "AS IS" with no guarantee of quality and may contain some other materials such as plastic, glass and metals.



Construction and Demolition Tipping Fees

Vehicle Type	Fee
Automobiles (2 or 4 door sedans, station wagons)	No Charge
Pick-up Trucks, SUV's, minivans, vans, trailers less than 12 feet in length	At sites without scales: \$22.00 per load (less than 5 cubic yards) OR \$44.00 per load (over 5 cubic yards; less than 10 cubic yards)
	At sites with scales: \$39.00 per ton / \$22.00 minimum charge
All other vehicles (including dump trailers)	\$39.00 per ton / \$22.00 minimum charge
Clean drywall (only accepted at Foxhole Landfill)	\$29.00 per ton / \$29.00 minimum charge
Clean Concrete (only accepted at Foxhole Landfill)	\$5.00 per ton / \$5.00 minimum charge
Tires (not on rim)	\$0.65 per tire / maximum of 10 tires
Tires (on rim)	\$2.00 per tire

Mini -Transfer & Recycling Facilities

Two Facilities for Charlotte County Residents

Mid-County Mini-Transfer
19675 Kenilworth Boulevard
Murdock, FL



West Charlotte Mini-Transfer
7070 Environmental Way
Englewood, FL

HOURS OF OPERATION

Tuesday through Saturday - 9:00am through 4:00pm

Items Accepted at these Facilities:

Special Wastes	Recycling Materials	Miscellaneous Materials
Household Hazardous Wastes	Cardboard	Furniture
Paints, Pesticides and similar items	Mixed Paper	Appliances
Rechargeable Batteries	Newspaper	Scrap Metals: Pipe, Metal Frames, Lumber, Wall-board, Insulation
Television & Computer Monitors	Glass	Yard Trimmings and Landscaping Waste
Used Hypodermic Needles (Sharps)	Aluminum	
Lead Acid Batteries	Steel Cans	
Motor Oils & Used Oil Filters	Plastics	
Tires—Automobile & Pick up Truck Tires		
Cooking Oil		

NEW — “Household Product Reuse Shop” – Visit the County’s Chemical Reuse Shop at Mid County Mini-Transfer & Recycling Facility and take home anything from motor oil, furniture polish, to house paint for **FREE**. The Reuse Shop is located inside C.A.R.E. (Center for Abuse and Rape Emergencies, Inc.) and residents must sign a waiver of liability to receive the products.

C.A.R.E. Project Reuse — C.A.R.E. sells discarded, useable household items at both facilities. Donate, rather than discard useable items to C.A.R.E. Proceeds from the sale of reusable items help victims in Charlotte County. Call 941.639.5499 for more information or to volunteer with C.A.R.E.

Businesses now have the opportunity to participate in the County’s Recycling Program by dropping off their recyclable materials: *Cardboard, Mixed Paper, Newspaper, Plastics, Aluminum Cans, Steel Cans, and Glass*. All other waste materials from businesses are prohibited at these facilities.

Prohibitions at these facilities are as follows: Putrescible waste, such as household garbage that decomposes and becomes foul smelling and rots, is **not accepted** at these facilities from residential or business customers.

DETAILS REGARDING YARD TRIMMINGS AND ELECTRONICS

Residential Yard Trimmings Information

This disposal service is NOT intended for residential materials that can be collected at the curb by Waste Management. It is intended for yard waste items that are between 10 and 20 inches in diameter, lengths between 6 and 8 feet or bundles that weigh more than 40 pounds. Yard Trimmings in Plastic Bags are prohibited.

Electronic Waste Materials are items such as:

Computers, TV’s, calculators, printers, copiers, fax machines, etc. (up to 4 computer systems per year per resident). No commercial E-Waste accepted at this facility.

CHARLOTTE COUNTY ENVIRONMENTAL & EXTENSION SERVICES
941.764.4360 ~ Englewood 941.697.4000, ext. 4360 ~ www.CharlotteCountyFl.com

Mini Transfer & Recycling Facility Condensed Policy

Proof of County Residency **REQUIRED**. A valid Driver's License, Utility Bill or Tax Bill will be accepted. A P.O. Box address will not be accepted.

Failure to provide proof of residency will result in denied access and use of the facility.

Each resident must not exceed 26 cubic yards per fiscal year (October 1st - September 30th) - per residential dwelling unit. The address of the waste origin must be given. If a resident brings waste on behalf of a friend or relative, and the friend or relative is not present during the time of disposal, the volume will be applied against the address of the resident who brought the waste and not from where the waste may have originated. **Failure to provide the location of the waste origin will result in denied access and use of the facility.**

Residents who own multiple properties and wish to have the waste they bring applied to the address of where the waste originated may do so by providing proof of ownership for the property.

Failure to provide proof of ownership will result in all waste volume being applied against the address of the resident who brought the waste.

RANDOM LOAD INSPECTIONS:

Load inspections will be performed randomly to identify waste and generator of waste. Load inspections will also be performed on suspected business activity; this may be initiated by a customer's frequency of use or by the nature of the waste delivered (should it be non-typical of waste generated by a residential dwelling unit).

ENFORCEMENT:

Suspected commercial or business waste use will be prosecuted through the County Code Enforcement Division and/or Sheriff's Office and/or State Attorney's Office, as appropriate for the offense; the County will seek financial restitution.

Department's of the Board of County Commissioners, Charlotte County Sheriff's Office, Florida State Agencies and Non-Profits are not authorized to use these facilities. WASTE FROM AN EMPTY LOT IS PROHIBITED.

PROHIBITED USE:

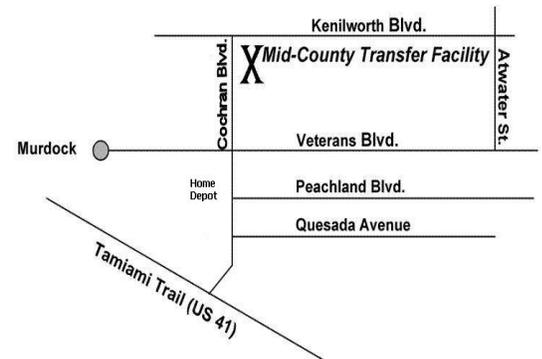
- Commercial / Business Waste
- Commercial or "For Hire" Haulers
- Commercial vehicles hauling materials presumed to be related to their business
- Trailers longer than 12 feet in length or wider than 6 feet
- Use of dump trailers – must hand unload Dump Trucks

PROHIBITED WASTE:

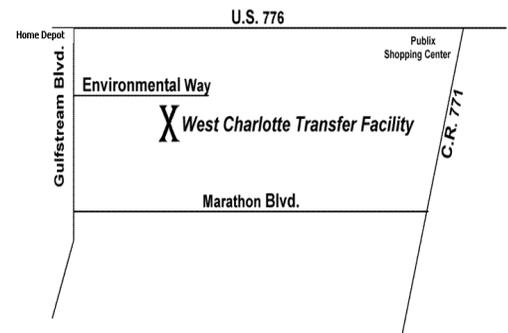
- More than 6 tires per year (Limit R17 or smaller)
- Propane Tanks larger than 71.5 pounds capacity
- Broken Fluorescent Bulbs
- Explosives, Firearms
- Combustion Engines-Except fluid drained residential mowers
- Medical Waste (i.e., Bandages and Drugs)
- Rotting Materials
- Land/Lot Clearing Debris
- Yard Waste in Plastic Bags (Must open bag and dump waste)
- Junk Cars, boats, tractors, trailers, or truck caps
- Tree stumps larger than 20 inches Large remodeling jobs including: Re-roofing, New Additions, and Major Repairs/Remodeling

**Please speak with an attendant to obtain information on where to take waste that is prohibited in this facility.*

• Mid-County Transfer Facility



• West Charlotte Transfer Facility



This handout is distributed by Charlotte County Government



Denver Public Works
Solid Waste Management
Denver Recycles

Charlotte Pitt, Program Manager
303-446-3413
Charlotte.Pitt@denvergov.org

FOR IMMEDIATE RELEASE

Guide to being “WasteWise” to arrive in mailboxes soon!

Denver Public Works Solid Waste Management’s WasteWise annual mailer features 2013 calendars for recycling and large item pick-up, information on the Great Denver Cleanup, graffiti prevention tips, basic trash service guidelines and so much more!

DENVER, CO — December 4, 2012 — It’s the gift that keeps on giving! Denver residents receiving trash and recycling collection service from Denver Public Works Solid Waste Management will soon open their mailboxes to find the 2013 edition of *WasteWise*.

This annual mailer contains helpful information about the following all in one handy publication:

- Recycling Cartons
- Trash Service Guidelines
- The Great Denver Cleanup
- LIP Calendar
- Barrel Trash Overflow Calendar
- Proper Use of Barrel Trash Overflow Services
- E-waste Banned From Colorado Landfills
- Household Hazardous Waste
- Denver Recycles On Facebook and Twitter
- Recycling Yard & Food Waste
- Graffiti Prevention Tips
- Recycle These Materials
- Wipe Out Graffiti with FREE Paint
- Holiday Waste Reduction
- Holidays & Contact Info

WasteWise will be mailed beginning the week of December 10 to Denver residents, who have their trash and recycling collected by Denver Public Works Solid Waste Management. A copy of *WasteWise* will also be available at denvergov.org/recycling in mid December. Residents are encouraged to hold on to their copy of the 2013 *WasteWise* so that they may reference service information all year long.

###



Annise D. Parker
Mayor

the TRASH FACTS

Winter 2012



Harry J. Hayes
Director

The Citizen's Guide to City of Houston Solid Waste Management Department Services

Residential Services: At Your Curbside



Garbage Collection

Household garbage must be put inside the city-provided container which should be placed at the curb between 6 p.m. the day before and 7 a.m. on the scheduled collection day. The container must be accessible to the automated collection truck and not blocked by obstacles, including parked cars. Drivers will not move improperly placed containers. Containers must be removed from the curblines and/or public

view by 10:00 p.m. on the day of collection and stored in a secure location. The garbage container is for disposing of regular household garbage only. Certain items should not be disposed of in your garbage container either because they are too heavy for SWMD equipment or because they may harm employees, property, neighbors, pets, and the environment. Therefore, do not put 1) household chemicals, 2) construction, demolition, and remodeling debris, 3) dead animals, 4) computer equipment and 5) recyclables and yard trimmings.



Yard Trimmings

Yard Trimmings, grass clippings, small branches and leaves must not be placed in the automated garbage cans. They must be in city-approved compostable bags not weighing more than 50 pounds, and placed at the curb 3 feet away from the automated container for separate yard trim-

TO BAG... yard trimmings recycling
...OR NOT TO BAG!
You have **CHOICES!**
Find out how easy your choices are!
Compostable Bags! Grasscycling! Composting!
Visit www.houstonsolidwaste.org for details!
Working to make Houston a Cleaner, Greener Place to Live
Visit www.houstonsolidwaste.org for details!

mings collection. Small branches may be put in bundles as long as each bundle is less than 4 feet in length and 18 inches in diameter and weighing less than 50 pounds. Yard Trimmings mixed with paper, plastic, or any other type of waste will not be collected. Work performed by a contractor must be removed by the contractor.

Adopt - A - Container Program

Non-profit organizations may request large bulk containers for weekend neighborhood cleanup campaigns. Requests must be sent to the SWMD in writing at least 14 days prior to the anticipated cleanup date. Bulk containers are provided on a "first come, first serve" basis and are delivered on Friday and collected on Monday. Only non-profit organizations and civic organizations coordinating a neighborhood cleanup campaign are eligible to sponsor bulk containers. For more information, call 3-1-1.

Dead Animals

Dead animals can be picked up by calling 311, the City's Customer Service Hotline. A fee is required for large dead animal pickup. For large animal pickup during the weekend, please call 311 from 7:00 a.m. to 3:00 p.m. Do not place dead animals with household garbage or tree waste / junk waste collection.

For dead animals on the freeway and feeder, call TXDOT at 713-802-5000.

Fines

Violation of any provision of the solid waste ordinance is punishable upon first conviction by a fine of no less than \$50 nor more than \$2,000. Each subsequent conviction is punishable by a fine of no less than \$250 nor more than \$2,000. Each day that any violation continues may be punishable as a separate offense. To report a violation or to file a complaint, call 311. SWMD Supervisors can write citations.

...for more information,
visit our website at www.houstonsolidwaste.org or call 3-1-1

~Printed on Recycled Paper~

IN THIS ISSUE
TREE WASTE/ JUNK WASTE
GO GREEN WITH SWMD!
RECYCLING
DEAD ANIMAL
INFO

Tree Waste / Junk Waste Recycling Program

The City will collect tree waste exclusively on designated months (odd months) on the resident's current tree waste / junk waste collection day. "Tree waste" is defined as "clean wood waste", which consists of tree limbs, branches or stumps. Lumber, furniture and treated wood will not be accepted. On the alternating months (even months), residents may set out their junk waste at the curb for city collection. "Junk waste" is used to describe items previously referred to as "heavy trash" such as furniture, appliances and other bulky materials. These items should be placed adjacent to the front curb in a location easily accessible to the collection vehicle between the hours of 6:00 p.m. the Friday before, and 7:00 a.m. on the scheduled collection day. No more than eight cubic yards per residence will be collected on the scheduled tree waste/junk waste collection day. *Of this amount, only a maximum of four cubic yards of building material (not to include roofing shingles, brick, plaster or concrete) generated by the resident in connection with the maintenance of the residential property may be collected by department personnel.* A maximum of four (4) tires per month, per household may be placed curbside for collection. Sheet rock must be bagged. Appliances containing refrigerant must have a tag attached to them certifying that a qualified



The Tree Waste Program diverts waste from landfills, saving tax dollars, saving landfill space.

Tree Waste Recycling reduces loads headed to the landfill

technician has removed the refrigerant. Materials should not be stacked under low overhead cabling, signs, or mailboxes; next to fences or posts; or on top of water meters, gas meters, fire hydrants, or other exposed utility components. Also, materials should not be placed in the street, on the sidewalk, or other right-of-way, or in any manner that would interfere with pedestrian or vehicular traffic. Tree waste and junk waste collection is limited to residential units and vacant residential lots only if the waste generated is in connection with the maintenance of the property. The SWMD is not allowed to collect any material that was generated by con-



tractors who were retained by a resident to perform work on his or her residential property. It is the responsibility of the contractor to remove, or cause to be removed, all debris that may arise from the course of his or her activities. These contractor related activities include, but are not limited to, trimming and removal of trees, remodeling, new construction and roofing. If authorized items placed for collection are mixed with unauthorized items, department personnel shall not be obligated to sort the materials and may refuse the entire load. Solid waste

collection services are not available to multi-residential structures of more than eight units.

Tree Waste/Junk Waste Collection Schedule

January	Tree Waste
February	Junk Waste
March	Tree Waste
April	Junk Waste
May	Tree Waste
June	Junk Waste
July	Tree Waste
August	Junk Waste
September	Tree Waste
October	Junk Waste
November	Tree Waste
December	Junk Waste

Neighborhood Depositories/Recycling Centers

Residents may dispose of tree waste / junk waste at one of the City's neighborhood depository facilities. Each user must provide proof of residency, including a Texas Driver's License or ID, a current utility bill or city property tax receipt. The depositories accept the same materials as the tree waste / junk wastecollection (furniture, stoves, refrigerators, etc.) Depositories will accept up to 4 tires per month, per household. Residents must unload their tires and place them in a specified container. Materials brought in a commercial vehicle will not be accepted. SWMD

personnel will not unload your tires or tree waste / junk waste. Residents may use depositories four times per month. Locations are now open Wed. - Sun., except holidays from 10 a.m. to 7 p.m.* Citizens are encouraged to arrive at least 30 minutes before closing to allow adequate time to unload. All depositories also accept recyclables. Materials accepted include aluminum and tin cans, tree waste, plastic bottles and jugs (#1-#5 and #7), newspapers and magazines, glass bottles and jars, and used motor oil.

Neighborhood Depository and Recycling Center Locations

North	9003 N Main	713.694.8435
NorthWest	14400 Sommermeyer	713.895.1002
NorthEast	5565 Kirkpatrick	713.675.3208
East	2240 Central Street	713.847.1188
South	5100 Sunbeam	713.738.1936
SouthWest	10777 SW Freeway	713.541.1953

City Recycling Centers (Junk Waste not accepted)

5900 Westpark - Westpark Recycling Center
 3602 Center Street
 Ellington Airport (Hwy 3 @ Brantley)
 Kingwood Park & Ride

Going Green

with SWMD

The SWMD operates two types of residential recycling collection services for participating areas of the City of Houston.

Curbside Recycling - utilizes an 18-gallon green bin placed at the curb for collection.

Automated Recycling - utilizes a 96-gallon green cart rolled to the curb for collection.

Recycling must be put inside the city-provided container which should be placed at the curb between 6 p.m. the day before and 7 a.m. on the scheduled collection day. The container must be accessible to the collection truck and not blocked by obstacles, including parked cars. Drivers will not move improperly placed containers. Containers must be removed from the curblane and/or public view by 10:00 p.m. on the day of collection and stored in a secure location.

What items can you recycle?

Newspaper
Magazines
Catalogs
Phone Books
Used Motor Oil



Plastic Containers 1 -5, 7 (rinsed & drained)
Aluminum and Tin Cans (rinsed & drained)
Cardboard (flattened)
Glass Bottles and Jars (Automated Recycling Program Only, rinsed & drained)

Environmental Service Centers

The Environmental Service Centers provide drive through drop-off locations for Houston residents to bring their household hazardous waste such as anti-freeze, batteries, fuel, oil, paint, paint thinner, pesticides, herbicides and household cleaners. Residential electronic scrap items will also be accepted (monitors, televisions, printers, keyboards, mice, scanners, fax machines, telephone handsets, VCRs, CPUs, cellular phones and other small consumer electronics). These items should not be placed on the curb with or in your container for collection with garbage or tree waste / junk waste pickup. Clean, white styrofoam blocks (plastic #6) are now accepted at the ESC- South location. Packing "peanuts" are not accepted.

North - 5614 Neches, Building C (open 2nd Thursday of the month from 9 a.m.-3 p.m.)

South - 11500 South Post Oak (open every Tuesday and Wednesday from 9 a.m.- 3 p.m. and the 2nd Saturday of the month from 9 a.m. - 1 p.m.)

For more information, please call 311.

WESTPARK RECYCLING CENTER

The Westpark Consumer Recycling Center, 5900 Westpark, allows Houstonians the opportunity to recycle their used goods. The center accepts aluminum and tin cans, batteries, oil filters, used tires, computers and other residential electronic scraps, #1-7 plastic containers, glass bottles and jars, telephone books, office paper, cardboard, magazines, and used motor oil. Newspapers placed in a brown bag will also be accepted.

Clean, white styrofoam blocks (plastic #6) are accepted at the Westpark Recycling Center and ESC South. Packing "peanuts" are not accepted. Styrofoam is not accepted in the curbside recycling programs.

The center is open Monday through Saturday from 8:00 a.m. to 5:00 p.m.

B.O.P.A.

(Batteries, Used Oil, Latex Paint, & Antifreeze)

The SWMD has a B.O.P.A. recycling operation at the Westpark Recycling Center. Residents can drop off these items and tires from 8 a.m. to 5 p.m., Monday through Saturday, except holidays. The facility is a drive through operation so you do not have to unload your own vehicle.

ReUse Warehouse

Construction material accounts for 38% of the waste stream in the Houston area. The Building Materials Reuse Warehouse, a component of the City of Houston Solid Waste Management Department, benefits the community by providing space for excess building materials that would otherwise be dumped in local landfills. The facility accepts material from individuals, supply companies, and builders, and makes it freely available for reuse by any

non-profit organization. The Reuse Warehouse is funded in part by a grant from the Houston-Galveston Area Council.

Location:
9003 N. Main St.
Houston, TX 77022

Contact Information:
3-1-1 or
reuse.warehouse@houston.tx.gov

HOURS OF OPERATION:

Tuesday - Friday:
8:30 a.m. to 4:30 p.m.

Every 2nd and 4th Saturday of the month
8:30 a.m. to 12:30 p.m.

Closed: Sunday - Monday

Extra Capacity Collection Fee

On June 19, 2002, Houston's City Council approved an ordinance amending Article IV of Chapter 39 of the Houston Code of Ordinances, approving and authorizing the creation of an Extra Capacity Collection Fee (ECC) for the SWMD. Under the umbrella of the ECC ordinance, the Add-A-Can and the Tags for Bags Program were created. Implementation of both programs began October 1, 2002.

Add-A-Can

This program provides residents with the opportunity of having a second or third can serviced for a fee. Residents will have their first 96-gallon can serviced free. The fee for servicing the second/ third can may be added to the citizen's monthly water bill upon request of the service. Citizens who already have an extra can and wish to continue to have it collected will need to request a sticker for it. Call 3-1-1 to enroll in Add-A-Can.

Tags For Bags

Extra bags of garbage are collected only if they have a special tag attached. The "Tags for Bags" program allows residents the convenience of purchasing "tags" instead of additional cans if they require extra service occasionally. These tags may be purchased at Fiesta, HEB, Sellers Bros. and participating Kroger stores. Residents may also download an order form at houston-solidwaste.org and send the completed form and payment through the mail. Yard waste bags do not require tags.



REQUEST THE SOLID WASTE MASCOT, REUSETTA WISELY, OR A SPEAKER

To request the Solid Waste Management Department mascot, Reusetta Wisely, or a Speaker from the SWMD, please call 3-1-1, the City's Customer Service Hotline.

City of Houston
Solid Waste Management Department
PO Box 1562
Houston, TX 77251
www.houstonsolidwaste.org

Houston residents can dial 3-1-1 for non-emergency calls. The 3-1-1 Service Center provides Houstonians with one easy to remember telephone number for quick reliable access.

The Trash Facts is a newsletter published by the Solid Waste Management Department. Information may be reproduced for public dissemination by civic groups and neighborhood organizations.

Harry J. Hayes, SWMD Director

Sandra Jackson, Public Information Officer

APPENDIX D

Task 3: Stakeholder Outreach Summary



Optimized Transfer Station Recycling Feasibility Study

Task 3: Stakeholder Outreach Summary

Prepared for
King County Solid Waste Division
King Street Center
201 S. Jackson Street, Suite 701
Seattle, Washington 98104

Prepared by
Herrera Environmental Consultants, Inc.
O'Brien & Company
HDR Engineering, Inc.

April 2013



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Background

As part of its effort to gain a complete picture of the recycling opportunities and challenges inherent in the current King County Transfer System, the consultant team engaged King County transfer station stakeholders, who include:

- King County Operations, Engineering, Recycling and Environmental Services, and Planning & Communications staff
- Waste and recycling industry participants
- Construction and design professionals, and
- Station customers.

The consultant team conducted this outreach/facilitation (Task 3) in order to elicit honest and instructive feedback that reflects each group's unique perspective. The outreach/facilitation consisted of:

- Conducting representative site visits and interviews of King County operations, engineering, and program management staff to better frame constraints and identify opportunities.
- Facilitating an internal workshop with transfer station employees and members of the Transfer Station Communication Team to better frame constraints and identify opportunities.
- Conducting brief on-site surveys of station users including contractors, commercial businesses, and residents.
- Conducting interviews of a variety of waste and recycling industry participants, including Private Commingled Processors under Contract with the County or Individual Jurisdictions; Private Commingled Processors not under Contract with the County; Private Source Separated Processors; Construction and Design Professionals that are Green Building Customers or transfer station designers.

Summary of Stakeholder Efforts

Site Visits

The team participated in site visits to three stations in September and October 2012, led by County station operators and County staff, to gain firsthand perspective on site-specific themes, but more importantly, to begin to identify common themes that cut across all stations. The following stations were selected representative of the different generations of transfer stations that exist in King County:

- **Bow Lake Transfer Station** - "State of the art new station"
- **Shoreline Transfer Station** - "Newer, advanced operating station"
- **Houghton Transfer Station** - "Older, most complex and space constrained station"

The strongest overarching themes that emerged from these site visits were that staffing and space limitations are the two most common challenges for most stations.

Customer Intercept Surveys

The team conducted two four-hour intercept surveys with a brief set of questions to elicit customer feedback on recycling at the transfer stations. Both stations targeted for surveys currently offer limited recycling although these services have been offered in the past. Dates and times were selected after reviewing inflow data provided by the County, which indicated peak customer flow, and the interview team coordinated with the station operator to identify appropriate locations to deliver the survey. Table 1 shows a synopsis of the survey effort and the profiles of customers interviewed.

Table 1. Survey Locations and Customer Summary

Date	Location	Summary
Weekday Survey 10/10/12 10am - 2pm	Bow Lake Transfer Station <i>Survey conducted as customers queued for the scale upon entry.</i>	93 customers interviewed: <ul style="list-style-type: none"> • 66 residential customers • 27 business customers • 25 customers noted recyclables in their load (primarily yard waste)
Weekend Survey 10/20/12 10am – 2 pm	Shoreline Transfer Station <i>Survey conducted at various locations within the transfer station and fee recycling area.</i>	64 customers interviewed: <ul style="list-style-type: none"> • 56 residential customers • 8 business customers • 22 customers noted recyclables in their load (primarily metals)

The interview questions included the following, though customer responsiveness and time constraints limited the ability to ask all questions of every interviewee:

1. Are you a residential or commercial/business customer?
2. Are you bringing any materials to recycle here? If so, what materials? Are you also bringing garbage?
3. Did you know in advance what this station accepts for recycling and associated fees? If so, how?
4. During this visit or previous visits to transfer stations, have you required assistance from operations staff to know where and how to dispose of recyclables?
5. What would make it easier for you to recycle at this station, or in general?

Overarching themes that emerged from the customer surveys included:

- Convenience is the biggest priority for most customers - although demographics may play a role in some areas, most customers don't take much time in advance to learn about recycling options, they just show up and want to get in and out as quickly as possible. If recycling is available and easy to understand, they'll use it.
- Customers are confused about what can be recycled at the station, particularly with the acceptance policy change of February 2012. For example, many customers would say they had recyclables, and then name cardboard or plastic (which is recyclable, but not collected at stations). Or they would not realize that yard waste and clean wood is considered recyclable.
- Customers miss the convenience of the separate areas for recycling at stations that had them.
- Customers rely more on experience than signage or public information to know what is recyclable. If they recycled it last time, they'll remember they can do it the next time around.
- Floor staff does not play an active role in helping customers sort recyclables in the unloading area.

Transfer Station Communication Team Stakeholder Meeting

On October 18th, the team facilitated a stakeholder meeting with the Transfer Station Communication Team, an existing group of staff representing different operations, engineering, recycling, planning & communications, and customer service roles. The team presented initial research and outreach findings, and gathered one-on-one feedback on operational and service practices and ideas about recycling opportunities. At the conclusion of the meeting, each participant presented at least one 'big picture' idea for the County to consider.

Participants at the meeting included:

- County Project Manager, RES (Josh Marx)
- County Transfer Station Recycling Project Manager (Michelle Miller)
- County Customer Service Hotline Lead (Chris Verro)
- Station Supervisor, multiple stations (Lee Momon)
- Part Time Scale Operator, multiple stations (Don Cross)
- One full-time Scale Operator, Factoria Station (Sue Morrison)
- One full-time Transfer Station Operator (TSO), Factoria Station (Julius Pastmore)
- County Facilitator (Kathy Hashagan)

Overarching themes that resulted from this meeting included:

- The potential for existing staff to work together in a more integrated fashion to increase diversion, without any kind of physical changes or new equipment.
- There are challenges with both customer and staff education about recycling.

- Any physical changes at the facility should result in a system that offers increased convenience and ease of flow for the customer.
- Policy changes may be required in order for staff to perform unloading area assistance, or tipping floor recovery for recyclables.

Stakeholder Phone Interviews

Phone interviews were conducted between October 15th and November 9th, 2012. The consultant team, in coordination with King County, developed specific questions for each of the Stakeholder types, which are included as an Appendix to this Summary. Interviewees and the current status of interview are shown in Table 2. Detailed results from the phone interviews are included in Appendix D. All questions were asked of each interviewee if successfully contacted; blank boxes indicate no answer was given during completion of the form or during the course of the conversation.

Table 2. Stakeholder Interviewees and Status

Interviewee	Status
<i>Private Commingled Processors under Contract with the County or Individual Jurisdictions</i>	
1. Republic – Mike Huycke	Called/emailed - has not responded
2. Waste Management – Scott Barden	Complete
3. Waste Connections - Rusty Cole	Complete
4. CleanScapes - Signe Gilson	Complete
<i>Private Commingled Processors not under Contract with the County</i>	
5. Recovery One – Terry Gillis	Complete
6. CDL Recycle – Signe Gilson	Complete
7. Glacier Recycle – Nick Harbert	Complete
8. Urban Ore - Dan Knapp	Complete
<i>Private Source Separated Processors</i>	
9. SeaDruNar – Seth Little	Complete
10. International Paper –Lonnie Streitberger	Complete
11. RockTenn (Formerly Smurfit) – Lesley Schlesinger	Called - Trading Phone Calls
12. CleanScapes (bicycles) – Chris Martin	Complete - See Above
13. Metals Express (scrap metal) – Don Kuzmer	Complete
14. Total Reclaim - Craig Lorch	Called/emailed - has not responded

Interviewee	Status
15. Northwest Center – Denise Small	Complete
16. RE Store - Pat Finn Covin	Called/emailed - has not responded
17. SecondUse - Dirk B. Wassink	Complete
18. Pacific Clean organics - Larry Condon	Complete
19. Rainier Wood Recyclers – Bob Sargent	Complete
20. Evergreen Shingle Recycling - Mike	Called/emailed - has not responded
21. Miles Resources - Peggy	Called - Trading Phone Calls
22. Cedar Grove – Steve Banchemo Sr	Called/emailed - has not responded
23. NewWest Gypsum - Cheryl Mckitterick	Complete
24. Renton Concrete Recyclers – Mike Dionne	Complete
<i>Construction and Design Professionals – Green Building Customers</i>	
25. Design Aire – Ken Hagen	Complete
26. Berschauer Phillips Construction Company - Jamie Tiegs	Complete
27. Gery Merlino Construction Co., Inc. – Gary Merlino	Complete
28. Thornberg Construction Company Inc.	Called/emailed - has not responded
29. PCL - Dana Johnson / Corey Vlad	Complete
30. Lydig - Kieron Walford	Complete
31. Mortenson	Called/emailed - has not responded
<i>Construction and Design Professionals – Transfer Station Design</i>	
32. Herrera – Mike Spillane	Complete
33. URS – Terrill Chang	Complete
34. CDM	Called/emailed - has not responded
35. CH2MHill	Called/emailed - has not responded
36. HDR – Debra Frye	Complete
37. JR Miller	Called/emailed - has not responded

Stakeholder Findings

General

What Works

- **Communicating Recycling as a Revenue Stream:** When staff understands that recycling can provide a revenue stream for the County, it is a motivation for them to be advocates on the floor to maximize diversion, as this can equate to job stability.
- **Clean and Easy to Navigate Stations:** Many customers visiting the Shoreline Recycling & Transfer Station noted that recycling in the County, and at that station in particular was great, and they preferred this station because it is clean and easy to navigate.
- **Curbside Convenience:** Survey customers at both Shoreline and Bow Lake noted that curbside recycling works well for them, and they don't have a need to visit the transfer station for recycling items, unless they have unusually large loads. Staff also noted that anything that makes recycling more convenient for the customer will have greater success.
- **Collection Days:** Several Bow Lake survey customers that don't use curbside noted that recycling collection events held at schools/community centers were a convenient alternative to taking materials to the transfer station or other recycling facilities.

Challenges

- **Limited Staffing and Staff Roles:** Limited staffing was recognized as a challenge at nearly all stations. A compounding factor is when staff roles don't match the site location. For example, though no staff are designated to certain areas, when Shoreline staff are monitoring the lower recycling area they are also expected to monitor the upper recycling area.
- **Space Constraints:** Space is the other common challenge - examples include: not enough room for adequate recycling within the Transfer Station building; tight space in separate recycling areas which causes congestion. Space constrained locations have in the past collected mixed recycling (i.e. glass, tin, aluminum and plastic together) which eases space constraints but lowers the value of the material. Recycling located in areas not visible from staffed areas such as the tipping floor or scale.
- **Previous Experience Trumps Education:** Most customers seem to rely on past experiences at transfer stations rather than proactively seeking out information in advance of arriving at the station (such as hotline, online). Any changes implemented at the station might require a more involved effort on behalf of the staff to override the tendency to repeat what they did last time.
- **Impact of Consumer Education is Slower than Policy Change:** Staff at the Stakeholder meeting noted that past efforts to educate the public on policy or recycling changes take several years before they have real impact on customer

behavior - by which time the policy is often outdated and new practices are being developed.

- **Confusion about Recyclable Materials vs. Accepted Recyclables:** There is significant customer confusion about what the transfer stations accept for recycling. Many people see the recycling symbol on materials (i.e., resin codes on plastics), and assume that the station will accept it as recycling.
- **Contamination in Recycling Areas:** Areas with the most contamination were the free recycling areas (when they existed). Contamination can be refuse in recycling containers as well as the wrong materials thrown into the incorrect bin.
- **Customer Honesty:** Customers are not always truthful about the contents of their loads at the scale and in the transfer station, even when staff explain the health reasons for not allowing certain materials. Staff often finds materials surreptitiously placed in the transfer station (behind poles, etc.) or garbage at the free recycle areas when they existed.
- **Communication to Staff:** Communicating change to staff can be very challenging, there are different shifts as well as regular part time employees that are not assigned to a specific station. In addition, currently mandatory meetings are not allowed under the contract.
- **Different rules at different stations:** Some survey customers noted it was very confusing understanding what the different stations collected, since they were not all the same. Others assumed that all stations collected the same things. Staff at the workshop noted that 'the green brochure' which lists out all of the information about all the stations has all of the right information and is helpful, but may be overwhelming.
- **Convenience vs. Contamination:** Most customers are very impatient and want to get in and out as quickly as possible, and don't always pay attention to signage. In space constrained areas, such as Houghton, this poses safety concerns, particularly when considering adding more collection areas to an already tight area. From the customer perspective, a separate recycling area at the Transfer Station which does not require entry into the station offers convenience. However, staff have noted that separate recycling areas are more difficult to oversee (especially with current staffing), and have the greatest contamination.
- **Union Rules Limit Hands-On Outside Partner Involvement:** Collection events that have involved partners (such as salvage companies) are infrequent since union contracts limit who is allowed to perform certain duties inside the transfer station gate. Therefore these events are required to be held outside the boundary of the transfer stations before the scale house.
- **Current Policy Prohibits Salvaging and Scavenging at Transfer Stations.** Under King County Code, salvaging and scavenging are prohibited at all King County solid waste

facilities, eliminating the ability to pull materials from loads (by employees or contractors) once they've been dumped.

- **Customer Willingness to Pay/Take Extra Time for Recycling:** In general, people come to get rid of items, and want to do it as quickly and easily as possible, with as little planning as possible. Unless it's very easy to do so (and very clear to the customer), customers generally don't cycle through stations to drop off garbage and then recycling. Staff even noted that customers barely take time to read signs that are posted.
- **Education Targeting Different Generations of Customers:** Education needs to take into account generational issues: older people rely on what they did when it was a landfill, younger will be online and savvy, middle - likes human interaction and reading material to learn more.

Opportunities

(Opportunities with an asterix denotes a 'Big Idea' presented by staff at the Stakeholder workshop)

- **Consistent Staffing** - King County has very low turnover in staffing at the Transfer Stations. In addition, most of the staff have worked on the same team for many years creating a sense of commitment and loyalty to the job and coworkers. Staff could be a key component in creating a sense of ownership or stewardship of recycling activities, particularly when considering additional staffing needs, staff training, or additional roles for staff to play regarding recycling.
- **Staffing Paradigm Shifts****
 - **Customer Service:** Staff are currently not trained in customer service, but this could be a critical element in getting them be more effective in communicating and educating customers.
 - **Team Building and Joint Training for Staff:** Team meetings or trainings that involve both scale operators and transfer station staff could help address joint issues and goals in a more cohesive way. Two - four meetings a year would allow for shorter meetings where staff were able to fully pay attention (versus longer three hour meetings where attention fades).
 - **Staff as Active Recycling Participants:** With adequate training, staff could be much more effective in directing customers where to recycle (such as at Snohomish County, where staff direct customers to stalls and assist unloading recycling and garbage), or actually doing the sorting on the floor. This may require additional staffing, and potentially additional equipment (pick line/mobile sort line).
- **Build on Existing Communication Priority** - The Transfer Station Communication Team is already working on developing an approach to get information out to all shifts and teams. Efforts to increase recycling that involve staff participation or awareness

should follow this team's protocols, but could capitalize on the idea that joint communication efforts directed at scale operators and staff could have great impacts on diversion.

- **Partner with Salvage/Reuse Companies:** Customers and staff both noted that there are organizations in the region that accept recyclable or reusable materials, and having some sort of co-located arrangement could help divert more material away from the waste stream. Some customers already make the effort to go directly to these places, but it would be easier to have them all in one place.
 - The County already has success with BikeWorks bike collection program, and could look at similar revenue-neutral models with other partners.
 - Staff at the stakeholder meeting noted that reusable building material collection events with salvage/reuse partners have been held in Shoreline, Renton, Enumclaw and Vashon, but only Shoreline and Vashon were successful.
 - Renton has a 'stop and swap' model that has been successful, and could be a model for transfer stations where space is not an issue
- **Materials Specific Opportunities:** Stakeholder mention of specific materials focused on carpet, mattresses, metals, cardboard, construction and demolition debris, bulky wastes, and yard waste/landclearing debris. Opportunities for these materials will be addressed in subsequent Task 4, 5, and 6 memos.
- **Focus on customer convenience and easy access**:** Having adequately sized bins at stations that are very clearly marked with clear signage, pictures on signage was noted as preferable, and information about that site's acceptance rules right there will make it much easier for the customer to recycle correctly upon arrival at the station.
- **Creative and Flexible Use of Space:** Space constraints are different at each site, though there may be some creative and flexible site specific opportunities for those stations not undergoing renovation in the future. The following are observations of how site by site solutions may present opportunities for additional recycling in addition to more systemic solutions that emerge:
 - Shoreline: The commercial exit is not currently used, offering room to expand the appliances recycling area for other materials.
 - Houghton: Raising the portable TSO building could provide some room for smaller recyclable collection bins (such as a small metal collection bin). Additionally, there are two spaces on the public side that are blocked as a safety precaution from commercial load debris. Bins to collect scrap metal from self-haulers could be placed in these spaces during the weekdays, while also acting as a barrier to refuse that goes over the pit from the larger collection vehicles.

Best Practices/Operations

Location of Recycling

- Staff noted that customer recycling increases when the bins are easily accessible, in the same location as garbage drop off. If customers have to go to a different location, they are less likely to recycle .
- Staff preference for recycling to be within the station area for easier monitoring/managing.
- Having a discrete location designated for recyclables makes it user-friendly for customers to drop off and staff to monitor, (for example, at Bow Lake the last two stalls are designated as the yard waste drop area. However, if any garbage is dumped and not removed, the whole pile is considered contaminated).
- Locating the recycling in a separate area from the garbage would be convenient as long as it didn't require waiting in two different lines. Customers that don't have garbage prefer not having to enter the station at all for recycling. (Bow Lake Survey)
- Staff at the Stakeholder meeting noted that only about 30% of customers take the time to walk over to the metals bin with recyclables, versus just dumping it with the garbage.

Staff Interactions with Customers

- Staff interactions with customers can reduce contamination, increase diversion, and promote customer awareness. If customers intend to dump recyclables in the wrong area, staff can redirect them to proper bins or locations.

Flexibility in Signage and Collection Areas

- If staff could move signs when changing collection locations/bins, it provides flexibility to accommodate changing material flow. Currently, staff are not allowed to make signs for collection areas without approval; there are currently no moveable signs.
- Flat floors are preferred by customers (intercept surveys), as they do not need to lift material over a wall or fence. This also provides some flexibility in where material is unloaded.

Equipment and Technologies

Equipment to Alter/Compact Materials

- Pieces of metal greater than 8 ft. long will jam equipment - Shoreline staff can bend long pieces of metal but cannot cut, which may be a contract stipulation or a lack of tools.
- Currently at Bow Lake yard waste is handled on the tipping from. Once the customer unloads the yard waste in the designate area staff then use a loader to load the material into a roll-off container. Limited compacting is available but some tamping is

done with the bucket. When construction is complete, there will be a direct drop into open top trailers where the material can be compacted. There is also a covered area that can be used for a chipper or grinder in the future. Bow Lake has two compactors inside the facility that are used for garbage. There is potential to use one during the off hours for yard waste should the County pursue being a transfer point for curbside collection of yard waste.

- Baler at Bow Lake is currently not being used.

Equipment to Move and Sort Materials

- Dollies by the appliance collection area.
- Equipment with a grapple or bucket clamp would be helpful for pulling recyclables out of the garbage pile on the tipping floor.
- Snohomish County has a track hoe for picking up yard debris and that can also be used to unjam compactors.
- Forklifts, bobcats, and machinery with buckets are all helpful equipment.
- At Bow Lake 35 - 40 full compacted trailers at 26 tons each leave the site. 4-axle trailers are used for compacted material. Recyclables (currently metal and appliances) are being hauled away in roll-off containers.
- Pick lines and mobile sort lines are used at other facilities regionally, as well as C&D processing facilities. Pick lines typically require more staff (someone to load onto the conveyor, and multiple staff to sort as materials move through the pick line).

Communication Equipment

- Most staff have a radio, which means they can communicate with each other and the scale, which they can use to discuss questions.

Facility Layout

- Bow Lake customers in particular had negative feedback about the wall, the chain and fence, and the angled parking, stating it was difficult to navigate and unload.

Staff Responsibilities

- Additional or different equipment requires staff to run it, which is already noted as a constraint. (For example, a 30-yard compactor for cardboard at Algona would be nice to have, but requires staff oversight and space is too limited in its current configuration).
- Baler at Bow Lake is currently not being used; staff labor agreements require modifications and the station does not recycle cardboard at this date. Note that this will require training on how to operate, maintain and troubleshoot (hopper jamming is a common issue).

Rate Structures

- C&D could be accepted and charged at a reduced rate, compared with MSW, as long as it goes for processing to a MRF.

Policies

Staff/Hauler Confusion about Policies

- There may be confusion by staff and hauler about required documentation to designate contaminated loads. Haulers are supposed to take pictures of loads with more than 5 or 10% (on visual inspection) contamination, depending upon the material, and send the photo to the Transfer Station Program Manager for approval. Staff were not aware of this process, though the vendor is.

Customer Confusion about Acceptance Policies

- Staff at Shoreline noted that many customers still come expecting free recycling, and are not willing to pay the minimum entry fee of \$20 to dispose of recycling. Several customers at both Shoreline and Bow Lake noted they were not happy that they had to pay to recycle certain items such as clean wood and yard waste as they believe it gets processed at a “profit” to the County. Staff at the Stakeholder meeting, however, noted that although customers might not be happy about having to pay for disposing of recyclables, they typically will because they are already there with a loaded truck.
- Many customers assume that if a material is accepted at curbside for recycling, or if it has the recycling symbol on it, it is accepted as recycling at the transfer station:
 - Customer Service Unit staff noted that a significant number of questions are about materials with the recycling symbol on them.
 - Most of the questions that customers noted during the Shoreline intercept survey related to specific materials acceptance at the transfer station, such as: paint, drywall, cardboard, materials that have some metal, household items (doors, hot tub), plastics.
 - Many Bow Lake survey customers noted they had recyclables, but then list cardboard or plastic (which is recyclable, but not collected there). Or they’d say they just had garbage, but clearly had yard waste or clean wood.
- Both operational staff and Customer Service Unit staff noted that there are many calls and onsite customer confusion about the difference between clean wood, processed wood, C&D, and yard waste.

The No-Fee Recycling Area is missed, but could be improved

- Survey customers at both Shoreline and Bow Lake noted they missed the no-fee recycling area that used to exist outside the station entrance. Specific recyclables that were noted include: cardboard, glass, paper, plastic.

- One customer and several staff noted that the bins in the no-fee recycling area were often overfull, and needed larger openings.

The No Salvage Policy as a Recycling Deterrent

- Many staff are hesitant to divert recyclable materials once it's been dumped on the floor, for concern that customers may report them as salvaging or scavenging material. Proactive staff will tell customers where the recycling locations in the station are instead, and some staff will move the material, but only after telling their supervisor.

Staffing

Capacity

- Additional staffing is the number one thing that staff reported could help with recycling at the stations.
- Due to the assignment of only 1 to 2 staff to the unloading floor, very few staff were observed interacting with customers during the four hour customer intercept survey at the Shoreline Transfer Station.

Staff Roles/Responsibilities

- One customer was frustrated to watch recyclables he and several other customers deposited in the right area (yard waste) be plowed into the larger garbage pile at Bow Lake. The customer reported the complaint to the station.
- Particularly when there is a wall, some customers need support unloading materials over the wall. Observations from customer surveys and staff comments from the communication meeting indicate that staff do not have the responsibility or capacity to assist.
- Stakeholder meeting staff noted that customer service is not a high priority, and that staff do not receive any training on it.

Team Structure/Staff Culture

- Staff recognition and praise are not typical at the stations. Staff noted that they've seen others reprimanded for giving praise to others, as it could build the expectation that recognition should be rewarded. This could make any kind of recognition program difficult; however it may be feasible with small changes.
- Staff noted that with only one customer complaint, they are under greater scrutiny and are assumed guilty rather than innocent.

Outreach and Education

Customer Willingness to Self-Educate

- Demographics may play a role in how effective 'at home' outreach methods are, such as website information and a call hotline. Of the 93 customers surveyed at Bow Lake

only two customers reported having looked online to see what kinds of materials were accepted (1%), versus ten of the 64 customers surveyed at Shoreline who either called ahead, looked online, or referred to brochures (15%).

- At both of the customer intercept survey locations, the primary source of information that customers relied on was past experience at the station.
- Staff at the communication team meeting noted that when customers do educate themselves prior to loading up their vehicle, they may be more likely to organize it is less commingled and can be more easily unloaded into recycling and garbage.
- In general business customers (particularly contractors) seemed the most aware of what materials were accepted, during the Bow Lake survey.

County Efforts to Educate Customers at Transfer Stations

- Outreach and education is not a focus at the actual transfer station, even when there is a separate educational kiosk as in Shoreline. Helping customers get in and out is the priority.
- The scale operator at Enumclaw handed out a half page flier explaining what actions result in contamination (i.e. mixing garbage with recycling), and the system wide costs and impacts of contamination, in an effort to explain why recycling is sometimes in flux at the station.
- Staff sometimes use 1-800-recycle as a resource for customers who have recycling questions, but were less aware of or willing to refer to the County's 'What do I do with..' website.

County Website and Brochures

- Staff report that people often cite information from the website incorrectly, and believe the website is difficult to use.
- The 'What do I do with' website is updated by King County when they receive information from recycling vendors and partners, or when staff do so annually, and therefore is sometimes outdated. In the past, businesses have been upset with the County for posting outdated information, however it is the business' responsibility to let the County know when policies change.
- The brochures have not been updated in some time, as the Communication Team is working on a process for updating them. Feedback about specific brochures includes:
 - Scale operators don't find the blue appliance brochure helpful
 - Site specific brochures are overwhelming - too many options of information to distribute, and harder to keep up to date.
 - Staff report that some customers find the green comprehensive brochure helpful since it has all of the information about every station on it, some find it too overwhelming. Staff use this brochure as a master 'key'.

- Once recycling is reinstated, one sheet about recycling services would be helpful.

Communication Methods to Staff

- Currently the primary methods of communicating to staff is via the County Transfer Station Recycling Project Manager spending time on-site, in the scale house, with the TSO and participating in meetings with the TSO and scale operators. In person meetings are definitely the most successful in getting information across. There is also a newsletter that gets faxed to the office, and the Communication Team is working on an approach for disseminating information to all the different shifts and teams.
- Staff at the Stakeholder meeting noted that if Staff had a 'cheat sheet' on hand of what the station accepts/doesn't accept, that would be helpful. Even if it just was in the scale house, floor staff could radio the scale with questions. A visual poster in the shack would also be useful, something they see every day.
- It's been at least 18 years since an all staff meeting was done with operators and scale operators in the same meeting. Staff at the stakeholder meeting were enthusiastic about this as an opportunity to build a cohesive team and team spirit, and focus on joint issues and joint goals.

Staff Training about Recycling

- Staff at the Stakeholder Meeting noted that the staff don't have adequate training about recyclable materials. This, combined with labor concerns about how staff interact with customers result in a missed opportunity for staff to help divert more recyclables at the transfer station.

Customer Questions

- The most common question about recycling, even at established locations, is where specific items should be deposited in the station.
- When unsure where something goes, customers are more likely to put materials with other recyclable materials than in the garbage area, even though this ultimately contaminates the recyclable pile.

Signage

Effectiveness of Signs

- Staff noted that regardless of how many signs are posted, customers never take the time to read them.
- Some staff feel that there are too many signs posted, overwhelming customers.

Signage Ideas

- Ideas for more effective signs included:
 - graphic signs,

- signs that grabbed customer's attention,
 - electronic signs/reader boards
 - 'pop up' signs
 - 'Q' cards for smart phones (though there is concern about looking at the phone and driving)
- The County is moving away from signs posted on recycling bins to moveable signs on stands. Staff were enthusiastic about this idea because it means added flexibility and less concern about incorrect signage on bins.



Recycling Bin Signage

- Staff at the stakeholder meeting noted that clearly marked recycling bins would greatly help their efforts and reduce contamination.

Site Visit and Survey Observations

- At Bow Lake some signage was in difficult to read locations (up high above the pit area, at the very far end of the station), missing or hidden (small metals bins).
- At Shoreline there an absence of signage letting customers know there is textile recycling outside of the station on the way out.
- Shoreline's 'Did you bring any of these items' sign does not provide any direction to customers who did bring the materials. Several customers noted that better signage would help.



Signage Flexibility

- Signage on posts provides added flexibility: don't need to use bins, can move the collection area (depending on demand, flow, etc.). Staff at the Stakeholder workshop were very supportive of this approach.

Specific Recyclable Materials

Metals

- Some appliances may be collected for scrap metal (bringing revenue for the County). Considerations for this include:
 - Appliances are bulky, would require staff effort to sort or separate at the end of the day, in clearly marked (or staffed) drop off spots.
 - Customers may be frustrated to know that the County is getting revenue for appliances they've paid to drop off.

- Metal bins are the quickest to fill at Shoreline and Bow Lake - staff dump the smaller collection bins into the larger ones several times a day.
- Shoreline recycles the most metal of all the County stations.
- During the Shoreline intercept survey, customers had a lot of questions about what constituted recyclable metals (for example, a plastic table with metal legs).

Glass

- Vashon receives the largest percentage of glass of all transfer stations.

C&D

- A mixed C&D collection area for self-hauling customers could be an opportunity for increased diversion. Currently most C&D is comingled, but not contaminated with garbage. It is currently disposed of as garbage.
- Carpet is a common C&D material that is deposited as garbage, although the number of local carpet collection/take back programs are growing.
- Roofing materials were noted by a roofing contractor
- Drywall was observed in loads at both Bow Lake and Shoreline
- Composite materials, such as Trex Decking, were contained in loads.

Cardboard

- Cardboard is one of the most missed recyclable items no longer accepted for recycling at stations whose free recycling areas were closed in February 2012.
- Bow Lake has a baler that is currently not used, but will be used in the future.

Bicycles

- Bicycle recycling is revenue neutral, and typically bins are full and hauled once a week.

Yard Waste

- Bow Lake was surprised by the volume of yard waste they receive - they weren't expecting as much as they get. Cedar Grove picks up 2 large containers once per day. The bulk is residential self haul.

Clean Wood

- During the Shoreline Customer Survey and site visit, very little clean wood was observed in the wood container.

Mattresses

- These are currently collected as refuse at stations with a limit of six mattresses per customer per visit. Some are used for floor-cleaning.

APPENDIX D-1

Site Visit Question List

OTSR Site Visit Question Sheet

Shoreline / Bow Lake / Houghton Transfer Stations

September 27, 2012

Best Practices/Operations

- In general, what's working well in terms of station recycling operations?
- In general, what's *not* working well in terms of station recycling operations?
- If you could redesign the station, where would you put recycling? Closer to the garbage or separate or some combo?
- Would an adjustment in overall hours, self-haul hours, or recycling facility hours appeal to customers?
- If you could recommend one or two things that would improve recycling at your facility (regardless of current policies, staffing, etc.), what would they be?
- What percent of the loads are mixed – garbage and recycling?
- Do customers with mixed loads cycle around or do they just pay for the whole load as garbage?

Equipment and Technologies

- What new equipment would increase recycling? Why? Appropriate for existing layout? Require modifications in layout or space utilization?
- Are there modifications to existing equipment that would increase recycling?
- Is there existing equipment that could/should be replaced to optimize recycling?

Rate Structures

For all stations

- What fees have been tried and what were the outcomes?

For Bow Lake and Shoreline only, where there are fee/no fee recycling options

- How often is there confusion among customers about fee/no fee recycling items?
- How often are either the fee/no fee areas contaminated with the wrong recyclable item, or non-recyclables? Who resolves the contamination and what level of effort does it take to resolve?

Policies

- Do any existing policies restrict recycling? Partially or completely?
- What policies have been tried before to increase recycling, but were unsuccessful?

Staffing

- In general, is there adequate staffing on-site to monitor and maintain the separate recycling area?
- Are there conditions (low staffing, busy days or times, particular season, etc.) where recycling area monitoring lags, and does this result in contamination of recycling bins or litter around the bins? Or is the contamination due mainly to customer actions?
- Would additional staff training help improve the recycling information or direction given by staff? What kind?

Outreach and Education

- What are the most common recycling questions that customers ask you about?
- What kind of information or resources do you wish you had available to better assist answering customers' recycling questions? Do you use the SWD website as the resource with the most up to date information to share with customers?
- Whose responsibility is it to check that recycling signage is accurate (noting that sometimes bins are delivered with the wrong signs, and that handwritten signs are sometimes needed)?
- What do you think would help customers understand recycling options the best (and help promote greater recycling at your facility)?

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General Notes

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Customer Intercept Survey Question List

Intercept Survey Customer Questions

**Part of the interview time will be spent at the Recycling Areas, and part of the time will be on the Tipping Floor.

General Observations

- Areas of congestion or back up or frustration
- How often do station staff interact with customers at the recycling area?
- Any materials deposited that are not allowed?
- Any loads of “highly recyclable” materials being disposed as garbage?

Commercial and Business Customers

Observations
<ul style="list-style-type: none"> ○ Number of customers that visit recycling area with recycling loads ○ Are customers looking for staff to ask questions? ○ Are customers reading any of the recycling signage on site?
Questions
<ul style="list-style-type: none"> ○ How often does your business need to visit this transfer station? ○ Do you typically have recycling and solid waste to deposit? ○ If you have a mixed load do you visit the recycling area first or just pay for it all as garbage and come back through with recycling? ○ Are station staff able to answer your recycling questions? ○ What types of recycling questions do you have about the services at the stations, or the services not available at our stations?? ○ Is the recycling signage at the site clear? ○ Did you know in advance what this station accepts for recycling, and associated fees? <ul style="list-style-type: none"> ● If so, how? (previous experience, looked online, called the hotline, etc.) ● If not, is there anything you have that you <i>can't recycle, or can recycle but didn't bring?</i> ○ Is there anything that would make it easier to recycle at this facility, or quicker to recycle?

Residential Customers

Observations
<ul style="list-style-type: none"> ○ Number of customers with recycling loads ○ Are customers looking for staff to ask questions? ○ Are customers reading any of the recycling signage on site?
Questions

- Why did you come to this station and not another one?
- Are station staff able to answer your recycling questions?
- What types of recycling questions do you have?
- Is the recycling signage at the site clear?
- Did you know in advance what this station accepts for recycling, and associated fees?
 - If so, how? (previous experience, looked online, called the hotline, etc.)
 - If not, is there anything you have that you *can't recycle, or can recycle but didn't bring? Why?*
- If you have a mixed load do you visit the recycling area first or just pay for it all as garbage and come back through with recycling?
- What would make it easier/better to recycle at this facility?

Stakeholder Workshop Agenda and Presentation

**King County Solid Waste Division
Optimized Transfer Station Recycling Feasibility Study**

**Transfer Station Communications Team
12:00pm – 1:50 pm, October 18, 2012**

Agenda

- | | | |
|---|---------------------------|----------|
| 1. Introductions | Josh | (5 min) |
| 2. Review Project Goals | Josh | (5 min) |
| 3. Meeting Objectives and Agenda Review | Andrea | (5 min) |
| 4. Highlights of Research to Date | Phil and Mary | (10 min) |
| 5. Communications Team Input | Andrea, all | (50 min) |
| 6. Ideas Brainstorm | Elizabeth, all (in pairs) | (30 min) |
| i. 10 min discussion in pairs, 25 minute roundtable | | |
| 7. Synthesis and Next Steps | Elizabeth and Andrea | (5 min) |

Transfer Station Communications Team

Input Questions

Most common recycling issues, questions, concerns?

1. What are the most common recycling issues from customers (i.e., at the scale house, in the unloading area, on the floor)?
2. What are the most common recycling challenges that you see (e.g., contaminating recycling area with garbage, customers dumping recycling as garbage, etc.)? How do you respond to these kinds of challenges?
3. What factors do you consider most important for locating recycling services to be user friendly for the customer, and easy for staff to manage? (e.g., some of it is in the station, some is outside of the station, stations where no-fee recycling existed (before Feb of this year)?
4. What percent of the loads are mixed – garbage and recycling? Do customers with mixed loads cycle around or do they just pay for the whole load as garbage?
5. How often is there confusion among customers about fee/no fee recycling items? How often are either the fee/no fee area contaminated with the wrong recyclable item or non-recyclables? Who resolves the contamination? What level of effort does it take to resolve?

Most useful training/source of information for you, for customers?

6. What has been the most useful information, training, materials to help you better assist customers regarding recycling?
7. What would motivate you to be a more proactive recycling 'steward' at your station (e.g., better understanding of how recycling helps the County's bottom line, staff recognition, facility recognition)?

8. What have been the most and least effective on-site methods of communication about recycling to customers? (e.g., signs, handouts, staff interaction, others)

How well is information being maintained and distributed?

9. How is it assured that recycling signage is accurate and in the right place (noting that sometimes bins are delivered with the wrong signs, and that handwritten signs are sometimes needed)? Could educational kiosks or recycling materials (e.g., brochures) be used differently?

10. What are the most popular brochures that you distribute to the customer? What information should be included on the SWD website to best answer the questions you receive from customers?

11. What kind of information or resources would better assist answering customers' recycling questions?

What do you need to help customers recycle more? What do customers need at the station to recycle more?

12. What do you think would help customers understand recycling options better in order to help promote greater recycling at your facility?

13. What would be the best way to inform staff of any changes in recycling at the station, such as new acceptance rules, or a new location where recycling is collected? (e.g., Mailings? Staffroom Information Board? Regular communication meetings? Through other staff?)

Optimized Transfer Station Recycling Feasibility Study

Transfer Station Communications
Team Mtg

12pm-1:50pm 10/18/12

Transfer Station Optimization Goals

- Help maximize diversion and improve services at transfer stations
- Look at other municipalities and get a fresh perspective on key issues: labor, staffing, equipment, etc. – consider that the way it's being done isn't the best way
- Understand what private partners are doing
- Develop a product that is supported by whole division, with input and support from everyone
- Think system-wide, including the recycle haulers and commodities, to truly think differently.



Agenda Review

- Highlights of Research To-Date
- Communications Team Input
 - Input Questions
- Ideas Brainstorm
- Other?

Meeting Objectives



- Briefly share what the consultant team has learned so far
- Gather more insights from the Transfer Station Communication Team
- Generate ideas for moving forward

Ongoing Work

King County System

- Site visits: Shoreline, Houghton, Bow Lake
- Customer survey: Bow Lake (93 business and homeowners); Shoreline - Oct 20th
- Phone interviews underway

Regional and National Research

- Phone interviews underway
- Successful facilities and practices



Highlights of Research To-Date

Emerging King County System Themes

- Top 2 'Wish List' items that would make recycling easier and more effective: More staffing, more space
- 'No fee' recycling areas are missed by customers; however these areas were also the most often contaminated
- Customers often rely on past experience or what others are doing next to them (eg., the guy next to me is dumping clean wood in the yard waste pile, so will I)



Diverting Reusable and Recyclable Material from Transfer Station Floor

- City staff help self-haul generators unload and recycle
 - Cardboard, Metal, Wood
- Urban Ore staff unload and divert reusable materials to their retail store
 - Lumber
 - Building materials
 - Household goods



Berkeley Transfer Station – Urban Ore

Self-Haulers Separate after Fee Gate

- Self-haulers directed to bunkers for separating materials
 - Metal
 - Yard trimmings
 - C&D
- Facility Use Fee (extra \$20) for by-passing separation area
- 97% of self-haulers separate materials



San Luis Obispo Resource Recovery Park

Resource Recovery Park for Multi-Materials

- Free drop-off center
- All curbside recycling materials
- Electronics
- Hard-to-recycle items such as:
 - Window glass
 - Carpet
 - Styrofoam
 - Cooking oil
 - Reusables



El Cerrito Recycling Center

- Exchange Zone
 - Office supplies
 - Books and magazines
 - Household goods

Sort Line for Self-Haul Materials

- After the fee gate
- Portable picking line
- Primarily C&D
 - Cardboard
 - Wood
 - Plastics
- Separate area for yard trimmings and reusables



Davis Street Transfer Station

Ideas Brainstorm



- Group in pairs with someone you don't know very well
- Take turns sharing your answer to this question:

What 1 thing would you do to improve recycling at transfer stations if you could do anything at all?

- Tell the rest of the group what your partner's great idea is.

Communications Team Input

- Most common recycling issues, questions, concerns?
- Most useful training/source of information for you, for customers?
- How well is information being maintained and distributed?
- What do you need to help customers recycle more? What do customers need at the station to recycle more?



APPENDIX D-4

Stakeholder Interview Questions and Results Compilation

Stakeholder Interview Notes Recording Form

Private Commingled Processors under Contract with the County or Individual Jurisdictions

(Republic, WM, CleanScapes)

Introduction

King County is investigating innovative programs and services that transfer and recycling facilities in the United States have successfully implemented for the purpose of expanded material recovery. King County hopes to implement those that are feasible within their system, and to explore ways to coordinate the private and public waste systems to optimize recycling system-wide. In order to collect accurate information, Herrera (HDR, O'Brien) is talking to a range of companies involved in hauling and processing waste, recyclables, and C&D. Our discussion will be used to collect information about how to best make these advancements.

Any information collected will not be shared with any other private parties, and will be presented by the County only in aggregated form.

Interviewee Name:

Interviewee Company:

Interview Date:

Facility material handling, separation and loading practices

- Do you have special handling requirements for certain types of loads or materials?
- Have you seen or heard of other transfer station recycling programs or ideas in other areas (public or private) to capture more recyclables that could be applied in King County?

Equipment used for material handling and separation

- Can you describe the components of your processing system and types of equipment used?
- How big are your receiving, processing, and storage areas in square feet?
- How successfully do you use floor sorts to divert recyclable materials?

Incoming load acceptance and screening procedures

- What practices (or equipment) do you use to understand load composition and to direct loads to different areas of your facility?
- What specifically determines loads destined for disposal versus recycling (C&D)?
- Do you accept recyclables from self-haulers? What types? Are they offered payment for recyclables? Which commodities? Reduced disposal rates? Which materials?

Level of sorting at the receiving facilities

- What is your process for recovering recyclables from mixed C&D loads?
 - Sorting
 - Material Flow
- How do you handle contaminated loads? Do you remove recyclables from loads of garbage? If so, how?

Education and outreach efforts

- How do you communicate changes in operating procedures to commercial drivers? To the general public?

Planned future improvements, on-site or some other site

- Do you have plans to expand your facility(ies) or purchase new equipment in the next 5 - 10 years?
- What will your processing capacity be in the next 5 - 10 years?
- Do you have plans for additional capacity aimed at specific commodities? If so, which ones?

Coordination Opportunities

- Have you considered potential areas or methods of coordination between King County facilities and your facilities? What are they?
- Are there ways the KC transfer stations could serve as a transfer or processing point for mixed or source separated recyclables to reduce travel time to your facilities (e.g., curbside collected yard/food debris)?
- What infrastructure do you think should be added (system-wide) to recover more materials?
- What policies do you think should be added (system-wide) to recover more materials?

Stakeholder Interview Notes Recording Form

Private Commingled Processors not under Contract with the County

Recovery One, CDL Recycle, Waste Connections

Private MRFs open to public/businesses that accept mixed recycling and C&D.

Introduction

King County is investigating innovative programs and services that transfer and recycling facilities in the United States have successfully implemented for the purpose of expanded material recovery. King County hopes to implement those that are feasible within their system, and to explore ways to coordinate the private and public waste systems to optimize recycling system-wide. In order to collect accurate information, Herrera (HDR, O'Brien) is talking to a range of companies involved in hauling and processing waste, recyclables, and C&D. Our discussion will be used to collect information about how to best make these advancements.

Any information collected will not be shared with any other private parties, and will be presented by the County only in aggregated form.

Interviewee Name:

Interviewee Company:

Interview Date:

Facility material handling, separation and loading practices

- Do you have special handling requirements for certain types of loads or materials?
- Have you seen or heard of other transfer station recycling programs or ideas in other areas to capture more recyclables that could be applied in King County?

Equipment used for material handling and separation

- Can you describe the components of your processing system and types of equipment used?
- How big are your receiving, processing, and storage areas in square feet?
- How successfully do you use floor sorts to divert recyclable materials?

Incoming load acceptance and screening procedures

- What practices (or equipment) do you use to understand load composition and to direct loads to different areas of your facility?
- What specifically determines loads destined for disposal versus recycling (C&D)?
- What types of materials do you accept from self haulers? Are they offered payment for recyclables? Which commodities? Reduced disposal rates? Which materials?

Level of sorting at the receiving facilities

- What is your process for recovering recyclables from mixed C&D loads?
 - Sorting
 - Material Flow
- How do you handle contaminated loads? Do you remove recyclables from loads of garbage? If so, how?

Education and outreach efforts

- How do you communicate changes in operating procedures to commercial drivers? To the general public?

Planned future improvements, on-site or some other site

- Do you have plans to expand the facility or purchase new equipment in the next 5 - 10 years?
- What will your processing capacity be in the next 5 - 10 years?
- Do you have plans for additional capacity aimed at specific commodities? If so, which ones?

Coordination Opportunities

- Have you considered potential areas or methods of coordination between King County facilities and your facilities? What are they?
- Are there ways the KC transfer stations could serve as a transfer or processing point for mixed or source separated recyclables to reduce travel time to your facilities (e.g., curbside collected yard/food debris)?
- What infrastructure do you think should be added (system-wide) to recover more materials
- What policies do you think should be added (system-wide) to recover more materials?

Stakeholder Interview Notes Recording Form

Private Source Separated Processors

SeaDruNar, International Paper, RockTenn, CleanScapes, Metals Express, Total Reclaim, Northwest Center, ReSTore, Second Use, Pacificlean Environmental, plus others as needed.

Introduction

King County is investigating innovative programs and services that transfer and recycling facilities in the United States have successfully implemented for the purpose of expanded material recovery. King County hopes to implement those that are feasible within their system, and to explore ways to coordinate the private and public waste systems to optimize recycling system-wide. In order to collect accurate information, Herrera (HDR, O'Brien) is talking to a range of companies involved in hauling and processing waste, recyclables, and C&D. Our discussion will be used to collect information about how to best make these advancements.

Any information collected will not be shared with any other private parties, and will be presented by the County only in aggregated form.

Interviewee Name:

Interviewee Company:

Interview Date:

General
<ul style="list-style-type: none">○ Do you have contracts in place with the County to collect recyclables from KC Transfer Stations?<ul style="list-style-type: none">○ If so, what could be done to increase the amount of recyclables that make it to your facility and are recycled (i.e. cleaner loads/better separation, ○ What are other sources of materials? (i.e. public, MRFs that sell commodities to you, etc)
Facility material handling, separation and loading practices
<ul style="list-style-type: none">○ Do you have special handling requirements for certain types of loads or materials? ○ Have you seen or heard of other transfer station recycling programs or ideas in other

areas to capture more recyclables that could be applied in King County?

- Is there a different way to separate the materials at the KC transfer station that would make the commodities more valuable? (e.g., sorting plastic 1&2 from other plastics, combining glass with Tin, Aluminum Plastic loads)

Equipment used for material handling and separation

- Can you describe the components of your processing system and types of equipment used?
- How big are your receiving, processing, and storage areas in square feet?
- How successfully do you use floor sorts to divert recyclable materials?

Incoming load acceptance and screening procedures

- What practices (or equipment) do you use to understand load composition and to direct loads to different areas of your facility?
- What specifically determines load acceptance with regard to contamination?

Level of sorting at the receiving facilities

- What is your process for removing contaminants from the material you accept?
 - a. Equipment
 - b. Sorting
 - c. Material Flow

Education and outreach efforts

- How do you communicate changes in operating procedures to commercial accounts? To the general public (if applicable)?

- Do you accept recyclables from the general public at your facility?

- If yes, how is this material usually prepared ?

- Do you pay for recyclables from the general public?

Planned future improvements, on-site or some other site

- Do you have plans to expand the facility or purchase new equipment in the next 5 - 10 years?

- What will your processing capacity be in the next 5 - 10 years?

- Do you have plans for additional capacity aimed at specific commodities? If so, which ones?

Coordination Opportunities

- Are there ways the KC transfer stations could serve as a transfer or processing point for mixed or source separated recyclables to reduce travel time to area your facility (e.g., curbside collected yard/food debris)?
- Have you considered potential areas or methods of coordination between King County facilities and your facilities? What are they?
- What infrastructure do you think should be added (system-wide) to recover more materials?
- What policies do you think should be added (system-wide) to recover more materials?

Stakeholder Interview Notes Recording Form

Construction and Design Professionals – Green Building Customers

Design Air, Berschauer Phillips Construction Company, Gary Merlino Construction Co. Inc., Thornberg Construction Company Inc., Lydig, PCL, Mortenson, plus others as needed.

Introduction

King County is investigating innovative programs and services that transfer and recycling facilities in the United States have successfully implemented for the purpose of expanded material recovery. King County hopes to implement those that are feasible within their system, and to explore ways to coordinate the private and public waste systems to optimize recycling system-wide. In order to collect accurate information, Herrera (HDR, O'Brien) is talking to a range of companies involved in hauling and processing waste, recyclables, and C&D. Our discussion will be used to collect information about how to best make these advancements.

Any information collected will not be shared with any other private parties, and will be presented by the County only in aggregated form.

Interviewee Name:

Interviewee Company:

Interview Date:

Onsite practices / Collection Services
<ul style="list-style-type: none">○ Do you haul your own waste or contract with a third-party C&D hauler? ○ Who do you use? ○ Do you use source-separated collection, commingled collection, both, or neither for C&D recyclables? ○ What type of materials do you typically recycle? ○ If you self-haul, how do you determine where the load is transported? For disposal? For recycling?

- What facilities do you typically use for recyclable materials? What about reusable materials?

- What kind of vehicles do you haul in (pick up, dump, trailer)?

- If you do NOT self-haul, do you have any say as to where the load is brought for recycling or disposal? Would you like to?

Recycling at Transfer Stations

- What do you like about the recycling services where your material is currently brought for recycling?
 - Traffic flow
 - Pricing
 - Staffing
 - Unloading/load acceptance
 - Information
 - Location
 - Other?

- Have you taken materials for disposal to King County transfer stations? How often?

- If you could bring C&D to King County Transfer Stations, would you? Why or why not?

- What do you know about the availability of recycling services at King County Transfer Stations?

- What features would you like to see at the King County Transfer Stations if they accepted C&D for recycling?

- What materials would it be useful to be able to drop off at transfer stations? Would you be willing to pay a fee for those services?
- In general, what's working well at the transfer stations and what doesn't work?

Future Opportunities

- What would make it easier (or create a better incentive) to recycle and reuse more of your C&D waste?
- What infrastructure do you think should be added (system-wide) to recover more materials?
- What policies do you think should be added (system-wide) to recover more materials?
- Outside of King County Transfer Stations are there enough options for recycling C&D materials in the County? Could you recycle more than you currently are?
- If not/If so, what materials do you need more resources for? Or is it locations/accessibility?
- How do you learn about opportunities to recycle C&D in the County?

Stakeholder Interview Notes Recording Form

Construction and Design Professionals – Transfer Station Designers

Herrera, HDR, URS, CDM, CH2M Hill, JR Miller, plus others as needed.

Introduction

King County is investigating innovative programs and services that transfer and recycling facilities in the United States have successfully implemented for the purpose of expanded material recovery. King County hopes to implement those that are feasible within their system, and to explore ways to coordinate the private and public waste systems to optimize recycling system-wide. In order to collect accurate information, Herrera (HDR, O'Brien) is talking to a range of companies involved in hauling and processing waste, recyclables, and C&D. Our discussion will be used to collect information about how to best make these advancements.

Any information collected will not be shared with any other private parties, and will be presented by the County only in aggregated form.

Interviewee Name:

Interviewee Company:

Interview Date:

Recycling at Transfer Stations

- What design or operations principles do you follow to maximize recycling at transfer stations?
 - Flat Floor?
 - Walls vs. chains?
 - Variable Traffic flow?
 - Separated Residential and Commercial?
 - Separate or co-located traditional recycling?
 - Flexible space to accommodate different materials as markets develop?

- What features do you typically design in to Transfer Stations in order to accept materials and increase their value for recycling?
 - Yardwaste?
 - Wood?
 - Cardboard?
 - Appliances?

- Reusables?
 - Commingled C&D
 - Carpet
 - Mattresses
 - Textiles
 - Tires
 - Scrap Metal
 - Other materials, depending on market demand? (i.e. plastic film, shingles, etc.)
-
- In general, what's working well to optimize recycling/diversion at the transfer stations and what doesn't work?
-
- What equipment do you specify to maximize diversion of recyclables and organics?
 - Drop boxes
 - Bins
 - Bunkers
 - Excavator
 - Skid Steer
 - Waste/load Screening
 - Baler
 - Compactor
 - Chipper
 - Conveyer belt for sorting
 - Other?
-
- What are some examples of flexibility for recycling you have incorporated into new transfer stations? Transfer Stations retrofits?
 - Flexible top-loading containers
 - Mobile pick line
-
- What features do you include in general floor operations, including how recyclables and organics are kept from being contaminated by MSW?
-
- What new [design or operations] trends have you tried for increasing recycling at Transfer stations, but which have not worked out?

- How would new staffing or partnership structures affect the way the station is designed? For example, if you knew in advance that staff would be doing floor sorting, or if you knew that private salvage companies would be allowed to help divert reusables, would this impact design?
- What type of education, signage, or any other 'wayfinding' features do you incorporate into the design of the transfer stations?

Future Opportunities

- What would make it easier (or create a better incentive) to recycle and reuse more C&D waste at Transfer Stations?
- What new [design or operations] trends are you most interested in for additional recycling at Transfer stations?
- What infrastructure do you think should be added (system-wide) to recover more materials? (Do these require a station to be designed in advance to accommodate them, or could they be added into existing stations?)
- What policies do you think should be added (system-wide) to recover more materials?

Private Commingled Processors with Contract Interview Results

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
Interviewee Name	Mike Huycke 425-646-2430	Scott Barden (Eastmont operations manager for 1 month, formerly worked at WM's hauling company operation)	Nick Harbert (Glacier Recycle operations manager in Auburn which was acquired by WM in 2010. Nick previously worked for Cedar Grove)	Rusty Cole per recommendation of Jody Snyder at 253-927-6810	Signe Gilson, 206-859-6706
Interviewee Date	11/9/2012	10/17/2012	10/17/2012	11/7/2012	11/8/2012
Question					
1. Do you have special handling requirements for certain types of loads or materials?	Cedar grove provides containers for organic material	(1) Eastmont accepts CDL (construction, demolition and landscaping) material. The facility receives most of their material from WM (mostly roll off trucks) with some 3rd party. Public is not allowed to dump materials at the facility. Gets some type of sludge from King County (hauled by the County) .may be from vacuum truck dewatering facility which is taken to WM landfill with garbage. Transfers commingled recyclable materials to WM Glacier Recycle	Glacier receives and processes material from 3 WM facilities.	No, with one exception. For transfer station co-located at landfill, large trucks with pups go directly to active face because not enough room to maneuver. Asbestos is only accepted at landfill and it costs \$150/ton for disposal.	

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
		<p>facility in Auburn, WA. For week of 9/30/2012 – 10/6/2012 the facility received the following materials:</p> <p>Recycle (commercial and curbside single stream) – 200 tons goes to Woodinville</p> <p>Garbage – 1,000 tons goes in containers and shipped to WM Columbia Ridge landfill in Oregon</p> <p>Yard Waste/food – 900 tons – taken to Cedar Grove composting</p> <p>C&D – 700 tons – goes to Glacier Recycle (Auburn)</p>			
<p>2. <i>Have you seen or heard of other transfer station recycling programs or ideas in other areas (public or private) to capture more recyclables that could be applied in King County?</i></p>				<p>Pierce County has free recycling containers and yard waste collection pre scalehouse. These are staffed and have cameras to minimize any garbage getting dumped. Anderson Island, a small “tight knit” community is the only place with an unstaffed recycling collection area. These collect usual recycling plus scrap metal and non-Freon containing appliances</p>	

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
				for no charge. At larger stations they have a baler for the scrap metal. If recycling is after the scales, not as many people will recycle. Sharps and other household medical waste are also collected pre-scales. They want as much of this waste as possible out of the refuse because it poses a safety risk to workers.	
3. <i>Can you describe the components of your processing system and types of equipment used?</i>		(1) Site uses 2 rubber-tired Front End Loaders and 1 excavator. Excavator is used to smooth out the tops of loads.		No processing. Larger stations have a baler for metals. Loader pushes waste into compactor at larger stations. At smaller (rural) stations which are for self-haulers only, customers dump refuse straight into trailer or box. They prefer as much as possible is mechanically done rather than manual.	Cleanscapes transports their collected materials to 3 rd party facilities – City of Seattle materials go to Republic’s 3 rd and Lander facility (per SPU requirement); other materials collected by Cleanscapes goes to Rock-Tenn facility in Renton.
4. <i>How big are your receiving, processing, and storage areas in square feet?</i>		(1) Facility has two tipping areas – an “upper level” and “lower level”		Varies by station. Make the transfer stations as large as you possibly can. All diversion programs take room. Items that have separate areas	

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
				in their transfer stations tipping floors are: E-waste, propane tanks, waste oil, wood, batteries (car not household), sand piles (use for fire suppression), and saw dust. Saw dust is accepted at a reduced rate. They have a large cabinet maker near a station and they get huge loads after the Puyallup Fair because saw dust is used to line all of the livestock barns. The biggest transfer station is just over three acres.	
5. <i>How successfully do you use floor sorts to divert recyclable materials?</i>	Does not do floor sorts due to safety and inefficiency, but may be ok with low volumes or for getting facility to improve waste diversion for "first time"...then can grow into equipment based sorting	(1) Does not use floor sorts due to space constraints; does do some floor stockpiling of materials prior to loading out.	They avoid floor sorts due to safety and inefficiency concerns.	None. It requires a lot of space and labor, plus liability and injury concerns. As much as possible they encourage customers to keep recyclable materials separate from refuse.	
6. <i>What practices (or equipment) do you use to understand load composition and to direct loads to different areas of your facility?</i>		(1) Scalehouse attendant directs incoming vehicles to appropriate unloading area. Also, most of facility users are WM vehicles who know where to dump.		Staff direct traffic to separate areas if they have materials that can be diverted. If staff note any recyclables in loads they tell customers that it can be dropped	

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
				into bins outside of scalehouse for free. Staffing is two on floor assisting customers, one operating equipment, and one below managing trailers and compactors. For busy days, there are three assigned to assist customers.	
7. <i>What specifically determines loads destined for disposal versus recycling (C&D)?</i>				If an actual C&D load comes to the scalehouse, they send the customer to one of the C&D recyclers in Pierce County	
8. <i>Do you accept recyclables from self-haulers? What types? Are they offered payment for recyclables? Which commodities? Reduced disposal rates? Which materials?</i>		(1) No.	No.	Yes, all typical recyclables.	
9. <i>What is your process for recovering recyclables from mixed C&D loads?</i>	They are adding another system at the front end of the processing line at 3 rd & lander which can process heavier, C&D type material	(1) Facility formerly had a sorting line, but was removed due to space constraints and availability to process materials at other locations.		None. . If a load comes in mixed refuse and C&D, it is handled as all refuse.	
o <i>Sorting</i>			(2) They have a manned sorting line to process the incoming material.		
o <i>Material Flow</i>					

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
10. How do you handle contaminated loads? Do you remove recyclables from loads of garbage? If so, how?	Big contamination issue is foodwaste in the recyclables...usually ends up getting mixed in with the glass. Good if can keep dry and wet wastes separated.then can sort the dry waste.	(1) If unacceptable materials are detected (such as electronics) the facility operator requires the vehicle's driver to remove the material and take offsite.		None, if not pre sorted, considered all refuse. They use pricing to encourage customers to separate materials. No, with one exception, clean wood. They are in process of buying a mini excavator that will grab wood off of tipping floor. They charge only \$35/ton for clean wood as an incentive for people to bring it in pre-sorted. They grind it and sell as hog fuel.	
11. How do you communicate changes in operating procedures to commercial drivers? To the general public?	Republic tries to educate customers --- using audits and sales staff to help customers separate materials and direct them where they should be taken	(1) None since mostly internal customers.		Changes are communicated by Pierce County and typically flyers and its web page are used. Waste Connections does change signage as needed. Only recent change is that they accept tires as MSW.	
12. Do you have plans to expand your facility(ies) or purchase new equipment in the next 5 - 10 years?	In process of moving C&D recycling from 3 rd & lander to their Black River facility (will be done by Jan 1, 2013)	(1) Scott is not aware of any plans for changes to the facility. Pretty sure they will not process materials at the site.		Yes and no. Pierce County is deciding now whether to add a new transfer station near Mt. Rainier and expand the one at Bonny Lake or go to mandatory curbside collection for all residents.	

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
13. What will your processing capacity be in the next 5 - 10 years?				Not planning to add processing.	
14. Do you have plans for additional capacity aimed at specific commodities? If so, which ones?	<p>County should consider collecting mattresses/boxsprings at their transfer stations...a local company will provide a trailer for the County to load into then replace when full. Company uses correctional labor to deconstruct the mattresses / boxsprings. Vancouver BC charged \$12 to \$16 disposal fee. Film plastics need to be kept out to the recyclable stream headed for the sort lines as it will mess up the screens; good value in the film plastic if it can be set to the side then added to mixed plastic loads for baling. Carpet – limited recycling opportunities locally, but one company does take some and believes they grind it up...and recover the</p>		(2) No plans to expand the facility in the near future.but could if County awarded processing contract to them. He has seen an uptick in volumes and anticipates continued increases into 2013.	Pierce County and Waste Connections has a joint task force that is working on achieving the 70% waste diversion goal. Task force is starting with a focus on wood, metal and cardboard as these are “big, easy targets.” Also looking at adding Styrofoam. They would like to collect mattresses but are space constrained.	

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
	paste (calcium?, 30% of carpet material) that is then used in masonry art products. Republic is looking at ways to recover/accept asphalt shingles.				
15. Have you considered potential areas or methods of coordination between King County facilities and your facilities? What are they?			(2) Thinks there are several opportunities for coordination with the County...but probably would need to be through a solicitation and contractual agreement.	King County affects them because on days Enumclaw station is closed, Pierce County's Bonny Lake station which is open daily, sees an increase in traffic. This is similar for Purdy Station which is close to Kitsap County. They get many customers there dumping yard waste because Kitsap charges for disposal of that and Pierce County does not. King County's commercials also cause problems for neighboring counties. For example, Pierce County does not accept food waste in yard waste bins but people are putting it in there because King County ran ads saying that is where it should go. Rusty asked if	Cleanscapes would like to take yardwaste to Shoreline for transfer to a composting facility. Would be interested in using existing transfer stations for transferring recyclables to subsequent delivery to the processing facilities.

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
				King County ads could be more explicit indicating the ads pertain to King County residents only.	
16. Are there ways the KC transfer stations could serve as a transfer or processing point for mixed or source separated recyclables to reduce travel time to your facilities (e.g., curbside collected yard/food debris)?			Several: 1. Putting magnets on a small excavator or possibly skid steer loader to pull out metals from incoming waste. 2. Place 30 cy or 40 cy containers at the transfer stations to collect (separately) wood waste and yard/food waste – wood waste could go to biomass or hog fuel plant while yard/food waste could go to compost facility. 3. Consider using baler at Bow Lake to bale mixed plastics – could receive plastics from other transfer stations for baling as well – then ship to end processor such as Agilyx (Oregon). 4. Does not think grinding of wood/yard waste makes much sense at the County's transfer stations. 5. Separate wood, metals, plastics	Not applicable.	Thinks it would be good to have dedicated staff at the County's facilities to identify materials that can be diverted and assist with recovering them from the waste stream (e.g., direct customers to appropriate areas and help place materials there if needed).

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
17. <i>What infrastructure do you think should be added (system-wide) to recover more materials?</i>	San Jose, CA has nice new plant with 4 lines (single stream, garbage, C&D, and organics).	(1) Scott is familiar with most of the County's transfer stations. Thinks they could provide boxes for more public drop-off recycling and also provide place for public to drop off organics (woodwaste, yard waste etc...).		For now, only thing they are adding is the mini excavator to assist with clean wood discussed above.	Has a bike box (40 cy) at the SPU NTS – has collected over 1,000 bikes in about 1 year's time to be refurbished (sold or donated) or recycled. Not sure that a dirty MRF or sorting line would be beneficial at the county transfer stations
18. <i>What policies do you think should be added (system-wide) to recover more materials?</i>	Recommend separating metals at least into ferrous and non-ferrous to improve value.		Several: 1. King County reviewing/updating their policy regarding their role in waste management and what they want to do and how they want to do it. 2. King County should consider segregating/targeting "dry waste" and further processing on-site then ship to end user or ship commingled to a processing facility ... "could solicit proposals from contractors to process the material" but most contractors would like a 10 year contract (minimum) to make the capital investment... 15 or 20	In general, make it as simple as possible for customers. The more staff the better. They can direct people where to dispose of materials. Also they help make sure that recycling loads are not contaminated with refuse. They do not like to put in bans because can lead to illegal dumping. Pierce County uses pricing to try and encourage diversion. Yard waste is free to dispose of. Pricing at compost facility is \$35/ton. They put this facility in the center of Pierce County and close to I-5 so it was most convenient for customers.	Consider program to collect/refurbish barbeque grills County should consider contracting with 3rd party firms (such as RE Store) to provide staff and containers at the stations to recover materials

Interviewee Company	Republic	Waste Management - Eastmont	WM - Glacier Recycle	Waste Connections	CleanScapes
Interviewee Perspective	MRF; Transfer Station	Transfer Station	C&D MRF	Hauler; Transfer Stations	Hauler
			<p>year preferred. Referenced that the City of Tukwila is now managing wastes as either “dry” or “wet” and thought that could be a model for other King County cities.</p> <p>3. Believes there would need to be extensive education of customers to generate dry waste (e.g., separate wet waste from dry waste). Also thinks the transfer station operators would need training in what to look for and target for diversion as well as how the material would be handled / processed.</p>		

Private Commingled Processors without Contract Interview Results

Interviewee Company	Recovery One	CDL Recycle	Urban Ore
Interviewee Perspective	C&D MRF	C&D MRF	MRF
Interviewee Name	Terry Gillis, 253-627-1180	Signe Gilson, 206-859-6706; Chris Martin, 206-859-6705	Dan Knapp
Interviewee Date			11/5/2012
Question			
1. <i>Do you have special handling requirements for certain types of loads or materials?</i>	Yes. We need to know that the materials we receive for processing are not contaminated with materials that would contaminate our finished products or present health hazards to our employees and/or customers. The most common materials of concern for co-mingled C&D are Asbestos, Lead Based Paint & mercury.	<ul style="list-style-type: none"> - Only accept C+D at the facility, and only from clients with accounts. - Visual inspection of loads upon arrival, and copies of abatement forms are required for all demolition loads (brought at arrival for one-off loads, or sent in advance for larger loads). 	Yes, all loads are separated by Reusable, Recycling, Organic, Wood, C&D, and Refuse.
2. <i>Have you seen or heard of other transfer station recycling programs or ideas in other areas to capture more recyclables that could be applied in King County?</i>	No.	<ul style="list-style-type: none"> - San Jose has a premier 'dirty MRF' concept facility with a pick line. - "Dirty MRF" concept applied to County stations, where a pick line is used to pull recycling. - Challenge with King County TS is that they operate as a convenience to customers who don't want to pay for curbside, and there is no incentive to recycle. The pricing model doesn't encourage recycling. - CDL has suggested the County lower yard waste recycling rate, but Council responds that this would jeopardize their revenues. 	Not particularly familiar with King County but after a brief overview, thought additional staffing is needed.

Interviewee Company	Recovery One	CDL Recycle	Urban Ore
Interviewee Perspective	C&D MRF	C&D MRF	MRF
3. <i>Can you describe the components of your processing system and types of equipment used?</i>	We use excavators, crushers, screens, magnets, conveyors, colorizers, grinders, shredders, balers, load out bins, forklifts, skid-steer loaders, wheel loaders, specialized carpet processing equipment and specialized wood processing equipment.	<ul style="list-style-type: none"> - Pick line (note that CDL offered to install in Shoreline, but this was not accepted). - Staffing: 14 employees total (1 scalehouse attendant, 1 presorter of loads dumped on floor, one loader that loads the line, 8 sorters on the line). 	Little equipment but uses lots of staff. Equipment is limited to drop boxes, forklifts, bins, etc. Sorting equipment is not used.
4. <i>How big are your receiving, processing, and storage areas in square feet?</i>	226,500 sq ft	<ul style="list-style-type: none"> - CDL has a tiny footprint - the sorting building is 10,000 sq ft, with a little more outdoor space. 	Varies by facility. Make them as large as possible. One facility in California is 14 acres, but that was due to having the space available, smaller sites, 3 acres, still work.
5. <i>How successfully do you use floor sorts to divert recyclable materials?</i>	We	<ul style="list-style-type: none"> - One staff does an initial sort before materials go up the line. They were actually more profitable and diverted more material before they put the line in however (4 people sorted 30 tons per day vs. 14 people sorting 100 tons per day), though load characteristics became dirtier. 	Very. However, labor is used as much as possible to direct customers to the correct disposal areas so that minimal sorting is required.
6. <i>What practices (or equipment) do you use to understand load composition and to direct loads to different areas of your facility?</i>	<ul style="list-style-type: none"> - Inspection before during and after tipping. - Jobsite documentation. - On site materials testing. XRF, NIR, PLM 		Staff assistance rather than equipment. Staff talk to customers before they start unloading and help direct them to correct disposal bins, boxes and areas.
7. <i>What specifically determines loads destined for disposal versus recycling (C&D)?</i>	Material composition		Determined by what is in the load by staff talking to customers. Everything that can be recycled is.
8. <i>What types of materials do you accept from self haulers? Are they offered payment for recyclables? Which commodities? Reduced disposal rates? Which materials?</i>	<p>Same as commercial haulers</p> <ul style="list-style-type: none"> - We do not buy materials at this time. - We accept debris for processing, if the customer has done the work to separate materials for profit, they are typically not utilizing our service. - No reduced disposal rates. 		All materials are accepted from self-haulers. Yes, offered some payment for recyclables and reusables, depending on market values. Yes, reduced disposal rates are offered for everything except refuse.

Interviewee Company	Recovery One	CDL Recycle	Urban Ore
Interviewee Perspective	C&D MRF	C&D MRF	MRF
9. <i>What is your process for recovering recyclables from mixed C&D loads?</i>			Floor sorting if necessary. Much of the labor is focused on getting customers to dump in the correct location in the first place.
a. <i>Sorting</i>	A combination of mechanical and hand sorting systems.		
b. <i>Material Flow</i>	Materials are typically conveyed through the processing system		Flow customers through station so that they pass through reusable and recycling disposal first, then towards organics and finally C&D and refuse.
10. <i>How do you handle contaminated loads? Do you remove recyclables from loads of garbage? If so, how?</i>	Hazardous materials discovered in the load result in a rejection or abatement. - Yes, we remove recyclables from garbage, mechanically and manually depending upon the situation however we do not open up garbage bags, Garbage bags are disposed of as garbage.	- If the load hasn't been dumped yet, they tell them to leave, if the load has been dumped, then protocols depend on the level of contamination. For example, asbestos contamination requires calling out an asbestos crew.	Yes, use labor to sort if necessary.
11. <i>How do you communicate changes in operating procedures to commercial drivers? To the general public?</i>	Very few procedural changes impact the commercial drivers and or the general public.	- Their customer base is very narrow and very targeted, and accounts oriented. If they have any changes they send out a notification to their customer list.	Staff talk to customers and signage.
12. <i>Do you have plans to expand the facility or purchase new equipment in the next 5 - 10 years?</i>	Yes	No	Not new equipment. Will expand as possible.
13. <i>What will your processing capacity be in the next 5 - 10 years?</i>	Depends upon markets and regulations placed upon our industry & the industries we serve.	They've actually explored selling CDL, the challenge for them is that it's impossible to expand (health department barriers) and competition is stiff with many smaller facilities that are not as heavily regulated as they are.	Likely to still use labor, as "good jobs for good pay" are needed.

Interviewee Company	Recovery One	CDL Recycle	Urban Ore
Interviewee Perspective	C&D MRF	C&D MRF	MRF
14. Do you have plans for additional capacity aimed at specific commodities? If so, which ones?	Yes, Carpet, Wood, Gypsum	No	Looking more at film plastics. Already do traditional recyclables plus carpet and mattresses.
15. Have you considered potential areas or methods of coordination between King County facilities and your facilities? What are they?	No.	<ul style="list-style-type: none"> - County transfer station could serve as a transfer point for yard waste. Currently garbage companies drive up to Maple Valley or Everett to dispose of yard waste cheaper, but if the County lowered their rate this could change. - With C+D rates so low elsewhere, not sure how the County could serve as a transfer point. 	Would be willing to consult on laying out future transfer stations to increase recycling.
16. Are there ways the KC transfer stations could serve as a transfer or processing point for mixed or source separated recyclables to reduce travel time to your facilities (e.g., curbside collected yard/food debris)?	Yes, if they become committed to the identification and elimination of hazardous materials from loads destined to a recycling facility.		Not applicable as Urban Ore currently does not have facilities in this area.
17. What infrastructure do you think should be added (system-wide) to recover more materials	More markets for finished products. Collection is easy, processing and selling what has been collected is and always will be the challenge.	<ul style="list-style-type: none"> - Find it amazing that Shoreline was built without having a 'dirty MRF' pick line for multi-family and a CD collection system. 	Thinks more staff is beneficial.
18. What policies do you think should be added (system-wide) to recover more materials?	Aggressive identification of hazardous materials that render materials non-recyclable.	<ul style="list-style-type: none"> - Find it ironic that facilities like CDL cannot accept recycling as garbage, but the County is allowed to do so - they should be held to the same standards. - Only allow contract collection vehicles to bring in MSW. - It's impossible to make all stations sorting facilities, but maybe they could transfer recyclables to a centralized sorting facility, contracted with the private sector. - The health department has been a 	King County would need to allow for floor sorts to dramatically increase diversion.

Interviewee Company	Recovery One	CDL Recycle	Urban Ore
Interviewee Perspective	C&D MRF	C&D MRF	MRF
		<p>barrier in the past - identify ways to overcome these barriers.</p> <ul style="list-style-type: none"> - Level the playing field related to residuals. Require all residuals from MRFs to go to the County transfer stations instead of trucked out to Yakima. - Concern about County willingness to make the changes needed - they've invested in transfer station infrastructure, and they need to 'feed' it with revenues from solid waste. 	

Private Source-Separated Processors Interview Results

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
Interviewee Name	Seth Little	Lonnie Streitberger. 253-372-1368	Don Kuzmer 253-606-4347	Denise Small 206-285-9140 x 2588	Dirk B. Wassink 206-423-9422	Larry Condon	Bob Sargent	Cheryl Mckitterick	Mike Dionne
Interviewee Date	10/26/2012	10/25/2012	10/29/2012	11/8/2012		10/25/2012	10/25/2012	11/6/2012	10/25/2012
Question									
1. Do you have contracts in place with the County to collect recyclables from KC Transfer Stations?	No.	Yes	Yes	- Yes, we have a drop box for Reusables at Enumclaw and are – hoping to extend this out to the other stations. We used to have one at Shoreline, have not been able to reinstall after the remodel. We are eager to do so. - There are clothing donation boxes at almost all stations except for Bow Lake and Factoria, and Denise is planning on	- Yes, we work with Michelle Miller and Kinley Deller on pre-scheduled collection events that occur 3-6 times a year outside of transfer stations. Because of union issues, we have to park outside the transfer station. These events are moderately successful for us. - Typically these have been 3 weekends in spring, 3 in fall held at	No.	No.	No	No. Other than what is brought to their facilities

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
				following up with Bow Lake. - Appreciates the County's support of innovative programs (such as bikeworks) and recognizes internal constraints.	Shoreline. In previous years we've attempted events at multiple stations but have narrowed it down to Shoreline as the most successful.				
<i>a. If so, what could be done to increase the amount of recyclables that make it to your facility and are recycled (i.e. cleaner loads/better separation,</i>	sorting - conveyors. Single-stream is detrimental to advancing recycling (both residential and commercial)	With no options at Bow lake, the drop in recycle collection is in the 100's of tons. Have plastics (bottles) in separate containers; OK with mix of newsprint and junk mail; OCC - pull off the tipping floor; plastics - other; Look at industrial customers (film, OCC) - target loads/industries. Create separate drop-off areas for commercial/in	Separate metals into small hoppers. Do this at all transfer stations	The clothing market will accept almost anything (unless it is completely trashed). There are for-profit collectors and non profits – the non-profits have a tough time competing to get their share to put back in to the community and again, really appreciates that King County supports Northwest Center via a contract.	- The County has been very earnest in helping. One of the big issues is that we don't have access to the materials, since Union requires we stay outside of the station. If we could get inside the station and work together with union staff we would have greater impact. We are open to creative routes, especially helping union staff understand	Contaminant avoidance. Mix yardwaste (YW), woody debris (and biosolids)	Rainier can't because King County insists on commingled (organics & wood) which is good for Cedar Grove, but not Rainier. Source-separated would be ideal for Rainier.	NA	King County could be more open to using finished product instead of virgin aggregate in construction projects.

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
		dustrial vs. residential.			that we aren't jeopardizing their jobs. - At minimum, being able to have our collection truck inside the station, after the scale, would help formalize it (right now it doesn't feel very official, as a truck on the side of the road).				
2. <i>What are other sources of materials? (i.e. public, MRFs that sell commodities to you, etc)</i>	MRFs; commercial direct	Commercial	Commercial.	We have spoken with the City of Seattle (Shirli Axelrod) about doing pilot projects for tough products that end up in the landfill – mattresses and baby equipment, for example. Denise is involved in Washington State Recycling Association and they are trying to figure out if there are ways to dismantle and	- The public - Contractors - We do salvage projects where we collect materials.	MRFs, Other, no public	Commercial, Industrial	Construction and transport companies deliver waste gypsum wallboard to our facility for recycling and we pick up waste from G-P Gypsum, a local wallboard manufacturer.	Only material that is brought to facility. Tipping fee charged.

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
				recycle plastics (i.e. from baby equipment). This could be a way to create jobs. West Side Baby is also interested in supplying product to Northwest Center.					
3. Do you have special handling requirements for certain types of loads or materials?	Pull out garbage and charge back to customer; With customer-direct, knowledge of the source is paramount, and provide direct education about acceptables. If too much ongoing contamination, account is removed.	Get at tip floor	No additional sorting	We have a policy not to collect contaminated or hazardous materials and a policy in place in the event a driver discovers something.	Because our materials are reuse they are very condition dependent. We don't do well with people just dumping off into a box – materials get damaged. The handling is extremely important at all points. This is another challenge with the Transfer Station when people think their materials are garbage so treat them as garbage.	Facility will be designed to manage contamination (and various feedstocks). Receiving will be split according to load quality and type	Commingling is NOT GOOD for Rainier (wood). The pricing is a lot different than wood-only. Use 50-yard wood containers.	No	No.

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
4. <i>Have you seen or heard of other transfer station recycling programs or ideas in other areas to capture more recyclables that could be applied in King County?</i>	Spokane has a good program	Tip floor sorting; Loader cuts piles for hand-sorting; process vs non-process, swarm sort	Rabanco; Pierce County; Go back with OCC, newsprint or other materials with value	Stations that collect e-cycling.	- We've also worked with Bill Smith in Pierce County, where we trained Goodwill workers on site about how to recognize good materials to divert to our bins. Goodwill would call us when they had a truckload full. This worked fairly well, but we ended up transferring the program to a local Tacoma organization which became defunct. In principle this was a good method. - Portland Metro (Bryce Jacobson) had a place inside transfer stations with a crew specifically targeting wood. They then processed the wood on site.	Spokane County. Use separate receiving areas for organics and MSW. King County should use separate areas.	Yes. Seattle transfer stations - take walking floor loads of wood only in the past - now they are commingling	Yes. Currently in BC we have numerous locations that collect recyclables	Republic, etc.; Sort thoroughly. Comes in SS; Conveyor, sort out contaminants

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
					They definitely got a higher volume of wood than without, but likely marginal return on investment.				
5. <i>Is there a different way to separate the materials at the KC transfer station that would make the commodities more valuable? (e.g., sorting plastic 1&2 from other plastics, combining glass with Tin, Aluminum Plastic loads)</i>		Separate out office pack (white ledger) vs newsprint; collect beverage bottles/aluminum (sorted) with no glass or food plastic	No - no additional sorting necessary or valuable - would require too many containers and staffing	We resell product to Value Village. Both our drivers and Value Village do different levels of sorting: At collection the driver does hard goods/soft goods and non sellable or garbage sorting, and the finer grain sorting happens at the store by value village. The driver would be the one to identify recyclable material or garbage for the transfer station.	Reuse material collection sites must be attended. The attendant needs to know something about the materials. If a Goodwill trailer were set up, they'd get piles of junk when most of it is not reusable, which could be a risk if the County weren't willing to dispose of that junk material that they didn't take.	Avoid contamination with MSW. Keep self-haul and commercial haul separate; Accumulate YW until it can be staged after YW for processing; tailor feedstock to certain processing components	Make a choice to Source-Separate wood	NA	No.
6. <i>Can you describe the components of your processing system and types</i>	Hand-sort; separator; eddy current; steel drum	Mixed paper - sort line. Don't sort commingled. Conveyor,	Metals Express provides hauling only.	By hand.	- Really depends a lot on the circumstances, and varies	Front end includes both manual and automated contaminant	Magnets, Grinders, Screens, 300 50-yard boxes, walking floor	1. Inbound wet and dry loads of waste product are dumped on	Excavator, front end loader, crusher

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
<i>of equipment used?</i>		belt, pickers.			from human effort (hands, lifting) for simpler or very fine scale items, versus operating at a higher intensity level for larger sturdier materials (forklift, pallets and carts). - Processing the materials happens with hand tools (pry bars, hammers, de-nailing guns).	removal, size reduction,	trailers	the NWGR plant's tipping floor, and hand-cleaned of metal, plastic and other debris. 2.The raw material gypsum waste is loaded into a large feed hopper and then fed onto a conveyor belt, where an electromagnet removes ferrous metal fragments. 3.The material is then conveyed to an enclosed processing area that separates the paper liner from the gypsum core. 4.The recyclable gypsum is trucked back to drywall manufacturers , where it is combined with virgin rock or synthetic gypsum to make new wallboard.	

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
								5. The paper is further processed prior to recycling for use in a wide variety of applications.	
7. How big are your receiving, processing, and storage areas in square feet?	3 receiving areas: OCC; mixed; unloading dock (office). 46,000 sq ft total	Kent. Truckloads go to docks; roll offs go to large/segregated six bunkers >> conveyors	Metals Express provides hauling only.	N/A	Roughly 10,000 square feet.	Large	Very large - uncovered.		16 acres total - 10 acres receiving
8. How successfully do you use floor sorts to divert recyclable materials?	Some pre-sort at unloading, but belts spread out material for sorting primarily	Some sort at bunkers, but mostly source ID'd	Metals Express provides hauling only. Some minor processing of large vehicles.	We have an arrangement at Enumclaw where Northwest Center staff can leave garbage materials with Transfer Station staff, and if the Northwest Center staff sees reusable materials on the floor, the Union Staff can collect it for Northwest Center.	- In the past we've worked with CDL Recycle in an arrangement where they'd drop off lumber, we'd sort/de-nail, and pay CDL a little bit for the drop. - We also did a program with Hungry Buzzard. They would have their trucks bring loads and tip on their tipping floor, and Second Use would come in to the floor and select materials (example of	None really. Minor contaminant removal.	When necessary		Metals sorted / crushed

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
					private facility, how this works). Other than the fact that they are 40 miles away, this worked well.				
9. <i>What practices (or equipment) do you use to understand load composition and to direct loads to different areas of your facility?</i>	Inspect every load visually; take pictures to inform customer; separate contamination and deduct from payment or rebate.	Meet with customers prior to dumping and monitor dumps for initial loads. The customer load is identified at tip pad, no cameras.		N/A	Visual inspection, feeling wood to see if it's rotten.	Visual screen / Quadrant design. Will use 53-foot trucks (top-load) and a Tipper for Puget Sound Material. Spokane uses walking floor trailers.	Visual assessment; source education. Every load inspected	We do have a sorting belt at the beginning of our processing system where an employee pulls out any unacceptable contamination	All loads inspected at facility. Reject load if contaminated
10. <i>What specifically determines load acceptance with regard to contamination?</i>	<2%. [There is a much higher % of waste now due to the commingled mix].	2% visual	focus mainly on educating the source	N/A	It's less about contamination and more about what we will accept. We have to look at the condition of the item and make sure it is in good condition, we have to consider if it is an item that can be reused (i.e. A perfect condition high flow toilet can't be reused), we have to look at whether there is demand for	Manned unloading helps immensely. Return contaminated loads to customer. Non-organics,	De-minimis amounts of contamination are accepted. Contracts say none.		Visual at scale; PRS Cam

Interviewee Company	SeaDruNar	International Paper	Metals Express	Northwest Center	SecondUse	PacifiClean Environmental, LLC	Rainier Wood Recyclers	NewWest Gypsum	Renton Concrete Recyclers
Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
					the item (i.e. there are lots of commercial solid core slab doors in supply, but no demand for them so we don't stock them).				
11. What is your process for removing contaminants from the material you accept?	Sort line separating into 15-16 grades of material aimed at highest and best value.	See above	Not much - no need.	See question 5. above		Sort CDL outdoors; separate light and heavy (i.e., plastics, glass); Shred rather than chip in order to run different products; Trammel screen; pre-processing (by recipe) into quadrants (which is by contamination/quality)	Always source separate. Hand sort.		Some manual sort for rebar
a. a. Equipment	See above		na			See above	Magnets, Grinders, Screens, 300 50-yard boxes, walking floor trailers		Crush >> Magnet ??Crush >>magnet/screens
b. b. Sorting	See above		na			See above	some hand		
c. c. Material Flow	See above		na			See above	SS		
12. How do you communicate changes in operating procedures to	Direct to customers: Identify problem; distribute	Front side sales; acceptance; photos; Hazardous	Phone	We have information on the King County website, and	Every interaction with a customer is an opportunity for	Minimize changes; direct mail	Never change - stay consistent on pricing. Sometimes	We use signs at the plant, send emails and have the plant manager	Normally get material from a project bid, so in touch with

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<i>commercial accounts? To the general public (if applicable)?</i>	flyers; educate property managers and janitorial staff	waste must be retrieved by customer and transported away		some brochures and signage (both of which could use some updates).	education: with contractors when they drop off, on-site when we collect, and with the public. We also go to community events, trade shows and have brochures and a website.		use a mailer or in invoices/remittances	communicate with the accounts. We do not receive material from the public.	contractors and is all set up up-front.
13. Do you accept recyclables from the general public at your facility?	No.	Yes. OCC, magazines, small drop-off (containers)	No - industrial only	Yes, we have a 24 hr drop off plus clothing collection bins across the state.		No	Yes. Landscapers and public	No	Yes, not great
14. If yes, how is this material usually prepared ?	na	As is	Containers - hauled to Schnitzer Steel			na	Commingling is slowly squeezing source-separated wood collections and markets (e.g., landscape; manufacturer furnish; fuel)	NA	
15. Do you pay for recyclables from the general public?	No, but sometimes pay for commercial accounts (if paid, contamination may alter the pay or change the scenario	No payments or charges. Some deliver larger or select loads for payment.	No	Everything is donation.	Yes, in many cases but not all.	No	Rarely	No	No. Tipping fee.

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Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
16. Do you have plans to expand the facility or purchase new equipment in the next 5 - 10 years?	Current facility could use upgrade to deal with contamination from single streams. But overall goal is employment training, so automation is not a priority.	Not near capacity	No	We have a new clothing bin program.	We just moved to a new location that is more than double in size.	Yes. New facility	No.		No
17. What will your processing capacity be in the next 5 - 10 years?	2600 TPM		na		Our new location should have a huge impact on processing.	380,000 TPY	Same		Same
18. Do you have plans for additional capacity aimed at specific commodities? If so, which ones?	Contemplating some changes to deal with Commingled.	Maybe. Depends on work with sources.	na	Mattresses, baby equipment, clothing expansion.	Building materials.	380,000 TPY	Tentative on industrial zone property (covered) to recycle SS concrete, asphalt, OCC, plastic, metal. Primarily to add revenue streams		No
19. Are there ways the KC transfer stations could serve as a transfer or processing point for mixed or source separated recyclables to reduce travel time to area your facility (e.g., curbside collected yard/food debris)?	Separate containers for OCC, mixed paper, glass and provide rebate for tonnage (ex. SPU)	Yes. Commodity-specific. May depend on volume (e.g., not less than three tons). Looking for fiber or any revenue-generating arrangement.	Not really sure. Would be competing with metals buy-back centers, which is not a good thing	- Getting donation boxes at all of the stations. - Helping to promote Northwest Center (both on What do I do with...website and other joint promotion opportunities) - Partnering		Food, woody debris, biosolids	Yes. Interim loading facility for wood-only.		No. No advantage - why handle the material twice? Renton is the "downtown of King County" Easy in, Easy out.

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Interviewee Perspective	MRF	MRF	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor	Source-Separated Recycling Processor
				with Northwest Center for any pilot projects, such as mattress collection (when a program is developed).					
20. Have you considered potential areas or methods of coordination between King County facilities and your facilities? What are they?	Bins, and container placement	Need to look at TS operations to determine methods. Mini waste audit >> research solutions	have more bosses at transfer stations			Work with KC for a year to maximize organics recycling	Use a Voucher system - Sign voucher to bring material directly to RW facility, County paid per yard according to voucher. Used successfully during storm debris cleanup		Not much going elsewhere anyway, is there?
21. What infrastructure do you think should be added (system-wide) to recover more materials?	Location/space; staff education; pre-sort on floor. Would take all commingled (TBD) except glass, which needs to be separated and clean. Separating OCC is best value. Would take all fiber, 1-7 plastics (12" minus), aluminum, tin.	Automation; commodities: wood	Boxes		There are probably some very site specific or program specific needs for onsite collection, such as signage, truck loading space, etc. but it would depend on what the new system looked like.	build a-la-cart (i.e., specific to need)	More choices for customers when they come tin to TS; E.g., Vashon - multiple receptacles		Concrete; Asphalt. Infrastructure to use dirt - Get lots of calls asking where to dump dirt.

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<i>22. What policies do you think should be added (system-wide) to recover more materials?</i>	Charge more for disposal, or pay more for recycling. Make it beneficial	Discounted rate for recycling; increase fee for dumps; convenience. Easier = better. Feedback to individual customers. Equipment >> automation.			Flexibility for Second Use staff to divert materials from within the station.		Wood disposal ban. Assist businesses already in business rather than create competition		Commercial: \$7.50/yard (2' minus); \$8.50/yard (2-4' minus); Add \$1.50/yard if includes rebar.

Construction and Design Firms - Green Building Customers Interview Results

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
Interviewee Name	Ken Hagen	Jamie Tiegs	Gary Merlino	Dana Johnson / Corey Vlad	Kieron Walford
Interviewee Date	11/6/2012	10/31/2012	10/30/2012	11/5/2012	10/25/2012
Question					
1. <i>Do you haul your own waste or contract with a third-party C&D hauler?</i>	Third-party	Third-party	Our own facilities. We do mostly civil and site work so have developed our own infrastructure to handle and process bi-products.	PCL uses third party haulers.	Typically, yes on larger projects. Small projects, like office or bank remodels or what they refer to as "tenant improvements", remove waste daily and take to closest transfer station. This is disposed of as garbage.
2. <i>Who do you use?</i>	Renu who hauls to Waste Management	Our demolition contractor - Northwest Metals and Salvage	N/A	Waste Management – most commonly used. (They have a co-mingle option). 2nd most commonly used is Allied Waste / Rabanco. ECC project is currently using. (They have a co-mingle option.) For separate recycling bins/dumpster, have used companies like Renew-Recycle. Corey believes they are a part of Nutec. (Murray Morgan project is currently	For larger projects, Lloyds, Re-Nu, WM, are usual subs.

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
				using Renew.) Independent Metals or Seattle Iron (structural steel scrap – they will deliver dumpsters, and haul, plus pay us about 10 – 12 cents/lb.)	
3. <i>Do you use source-separated collection, commingled collection, both, or neither for C&D recyclables?</i>	Both	Commingled	Source separate - each with site work.	Typically source-separated collection for projects where multiple dumpsters can be sustained – metal scrap separate from drywall, separate from general trash. Co-mingled collection where required by Owners (projects where Garage space are at a premium – such as tenant improvement in Seattle hi-rise) or there is not enough justification for multiple dumpsters. Specifically for LEED projects, additional dumpsters are maintained as required.	Commingled, all goes into same dumpster. This is typically due to space constraints and sub, like Lloyds, does the sorting and sending to places for recycling. Sub provides monthly report back on % recycled by tonnage and each waste stream when for recycling.
4. <i>What type of materials do you typically recycle?</i>	Renovation and new construction wastes	All major construction debris goes in the commingled container	Soil, rock, landclearing, fill.	At the jobsites: Metal (metal studs) scrap, drywall. Demolition subcontractors (and on bigger jobs plumbing, fire sprinkler, electrical subcontractors) typically haul their own	Metals, asphalt, gypsum board, wood, concrete, cardboard.

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
				scraps – due to salvage value. Paper, plastics, aluminum cans, glass for office personnel and site employee lunches.	
5. <i>If you self-haul, how do you determine where the load is transported? For disposal? For recycling?</i>	Don't have subs self-haul - only takes one knuckle head to mess it up. Use our dumpsters.	Don't self haul.	To our own facilities or know locations.	Not applicable	Not applicable because do not self haul on larger projects and if self performing on smaller projects, take materials to transfer station as garbage.
6. <i>What facilities do you typically use for recyclable materials? What about reusable materials?</i>	Renu/Waste Management for comingled. When we source separate and Renu hauls it to reputable recycling facility. Did salvage on recent project where we pulled off the siding for reuse on another King County project.	NW Metals and Salvage or other KC haulers who can provide reports for LEED.	N/A or didn't ask.	Usually co-mingle haulers if recycling is to be tracked – for LEED sake, for instance. Waste Management, Allied Waste – also do comingling – and divide for recycling.	Not applicable because sub does this.
7. <i>What kind of vehicles do you haul in (pick up, dump, trailer)?</i>	N/A	N/A	Big dump trucks.	Not Applicable. 20yd – roll-off style dumpsters. Smaller if needed by individual jobsites – High rises may use 3cy tippy-dumpsters on each floor and bring down through manlifts to main dumpsters.	Not applicable because third party provides drop boxes.
8. <i>If you do NOT self-haul, do you have any say as to where the load is brought for recycling or disposal? Would you like to?</i>	On my recent LEED project, Renu hauled our co-mingled waste to Waste Management, which	Yes, when we do LEED projects we insist the hauler take the materials to facilities with high	N/A or didn't ask.	Typically not. It is up to the vendor to perform disposal at agreed upon rates. They likely dispose	No. This is up to the sub. Yes because would rather see materials recycled as local as possible. If

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
	because of King County regulations(?) will only report 75% facility recycling rate for our	recycling rates.		where cost effective. While working at the Transfer Station – it was very common to see commercial haulers dump green waste at Houghton. This is an example of where costs to haul to Maple Valley for Green Waste / Compost are prohibitive due to time spent in traffic.	Lydig could recycle right at a place like Bow Lake, that would be great. But note this depends on labor costs to sort and whether or not disposal fee makes sense. Will always go to third party with who they can just provide commingled loads if price is cheaper.
9. <i>What do you like about the recycling services where your material is currently brought for recycling?</i>	N/A	N/A	N/A or didn't ask.	Not sure – because we don't haul our own recycling.	
a. <i>Traffic flow</i>	N/A	N/A	N/A or didn't ask.		
b. <i>Pricing</i>	N/A	N/A	N/A or didn't ask.		Pricing by sub. Others are really not applicable because Lydig does not self haul to recyclers.
c. <i>Staffing</i>	N/A	N/A	N/A or didn't ask.		
d. <i>Unloading/load acceptance</i>	N/A	N/A	N/A or didn't ask.		
e. <i>Information</i>	N/A	N/A	N/A or didn't ask.		
f. <i>Location</i>	N/A	N/A	N/A or didn't ask.		
g. <i>Other?</i>	N/A	N/A	N/A or didn't ask.		
10. <i>Have you taken materials for disposal to King County transfer stations? How often?</i>	Yes, personally.	No.	N/A or didn't ask.	PCL does not make use of transfer station facilities typically.	Not often because they only dispose at transfer stations for small interior remodel projects like tenant improvements. Larger projects have

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
					demolition sub that takes care of materials.
11. <i>If you could bring C&D to King County Transfer Stations, would you? Why or why not?</i>	No because we use a hauler.	No because we use a hauler.	N/A or didn't ask.	Probably not. Because we are signatory to the Union, our labor costs to drive materials for recycling would be more expensive than it would be to have other haul and recycle/salvage.	Yes. But needs to be economically the better option so fee needs to be reasonable.
12. <i>What do you know about the availability of recycling services at King County Transfer Stations?</i>	On a personal level they generally work great for intended purpose. Clear about what goes where. (Interviewer note: I believe he was talking about SPU stations.)	Didn't ask.	N/A or didn't ask.	As a company, we know little about recycling services at the County – because we use 3 rd party haulers. As a former King County resident I am aware that station have recycling available to the public.	Yes regarding CD disposal, they know there is none. Lydig knows some stations, like the Shoreline one they built and new Bow Lake one, has traditional recycling areas set up to collect these types of materials. As a company, they do not use these services.
13. <i>What features would you like to see at the King County Transfer Stations if they accepted C&D for recycling?</i>	Don't know - see above answer	Didn't ask.	N/A or didn't ask.	If it were a larger facility, the same sort of “dumping” that a transfer station offers – drive up and unload from pick up beds as opposed to hand loading into smaller containers that are currently offered.	Separate dumpsters for pre-sorted scrap metal, cardboard, gypsum board, wood, etc...

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
14. <i>What materials would it be useful to be able to drop off at transfer stations? Would you be willing to pay a fee for those services?</i>	N/A	Didn't ask.	N/A or didn't ask.	Same materials that we currently recycle through third party haulers – metal scrap (structural steel and light gauge metals), drywall.	Yes, they already pay a fee for disposal of C&D and are willing to pay King County for this. Lydig said it needs to be a reasonable fee. If costs more to do CD rather than garbage then will not dispose of these materials at King County facilities. If price is the same, would recycle. Kieron mentioned that several of their projects have LEED goals and so they need these C&D recycling services in order to meet those recycling requirements.
15. <i>In general, what's working well at the transfer stations and what doesn't work?</i>	N/A	Didn't ask.	N/A or didn't ask.	Seems to be working fairly well for trash. At Houghton, recycling facilities could get clogged up – traffic flow was not very good right next to commercial exit.	Not applicable to Lydig because only uses stations to dispose of waste materials as garbage. As far as that goes, they work fine.
16. <i>What would make it easier (or create a better incentive) to recycle and reuse more of your C&D waste?</i>	It is relatively easy and cost effective in King County already.	Don't need to make it easier.	N/A or didn't ask.	If costs for recycling relative to trash are significantly less, than premiums can be afforded to spend labor/time to separate, or pay smaller premiums for co-mingled trash dumpsters.	A reasonable fee to dispose.

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
17. <i>What infrastructure do you think should be added (system-wide) to recover more materials?</i>	Recyclable materials mixed with hazardous waste - like gravel in a tar roof.		N/A or didn't ask.	Not sure what infrastructure... Increased trash disposal pricing would encourage higher utilization of recycling services available. Some ideas could include more strategic locations – pickup from denser areas with greater frequency?	Identify separate dumpsters and make areas efficient to use.
18. <i>What policies do you think should be added (system-wide) to recover more materials?</i>	Don't disincentivise private commingled facilities from achieving and reporting better facility recycling rates than 75%. 95-100% of our material was recycled and we didn't get credit.		N/A or didn't ask.	Free disposal of recycling – assuming the County can be profitable processing materials for salvage at a lower cost than salvage value.	King County delivering dumpsters, commingled is the best. Lydig's labor tends to be union, and some jobs are prevailing wage. Labor costs a lot more for them to sort. Plus space for separate dumpsters is sometimes not possible. They would like it if King County would drop off drop boxes at their construction sites and pick them up when full the same way their subs do. They mentioned that King County would need to be cost competitive for this service.
19. <i>Outside of King County Transfer Stations are there enough options for recycling C&D materials in the County? Could</i>	More than 95%?		N/A or didn't ask.	Yes, we believe so based on our third party haulers ability to recycle. I would	Yes. Lydig has not had problems with their subs finding places to recycle

Interviewee Company	Design Aire	Berschauer Phillips Construction Company	Gery Merlino Construction Co., Inc.	PCL	Lydig
<i>you recycle more than you currently are?</i>				contact those firms to find out if they could recycle more – and if they can, why they aren't currently.	materials. Not sure if they could since this is handled by subs.
<i>20. If not/If so, what materials do you need more resources for? Or is it locations/accessibility?</i>	N/A		N/A or didn't ask.	Again, check with third party haulers we contract with.	See above.
<i>21. How do you learn about opportunities to recycle C&D in the County?</i>	From our hauler.	From our hauler.	N/A or didn't ask.	We would be most likely to search via web page.	Not applicable as they do not usually try. I asked if he had ever looked at King County's web site to determine C&D disposal options within the County and he said that he has not.

Construction and Design Firms – Transfer Station Designers Interview Results

Interviewee Company	Herrera	URS	HDR
Interviewee Name	Mike Spillane	Terrill Chang	Debra Frye
Interviewee Date	10/26/2012	11/9/2012	10/25/2012
Question			
1. <i>What design or operations principles do you follow to maximize recycling at transfer stations?</i>	Depends on the site and intended operation. Flat Floors add flexibility. May include stationary or mobile equipment depending on application and waste streams to be handled		Flat floor to provide flexible space, most facilities have separate unloading areas for commercial and residential customers. Many facilities also have a traditional sorting line at the same location, some of those sorting lines just take single stream recyclables, while other facilities have included a dirty MRF line to process mixed waste or select loads.
a. <i>Flat Floor?</i>		Yes	
b. <i>Walls vs. chains?</i>			
c. <i>Variable Traffic flow?</i>	Flat floors allow for variable traffic flow. Otherwise traffic is largely set.	Yes	
d. <i>Separated Residential and Commercial?</i>	For larger stations, separated unloading adds to safety and potential for separation of commodities.	Yes	
e. <i>Separate or co-located traditional recycling?</i>	Recycling is at the same site, but often in a separate area from garbage disposal.	Separate. Ahead of inbound scale if possible	
f. <i>Flexible space to accommodate different materials as markets develop?</i>	Yes, space dependent	Yes	

Interviewee Company	Herrera	URS	HDR
2. What features do you typically design in to Transfer Stations in order to accept materials and increase their value for recycling?	Multiple top loading containers for materials like yard waste, wood, metal, cardboard. Usually in a z-wall configuration, or in a separate area where it can be made easy to unload. Convenience is key.	Large flat floor area where bunkers made of jersey barriers can be built for various recyclables	
a. Yardwaste?	Open top containers. Space on the floor for separate storage/unloading		either provide a separate space on the tipping floor with either an open top or compactor hopper to handle the load out, or provided separate paved area outside with a push wall and elevated pad to load out material via crane.
b. Wood?	Open top containers. Space on the floor for separate storage/unloading		Either separate floor space or a roll-off bin
c. Cardboard?	Open top containers or compactors		Roll off connected to compactor or smaller bins on the floor, many facilities have a separate drop area ahead of the scales for cardboard.
d. Appliances?	Storage containers or trailers		Floor space, sometimes ozone removing room and sometimes an elevated platform.
e. Reusables?	Small covered shed		Not included in the transfer station, we have provided a separate building at the same location that takes reusables
f. Commingled C&D	Top loading container for future processing. Some floor space to sort out clean wood.		Space on the floor in a bunker or roll off
g. Carpet			Carpet? – space on the floor.
h. Mattresses	Storage trailer		o Mattresses? – not typically provided for on the tipping floor. Some facilities have provided shipping containers for this material. X
i. Textiles	Small on-site third-party container		Textiles? – small bins.

Interviewee Company	Herrera	URS	HDR
<i>j. Tires</i>			o Tires? – space on the floor.
<i>k. Scrap Metal</i>	Small and large bins		o Scrap metal? – space on the floor or roll-off container.
<i>l. Other materials, depending on market demand? (i.e. plastic film, shingles, etc.)</i>			o Other materials, depending on market demand? (i.e. plastic film, shingles, etc.)
<i>3. In general, what's working well to optimize recycling/diversion at the transfer stations and what doesn't work?</i>	Flexible flat floor design. Space for multiple materials. Storage area to allow some floor sorting	Working well: Flexible flat floor areas for clean green, clean wood, misc. metals, etc.	A big flat floor works the best with a smooth traffic flow through the facility. This allows for vehicles to stop and unload their materials easily (not have to lift over a wall or up into a container). It needs to be easy, and not out of the way or have economic incentives for them to recycle (materials that can be dropped off before the scales). The facilities that have a dirty MRF can take select loads and recover even more materials out of the waste. Though this is more labor and equipment intensive, so can be hard to break even on costs. If people are in a hurry, or the tipping floor is too tight, not enough space to handle all the traffic and materials then the diversion rapidly decreases. Also if it's difficult – like if they have to walk up steps to drop into a bin, or lift over a wall will decrease participation.
<i>4. What equipment do you specify to maximize diversion of recyclables and organics?</i>			Organics are typically stored on the floor, or in bunkers or on site, or in a trailer. HDR does not typically specify rolling stock. Though the owners will use excavators or loaders to move or handle the material. Transfer stations typically do not process the organics, are just used to move the material to a

Interviewee Company	Herrera	URS	HDR
			processing facility. If it's is straight yard waste, and it is stored outside sometimes the vendor (who is taking the material) will bring a chipper in to load their trucks.
a. Drop boxes	Yes	Yes	
b. Bins	Yes	Yes	
c. Bunkers	Yes, for interim storage prior to load out or processing	Yes	
d. Excavator		Yes	
e. Skid Steer	Yes, with attachments	Yes	
f. Waste/load Screening	Camera		
g. Baler	When appropriate	Useful for OCC to reduce volume, but a TS can't compete with a MRF and will not get good prices for baled materials	
h. Compactor	When appropriate	OK for yard waste, food waste in large volumes	
i. Chipper	For separate organics processing		
j. Conveyer belt for sorting	When appropriate	No	
k. Other?			
5. What are some examples of flexibility for recycling you have incorporated into new transfer stations? Transfer Stations retrofits?			Facilities that we have designed have been able to run tests with mobile picking lines to evaluate the materials recovered versus marketability.
a. Flexible top-loading containers		Flexible top-loading chutes for trailers	
b. Mobile pick line	Mobile pick lines that can be stored on site, and brought in at irregular intervals for processing of stored recyclables (particularly for start-up recycling programs)	Maybe for rural locations; urban areas probably cheaper to accumulate recyclables on flat floor and send to MRF as trailer load of single stream recyclables	

Interviewee Company	Herrera	URS	HDR
6. <i>What features do you include in general floor operations, including how recyclables and organics are kept from being contaminated by MSW?</i>	Floors large enough for physical separation. Separate load-out chutes or top-load trailers. With enough space, separate buildings for unloading and consolidation	Flat Floor, separate areas of jersey barriers, easy to move, durable, street sweeper or attachment for loader.	The organics are located in a separate corner, or on a separate wall, some facilities use ecology blocks to create a separate area. If these are pushed through a waste hopper it is done after hours typically, when the floor is cleaned or a separate load out hopper is dedicated for organics.
7. <i>What new [design or operations] trends have you tried for increasing recycling at Transfer stations, but which have not worked out?</i>			The mobile sort lines have not been cost effective. When permanent walls were used, material would often extend out beyond the wall as it could not adjust to the changes.
8. <i>How would new staffing or partnership structures affect the way the station is designed? For example, if you knew in advance that staff would be doing floor sorting, or if you knew that private salvage companies would be allowed to help divert reusables, would this impact design?</i>	Space is necessary for floor sorting, along with good communications between equipment operators and sorters. Protocol for time intervals between unloading and Front-end-loader use. Good site lines around waste piles (i.e., not up against walls and not near waste chutes).	<ol style="list-style-type: none"> 1. Work with sorting staff during design to lay out floor to fit their operations, union rules, expected types of recyclables, etc. 2. Ditto for private salvage companies; floor might be smaller if they come and load staff away to sort elsewhere. 	Yes, the space needed for these efforts would need to be included in the floor plan design as doing floor sorts can take a lot of space to create safe areas for the pickers to work.
9. <i>What type of education, signage, or any other 'wayfinding' features do you incorporate into the design of the transfer stations?</i>	Variable read signs	<ol style="list-style-type: none"> 1. Safety and clean understandable wayfinding 2. Helpful - clean wood here, yard waste there, etc. 3. Educational - interesting facts & statistics about recycled materials, re-use opportunities, pollution and energy use age avoided 	We have a wayfinding group at HDR that works with the client and the designers to determine the decision points and best messaging approach or options, and design the signage/education materials to suit the owner. We have also worked with incorporating more information on web sites so visitors know where to take what before entering the site.
10. <i>What would make it easier (or create a better incentive) to recycle and reuse more C&D waste at Transfer Stations?</i>	lower pricing	<ol style="list-style-type: none"> 1. It's impractical to do extensive C&D sorting at a TS 2. Could have lower rate for C&D, but MSW would have to be weighed separately and pay higher MSW rate >> inconvenient to cross scales twice 3. Bulk load unsorted C&D into 	For contractors it comes down to price and to a certain extent the tracking of recyclables or reusable products for LEED projects. Locations have played with the price they charge and know the breaking point where they will not get C&D materials.

Interviewee Company	Herrera	URS	HDR
		trailers \$ send to private MRF for most economical sorting 4. Good, clean, pre-sorted stuff could go to a reuse store, but there won't be much of it.	
11. <i>What new [design or operations] trends are you most interested in for additional recycling at Transfer stations?</i>	Integration of waste, recycling, and organics receiving on one campus	Provide a single-stream (some commingled misc as curbside) area of the floor where self-haulers can drop small amounts of traditional recyclables; also easy for floor spotters to capture amounts of recyclables that they notice on the floor without having to walk to drop boxes. >> Send this all to a MRF.	More facilities are receiving and transferring organics, the challenge is providing adequate space and keeping the material separate. Some of the larger campuses are also looking at adding digesters or other types of conversion technologies though still seem to be moving very slow in that direction.
12. <i>What infrastructure do you think should be added (system-wide) to recover more materials? (Do these require a station to be designed in advance to accommodate them, or could they be added into existing stations?)</i>	Drops sites for source-separated organics; "wet" and "dry" waste processing; Flexible operations for weekday and weekends (i.e., commercial vs residential)	Depends on available area; e.g., Enumclaw TS yes, Shoreline, probably not; Seattle North - no way!	Many companies are successful at operating dirty MRF's though the challenge is getting enough material at the right quality, and having a market for some of the "waste products" from the line. So the question is the County's waste stream conducive to this.
13. <i>What policies do you think should be added (system-wide) to recover more materials?</i>	Financial incentive; landfill bans on materials with markets;		I am not a policy person, and do not know how this impacts recovery.

APPENDIX E

Task 2: Draft Background Document Review Summary



Optimized Transfer Station Recycling Feasibility Study

Task 2: Background Document Review Summary

Prepared for
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Existing Issues and Opportunities

General

- We must think system-wide, including the recycle haulers and commodities, to truly think differently.
- See *Milestone Report 3: Appendix 2, Comprehensive Plan Text On Select Topics*

Waste and Diversion Data

Table 1. 2011 Transfer Station and Drop Box Recycling Tonnage (Tons)

2011 Orig	Applnc / Electrnics	Misc	Paper	Scrap Metal	T-A-P-G	Wood	Yard / Food	Total
Cedar Falls		3.00	214.00		126.00		362.00	706.00
Cedar Hills	9.00	0.00		101.00				111.00
Enumclaw	173.00	7.00	424.00	55.00	255.00	4.00	458.00	1,377.00
Houghton		3.00	551.00		108.00			662.00
Renton		6.00	745.00		282.00			1,033.00
Shoreline	389.00	8.00	651.00	591.00	154.00	49.00	3,134.00	4,971.00
Skykomish			22.00		23.00			45.00
Snoqualmie			53.00		44.00			98.00
Vashon	64.00	4.00	135.00		520.00			721.00
	635.00	31.00	2,795.00	747.00	1,512.00	53.00	3,955.00	9,729.00

Source: 2011 Solid Waste Division Annual Report, King County

Table 2. 2010 Transfer Station and Drop Box Recycling Tonnage (Tons)

2010 Orig	Applnc / Electrnics	Misc	Paper	Scrap Metal	T-A-P-G	Wood	Yard / Food	Total
Bow Lake	3.00							3.00
Cedar Falls	56.0	4.00	214.00		119.00		255.00	648.00
Cedar Hills	9.00		1.00	11.00			37.0	58.00
Enumclaw	182.00	5.00	475.00	52.00	230.00		293.00	1,237.00
Houghton		3.00	530.00		90.00			623.00
Renton		5.00	790.00		269.00			1,064.00
Shoreline	357.00	5.00	598.00	651.00	143.00	141.00	3,942.00	5,837.00
Skykomish			23.00		28.00			51.00
Snoqualmie			53.00		25.00			78.00
Vashon	56.00	3.00	175.00		516.00			750.00
	663.00	25.00	2,859.00	714.00	1,420.00	141.00	4,527.00	10,349.00

Source: 2010 Solid Waste Division Annual Report, King County

Table 3. Ten Most Prevalent Disposed Materials, Self-haul Substreams, 2011 (Tons)

Material	Estimated Percent	Cumulative Percent	Estimated Tons
Dimensional Lumber	12.4%	12.4%	24,362
Yard Waste	10.3%	22.7%	20,083
C&D Wastes	5.6%	28.3%	10,983
Gypsum Wallboard	5.3%	33.6%	10,307
Carpet	5.0%	38.5%	9,768
Furniture	5.0%	43.5%	9,709
Other Ferrous	4.9%	48.4%	9,673
Contaminated Wood	2.9%	51.3%	5,708
Mixed Metals (items <20% non-metal)	2.7%	54.0%	5,195
Other Wood	2.4%	56.4%	4,740
Subtotal	56.4%		110,528
All other materials	43.6%		85,385
Total	100.0%		195,913

Source: 2011 2011 King County Waste Characterization and Customer Survey Report

Facility and Site Layouts

General

The following observations came from documents provided by King County, or the initial project kick-off meeting.

- Extreme space constraints are cited as the reason for no recycling at Houghton, Algona and Factoria.
- Number of access points, site size and layout differ among facilities and impact the route of travel for each customer type. In general, there is a loop of travel, though some facilities have crossover points – possibly a source of congestion?
- All sites have some space constraints, except Bow lake, Shoreline, and Enumclaw, Renton and Vashon.
- Issaquah: Cleanscapes has a new contract, operates a ‘retail specialty recycling store’
 - other cities have expressed interest in this model, to avoid curbside pickup of all specialty items
- New Factoria and Bow Lake facilities compel us to consider the ultimate use of the Renton facility: close or other opportunity?
- There are some no-fee recycling services that are after the gate at Shoreline, soon to be at Vashon (scrap metal), and interim recycling services at Bow Lake.

- Many of the stations with no-fee recycling areas allow customers to access the area and leave without having to queue up to the scale - they can continue to the scale after depositing recycling for garbage or fee recycling drop off. (Bow Lake, Enumclaw, Houghton and Renton). This is an efficiency opportunity. For those that cite space constraints for recycling, is there a way to integrate the recycling into the solid waste tip area, so a separate space is not required?

Algona

- The Algona Transfer Station is located at 35315 West Valley Highway in the city of Algona in King County. The transfer station is bordered by undeveloped land on the south, west, and north sides
- Due to site space constraints, there is no recyclables collection service offered at this facility
- Inbound scale forces quick entrance to avoid backup on WVH, no time for load screening.

Cedar Falls

- From the scalehouse, customers follow signage directing them towards the drop boxes. Customers dispose of waste directly into three top loading drop boxes; two are reserved for solid waste, one is for yard waste. Loaded boxes of yard waste are hauled by a contracted hauler to a contracted compost facility for processing.
- The maximum facility capacity is 3 full drop boxes. Should solid waste boxes fill, but space remain in the yard waste box, solid waste may be disposed in the yard waste box which would then be disposed as solid waste.
- Another constraint is that the only person on site is a Scale House Operator.

Enumclaw

- Is it possible to leave the no fee recyclables area open 24 hours? Currently only open during hours of operation. This may result in additional contamination due to lack of monitoring.

Factoria

- Expand entrance, prior to scales, to allow for recycle bins? Is there enough space on the tip floor for laborers to sort floor dumped refuse?

Houghton

- Is it possible to leave the no fee recyclables area open 24 hours? Currently only open during hours of operation. This may result in additional contamination due to lack of monitoring.

Recycling Policies and Programs

- Waste Prevention Policies:

- 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-6 Strive to ensure that materials diverted from the King County waste stream for recycling, composting and reuse are handled and processed using methods that are protective of human health and the environment.
- Inconsistencies and confusion from different municipal contracts (e.g., the County accepts something different or in a different way from curbside) can send mixed messages to customers.
- Opportunities for thinking differently about the process, such as partnering with Cities for alternative spaces and drop box sites using City 'real estate'
- Don't want to duplicate city services or private sector recycling services, want to fill gaps or recovery materials that have value are being dumped as waste in our system
- Aggressively promote and seek to expand waste reduction and recycling, with grants to member communities and recycling opportunities at all facilities for self-haul customers. Unfortunately, the Zero Waste grant being cut from the County's budget (which could have done this).
- "A few cities expressed interest in including a design, build, and operate approach to siting or constructing new facilities and making major improvements to existing stations. Under the design, build, and operate procurement process, one company is contracted to perform all three functions. Typical County practice is to issue separate contracts for the three functions. RCW 39.10.050 allows public agencies to use a design/ build (but not operate) procurement process. The County is considering using this alternative procurement process for the design and construction of the replacement Factoria Transfer Station." (Source: King County Milestone 4 Report)
- "Under contract with King County, the Rabanco facility currently provides only construction, demolition and landscaping debris (CDL) transfer and disposal services at Black River. To provide a level of service comparable to that at the Renton station, Rabanco would need to add MMSW and recyclables transfer services at the station. Rabanco suggested they could make this change in service levels through an amendment to their existing CDL handling contract with the County (see Chapter 8). However, since Rabanco's current proposal is outside the scope of the original Request for Proposals and would be for a different service than that provided by the original contract, a contract amendment would not be adequate. Instead, this change would require a new contract and a competitive procurement process.

"Another issue involves restrictions placed on the County regarding the contracting out of work. With the suggested closure of the Renton Transfer Station, Rabanco has proposed to either hire affected County employees at similar wages and benefits, or contract with the County for labor. Either method of staffing the Black River facility would change the contracted condition of County workers and therefore would require

collective bargaining with the affected bargaining units before any change in working conditions could occur (RCW 41.56). Currently, the union contracts in place for workers at County facilities include clauses that prohibit the contracting out of their work to another party. Therefore, it is highly unlikely that an agreement could be reached with County workers to either be hired by Rabanco or become contracted employees at a Rabanco facility. (Source: King County Milestone 4 Report)

- Enumclaw is an example where commercial access is available after the station is closed to the public. Could it increase recycling to have recycling access available after hours (but how would this be monitored?)

Incoming Load Acceptance and Screening Procedures

- Nearly all operations plans cite that the scale operator has time to ask customers questions pertaining to the load to ensure that customers are bringing in only acceptable waste and offer information about disposal options for unacceptable materials. Customers may also ask questions or request information. This could be an opportunity for targeted direct education about recycling options, if operators were trained on messaging and resources.
- It is not clear if Transfer Station personnel monitor and maintain recycling areas and handling recyclables. It is often not clear whose responsibility this is and may vary by station.

Algona

- Upon entering the site every customer stops at the scalehouse where the Scale Operator visually inspects the load when possible, asks the customer questions about their load as needed, and denies access to vehicles carrying prohibited wastes. The Scale Operator contacts the Transfer Station Operator by radio if prohibited wastes are suspected. (Opportunity to ID recycling)
- Waste Screeners perform periodic visual screening of mixed municipal solid waste as it is being disposed into the trailer. Their observations are documented and may lead to citations if waste hauling/disposal violations are detected. (Opportunity to ID recycling). It is unclear how much this is actively occurring.
- Waste Screeners perform periodic visual screening of solid waste hauled from the Algona Transfer Station as it is unloaded at the Cedar Hills Landfill. (Opportunity to ID recycling)

Cedar Falls

- Customer unloading is generally unsupervised at the No-Fee Recycling Area, but the Scale Operator can visually monitor activity via closed circuit television.

Enumclaw

- The No-Fee and Fee-Based Recycling areas are in view of the Scale Operator and Transfer Station Operators, respectively. While customer unloading is generally

unsupervised, Transfer Station Operators can monitor the process as time allows and remove non-recyclable materials. Acceptable waste is disposed into the transfer building receiving pit; unacceptable waste is managed as described above.

Houghton

- Transfer station staff monitor and maintain the recycling area.

Renton

- Transfer station staff monitor and maintain the recycling area.

Receiving To Increase Recycling and Minimize Disposal

- Operations plans submitted to the Health Department are meant to be vague enough that SWD can change materials without having to amend Ops plans. Except for Houghton, if a material is collected it is collected in the same manner throughout the system. For example, wherever we accept source separated glass, it will always be clear and colored mixed.

Planned Future Improvements, On-Site or Some Other Site

- Factoria - deconstruct the existing transfer station and construct a new recycling and transfer station and HHW facility 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 - initially, the plan was to close the station and do not replace it, but the County will revisit whether or not to close it after all the other stations are built.

C&D Policies & Practices

- County Recommendations:
 - Evaluate options for ensuring there is adequate transfer capacity and recycling/reuse opportunities for construction and demolition debris now and in the future system-wide.
- Key observations and opportunities from the 2007/2008 C&D characterization include:
 - Nearly two thirds of the transfer station disposed C&D was comprised of just ten materials (64%).
 - Nearly one quarter of the transfer station disposed C&D stream was Clean Wood (24%).

- Aggregates, Rock and Soil was the second most prevalent material class in the transfer station disposed and processed substreams at 23.5% and 17.9% of the total, by weight.
- Nearly 17,500 tons of composition roofing was disposed at the study facilities making it the most prevalent material component in the disposed stream.
- Clean Wood and Aggregates, Rock and Soil combined were nearly 30% of the residuals stream.
- Nearly one third of transfer station disposed materials and one half of processed materials come from new construction projects (29.5% and 50.0% respectively).
- About half of transfer station disposed and processed materials come from residential buildings (54.2% and 49.4% respectively).
- Transfer station disposed and processed loads have very similar characterization profiles (Table 2-1).

Level of Service (LOS) and LOS Criteria

Following are descriptions of the sixteen LOS Criteria for Transfer Stations. These are used to analyze performance per requirements of King County Ordinance 14971 and establish when a transfer station needs to be upgraded in place, relocated to a more appropriate location, or additional transfer stations need to be built to adequately serve the region's growing population. Note these criteria do not apply to Skykomish and Cedar Falls Drop Box facilities.

- A transfer station is less than 30 minutes of 90% of users within service area. Travel time to a facility provides an indicator of how well dispersed the transfer stations are, given the population distribution and service needs of King County residents and businesses. King County is meeting this criterion with its current transfer stations.
 - Time on site meets following standards for 90% of trips:
 - Commercial vehicle in less than 16 minutes
 - Business self haulers in less than 30 minutes
 - Residential self haulers in less than 30 minutes
- Time on site is one indicator of whether a transfer station can efficiently handle customers in a timely manner. It is determined by measuring the time from when a customer crosses the in-bound scale to when a customer crosses the outbound scale. It is an indicator of whether the facility is overcapacity.
- Facility hours meet user demand. The Solid Waste Division has the flexibility to adjust operating hours to fit actual needs. Most of the changes in have been in response to requests from the commercial collection companies since these bring most of the waste to facilities. To determine the optimum hours that transfer stations should be

open, the King County looks at monthly usage data by hour of day and day of week, hourly staffing and operational costs, and requests for services from commercial and self haulers.

Table 4. Transfer Station Hours

Transfer Station	Monday-Friday	Saturday and Sunday
Algona	7 a.m. to 4:30 p.m.	8:30 a.m. – 5:30 p.m.
Bow Lake	24 hours	8:30 a.m. – 5:30 p.m.
Cedar Falls Drop Box	9 a.m. to 5 p.m. (closed Tuesdays and Thursdays)	9 a.m. to 5 p.m.
Enumclaw	9 a.m. to 5 p.m. (closed Wednesdays and Thursdays)	9 a.m. to 5 p.m.
Factoria	6:30 a.m. – 4 p.m.	8:30 a.m. – 5:30 p.m.
Houghton	8 a.m. - 5:30 p.m.	8:30 a.m. – 5:30 p.m.
Renton	7:30 a.m. – 5 p.m.	8:30 a.m. – 5:30 p.m.
Shoreline	7:30 a.m. – 5 p.m.	8:30 a.m. – 5:30 p.m.
Skykomish Drop Box	Winter: 8 a.m. – 5 p.m. Summer: 9 a.m. – 6 p.m.	Winter: 8 a.m. – 5 p.m. Summer: 9 a.m. – 6 p.m.
Vashon	9 a.m. to 5 p.m. (closed Tuesdays and Thursdays)	9 a.m. to 5 p.m.

- Recycling services provided at the transfer stations meet the waste reduction and recycling policies in Comprehensive Solid Waste Management Plan for business and residential self haulers. Waste reduction and recycling have become one of the King County’s priorities, but one that is met primarily through partnering with cities, agencies and businesses, through promotion, collection and education programs. The majority of recycling is handled by the private sector and these materials are not collected at King County’s transfer stations. Currently, basic recyclables are collected at Cedar Falls, Enumclaw, Skykomish and Vashon. King County has space constraints at Algona, Bow Lake, Factoria, Houghton and Renton. Following construction, there will be space for these services at Bow Lake.
- Vehicle Capacity is the measure of a station’s ability to accommodate the flow of both commercial and self-haul vehicles for current needs and the 20-year forecast needs. The methodology for rating actual vehicle and tonnage capacity was developed by determining each station’s maximum sustainable operating capacity. Optimal operating capacity is defined as the maximum optimal number of vehicles or tonnage that can be processed through the station each hour based on the station design and customer mix. Ideally, a transfer station can easily accommodate vehicle and tonnage throughput at all times of the day but ability to accommodate vehicle and tonnage throughput all times of the day, except for occasional peak hour times is acceptable. Currently Bow Lake, Renton and Shoreline meet this criterion, but Renton does not for the 20-year forecast.

- Tonnage capacity is the ability of a station to accommodate the flow of both commercial and self-haul garbage tons during the hours of operation for current needs and the 20-year forecast needs. This is measured similar to vehicle capacity. Currently Bow Lake, Factoria, Renton and Shoreline meet this criterion, but Factoria does not for the 20-year forecast.
- This criterion 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. Currently only Bow Lake and Shoreline meet current and 20-year forecast needs.
- Space for expansion at a station is a criterion that measures the ability of a station to expand to accommodate regional population and employment growth, the addition of services, and the area needed for a compactor. If there is unused space inside the property line, the active area of the station could be expanded otherwise, it could be expanded on available adjacent lands. Following is a table regarding space available as it relates to basic recyclables collection.

Table 5. Transfer Station Space Constraints

Transfer Station	Space within Property Line	Space on Adjacent Lands
Algona	No	Yes
Bow Lake	Yes (after construction)	Yes
Cedar Falls Drop Box	Services currently offered.	Not Applicable.
Enumclaw	Services currently offered.	Not Applicable.
Factoria	No	Yes
Houghton	Yes	No
Renton	No	Yes
Shoreline	Yes	Yes
Skykomish Drop Box	Services currently offered.	Not Applicable.
Vashon	Services currently offered.	Not Applicable.

- The purpose of this measure is to evaluate minimum roof clearance of 25-feet. The only station that does not meet this criterion is Factoria.
- Customer and employee safety at the transfer stations is a priority for King County. All transfer stations hold current permits from the Department of Health and meet health and safety regulations. The more congested the station and constricted the operations become, the higher the concern for safety. The presence of these physical challenges does not mean transfer stations operate in an unsafe manner. Instead, extra effort by staff and management, which reduces system efficiency, is needed to ensure the facilities are operated safely.
- Ability to compact waste is an efficiency measure for transfer stations. Waste compaction at the transfer station enhances overall system efficiency and reduces

costs by reducing the number of trips required to transport the same amount of waste. Currently, only Bow Lake and Shoreline are equipped with compactors.

- The purpose of this criterion is to ensure that the facility meets code requirements for seismic, wind and snow events. The appropriate FEMA standard that would apply is the Immediate Occupancy standard. All transfer stations are in compliance with applicable building standards. Algona, Bow Lake, Renton, and Shoreline also meet the Immediate Occupancy standard.
- The purpose of this criterion is to ensure that the facility does not violate applicable local noise ordinance levels. All transfer stations are in compliance with this criterion.
- Measuring odors is a relatively subjective process. Complaints from the public or employees are the primary measure of whether odors are a problem at a facility. No citations have been issued by PSCAA for any of the sites. Houghton is the only facility to have received a complaint from the public.
- This criterion is intended to measure the impacts on local streets and neighborhoods from vehicle traffic and queuing near the transfer stations. This is evaluated for meeting the standard and also that traffic does not extend onto local streets 95% of time. Impacts extend from the station entrance to the surrounding streets that may be affected by self haulers' and commercial collection trucks that use the site. Bow Lake does not meet this standard and only Renton does not extend onto local streets 95% of time.
- The goal of this criterion is to have a 100-foot buffer between the active area and nearest residence. Only Houghton and Renton do not meet this criterion.
- Operate a public transfer system network designed to provide redundant opportunities for safe disposal of solid waste, and provide surge capacity in the event of shut-down or unusual volumes at private facilities.
- Choices to be considered for the system include but are not limited to:
 - Should a "full service" transfer facility, providing commercial, self-haul and recycling services be provided for each defined service area and should additional service areas be provided?
 - Alternatively, could "commercial only" service be provided for each defined service area? This is not currently planned.
 - Is there a willingness to require "self-haul" customers to drive further to fewer stations; or to reduce or eliminate access to self-haul customers at all transfer stations?
 - Should the system be re-configured to provide limited service by customer type or by limiting use (limited operating hours for self-haul only; commercial only, no recyclables, etc.)?

- Should some segments of the waste stream be removed from the public system?

Rates/Fees/Revenues

- Construction & 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 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 disposed at Allied and Waste Management's C&D facilities ; the surcharge is established by county code KCC 10.30.050 and required in the contracts. 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.

- Revenue from the sale of recyclable materials received at division transfer facilities
- A fee exists on recyclables collected in unincorporated areas

Facility Operations and Staffing

General

- Labor and political constraints will help to dictate solutions.
- Recycling areas are generally not staffed
- Recommendations will need to be consistent with collective bargaining agreements and labor classifications, however, goal is to present best practices regardless of current labor agreements and then consider how they can be tailored.
- Current Labor classifications:
 - Transfer Station Operator
 - Scale Operator
 - Utility workers (at Cedar Falls only)
- Our job: Recommend what needs to be done (roles), not who needs to do it (KC Labor will identify this)

Algona

- Due to site space constraints, there is no recyclables collection service offered at this facility.

- There are two designated customer entrances to the partially enclosed transfer building, commercial customers and other large dump vehicles use the west side; and self-haul customers use the east side. When commercial customers are not present, self-haul customers may use both sides of the transfer building.
- As directed by the Transfer Station Operator, commercial and self-haul customers dump directly into the refuse trailers located in the trailer tunnel, under the chutes, from the tipping floor above. Commercial customers and other large dump vehicles access the north and south chutes from the west side and self haul customers access the north and south chutes from the east side. A stationary packer with a knuckle-boom crane is used to distribute and tamp the material in the trailer. Transfer Station Operators, using a yard goat, pull loaded trailers from the trailer tunnel using the south side exit out of the transfer building, close the lids, and park them in the full trailer parking area east of the transfer building. From there, full trailers are hauled to Cedar Hills Regional Landfill (CHRL) for unloading and waste disposal.
- Empty trailers, brought from the CHRL, are stored in the empty trailer parking areas located north of the facility outside the main gates and on the west side of the property between the scalehouse and transfer building. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, pulls it into place in the trailer tunnel, under the chute, using the north side entrance into the transfer building used by Solid Waste Division vehicles only.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically four full time employees (FTEs) are providing for transfer station operations and one FTE is working in the scale house.

Bow Lake

- Currently there are interim recycling services available at Bow Lake. Additional collection may start in 2013 following construction.
- There are two designated customer entrances to the enclosed transfer building, commercial customers and other large dump vehicles enter the building through a single door on the southeast corner of the building and self-haul customers use a door on the southwest side of the building.
- As directed by the Transfer Station Operator, commercial and self-haul customers dump directly onto the tipping floor. Self-haul customers must dump over a wall separating these customers from the commercial haulers and King County loading vehicles. A loading vehicle on the tipping floor is used to move, bulk sort, mix, and lift MSW into a compactor chute. The chute feeds two compactors located below the tipping floor. The Transfer Station Operator cycles the compactors to compact the

waste into a bale and push the bale into a docked transfer trailer. Using a yard goat, the Transfer Station Operator pulls the loaded trailer from the compactor loading dock at the east side of the transfer building, closes the rear door, and parks it in the full trailer parking area. Full trailers are hauled to CHRL for unloading and waste disposal. Self haulers also have access to an area that does not have a wall.

- Empty trailers, brought from CHRL, are stored in the empty trailer parking area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, backs it to a compactor at the east side of the building, via entrances used only by Solid Waste Division vehicles.
- Yard waste is collected from self-haul customers via an open top located on the south side of the building. Yard waste is currently accepted in the self haul area at designated stalls.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically four FTEs are providing for transfer station operations and three FTEs are working in the scale house.

Cedar Falls Drop Box

- No-Fee Recyclables are collected within the fenced area of the facility. The area is accessible by customers only during regular operating hours. The Solid Waste Litter Crew maintains the recycling area. Signage provides information about materials accepted. Recyclables are hauled off-site to contracted processors by a contracted hauler.
- Yard waste accepted for a fee.
- The waste drop boxes are located in a roofed, three-sided structure. There are four customer stalls designated for solid waste and two for yard waste. As directed by the Scale Operator, customers dump directly into the drop boxes located below a z-wall from the concrete floor above. Customers access any available stall.
- Once full boxes are pulled from the disposal area, they are hauled by a private vendor to CHRL for unloading and waste disposal. Loaded boxes of yard waste are hauled by a contracted hauler to a contracted compost facility for processing.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Scale Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Waste Screeners, maintenance personnel, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager.

Enumclaw

- No-Fee Recyclables are collected within the designated area of the transfer facility. The area is accessible by customers only during regular operating hours. Transfer station staff monitor and maintain the recycling area. Signage provides information about materials accepted. Recyclables are hauled offsite to contracted processors by a contracted hauler.
- Past the No-Fee Recycling Area, customers disposing of MSW, household appliances, and wood and/or yard waste proceed to the scalehouse, where they stop, are weighed, fees are assessed and transaction data is recorded.
- There are two designated customer entrances to the partially enclosed transfer building, commercial customers and other large dump vehicles use the south side; and self-haul customers use the north side. When commercial customers are not present, self-haul customers may use both sides of the transfer building.
- As directed by the Transfer Station Operator, commercial and self-haul customers dump directly into the refuse pit from the tipping floor above. Commercial customers and other large dump vehicles access the south side of the pit from the south side and self haul customers access the north side of the pit from the north side.
- A loader on the pit floor is used to mix the municipal solid waste (MSW) for load consistency. The MSW is pushed into a compactor hopper/chute in the southwest corner of the pit floor. The chute feeds a compactor located below the pit level. The Transfer Station Operator cycles the compactor to push a bale into a docked, fully-containerized transfer trailer. Using a yard goat, the Transfer Station Operator pulls the loaded trailer from the compactor loading dock at the south end of the transfer building, closes the rear door, and parks it in the full trailer parking area. Full trailers are hauled to the CHRL for unloading and waste disposal.
- Empty trailers, brought from the CHRL, are stored in the empty trailer parking area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, backs it to the compactor under the transfer building using the south side entrance used by Solid Waste Division vehicles only.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically two FTEs are providing for transfer station operations when the station is open to all customers. When only commercial haulers are allowed to use the facility, only one FTE is required. The scale house is manned with regular part-time employees (RPTs).

- Transfer station staff monitor and maintain the recycling area. Signage provides information about acceptance.

Factoria

- Due to site space constraints, there is no recyclable collection service offered at this facility.
- There are two designated customer entrances to the partially enclosed transfer building, commercial customers and other large dump vehicles use the northwest side; and self-haul customers use the southeast side. When commercial customers are not present, self-haul customers may use both sides of the transfer building.
- As directed by a Transfer Station Operator, commercial and self-haul customers dump directly into the refuse trailers located in the trailer tunnel, under the chutes, from the tipping floor above. Commercial customers and other large dump vehicles access the northeast and southwest chutes from the northwest side and self haul customers access the northeast and southwest chutes from the southeast side. A stationary packer with a knuckle-boom crane is used to distribute and tamp the material in the trailer. Transfer Station Operators, using a yard goat, pull loaded trailers from the trailer tunnel using the northeast side exit out of the transfer building, close the lids, and park them in the full trailer parking area. From there, they are hauled to CHRL for unloading and waste disposal.
- Empty trailers, brought from CHRL, are stored in the empty trailer parking area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, pulls it into place in the trailer tunnel, under the chute, using the southwest side entrance into the transfer building used by Solid Waste Division vehicles only.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically three FTEs are providing for transfer station operations and one FTE is working in the scale house.

Houghton

- As of February 1, 2012, recyclables collection service was suspended at this facility. Collection may resume in 2013. If so, it is assumed collection will be similar to prior practices, meaning recyclables will be collected within the fenced area of the transfer facility. This area is accessible only during regular operating hours. Transfer station staff will monitor and maintain the recycling area. Signage will be provided regarding information about accepted materials. Recyclables will be hauled off-site to contracted processors by a contracted hauler.

- There are two designated customer entrances to the partially enclosed transfer building, commercial customers and other large dump vehicles use the south side; and self-haul customers use the north side. When commercial customers are not present, self-haul customers may use both sides of the transfer building.
- As directed by the Transfer Station Operator, commercial and self-haul customers dump directly into the refuse trailers located in the chutes (trailer tunnel) from the tipping floor above. Commercial customers and other large dump vehicles access the east and west chutes from the south side and self haul customers access the east and west chutes from the north side. A stationary packer with a knuckle-boom crane distributes and tamps the material in the trailer. Transfer Station Operators, using a yard goat, pull loaded trailers from the chutes (trailer tunnel) using the west side exit out of the transfer building, close the lids, and park them in the loaded trailer parking section (west side) of the Empty and Loaded Trailer Parking Area. From there, they are hauled to CHRL for unloading and waste disposal. This exit is used by Solid Waste Division vehicles only.
- The Solid Waste Division and the City of Kirkland, through a Memorandum of Understanding, have agreed that 90% of the time, full trailers will be removed from the site at the end of the day. Empty trailers and up to two partially full trailers may remain on site overnight. Removal of all full trailers may be precluded by unforeseen and unpreventable situations such as, but not limited to, emergency roadway conditions, equipment breakdown, and inclement weather conditions.
- Empty trailers, brought from the CHRL, are stored in the empty trailer parking section (east side) of the Empty and Loaded Trailer Parking Area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, pulls it into place in the chute (trailer tunnel) using the east side entrance into the transfer building used by Solid Waste Division vehicles only.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners (from the Landfill Operations Unit), maintenance personnel, Truck Drivers, Supervisors and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically three FTEs are providing for transfer station operations and one FTE is working in the scale house.

Renton

- As of February 1, 2012, recyclables collection service was suspended at this facility. Collection may resume in 2013. If so, it is assumed collection will be similar to prior practices, meaning recyclables will be collected within the fenced area of the transfer facility. This area is accessible only during regular operating hours. Transfer station staff will monitor and maintain the recycling area. Signage will be provided regarding information about accepted materials. Recyclables will be hauled off-site to contracted processors by a contracted hauler.

- There are two designated customer entrances to the partially enclosed transfer building, commercial customers and other large dump vehicles use the east side; and self-haul customers use the west side. When commercial customers are not present, self-haul customers may use both sides of the transfer building.
- As directed by the Transfer Station Operator, commercial and self-haul customers dump directly into the refuse trailers located in the trailer tunnel, under the chutes, from the tipping floor above. Commercial customers and other large dump vehicles access the north and south chutes from the east side and self haul customers access the north and south chutes from the west side. A stationary packer with a knuckle-boom crane is used to distribute and tamp the material in the trailer. Transfer Station Operators, using a yard goat, pull loaded trailers from the trailer tunnel using the south side exit out of the transfer building, close the lids, and park them in the full trailer parking area. From there, they are hauled to CHRL for unloading and waste disposal. If a partially full trailer is under the chute when the station closes, it is pulled from under the chute and parked on the tunnel apron with lids closed; it is returned to under the chute when the station reopens to complete loading.
- Empty trailers, brought from the Cedar Hills Landfill, are stored in the Empty Trailer Parking area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, pulls it into place in the trailer tunnel, under the chute, using the north side entrance used by Solid Waste Division vehicles only.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically two FTEs are providing for transfer station operations and one FTE is working in the scale house.

Shoreline

- As of February 1, 2012, recyclables collection service was suspended at this facility. Collection may resume in 2013. If so, it is assumed collection will be similar to prior practices and in the same location on the north side of the site. There are additional recycling services (both fee & free) at Shoreline.
- There are two designated customer entrances to the enclosed transfer building, commercial customers and other large dump vehicles enter the building through a single door on the southwest corner of the building and self-haul customers use a door on the southeast side of the building. As directed by the Transfer Station Operator, commercial and self-haul customers dump directly onto the tipping floor. Self-haul customers must dump over a wall separating these customers from the commercial haulers and King County loading vehicles. A loading vehicle on the pit floor is used to move, bulk sort, mix, and lift MSW into a compactor chute. The chute feeds a compactor located below the tipping floor. The Transfer Station Operator cycles the

compactor to compact the waste into a bale and push the bale into a docked transfer trailer. Using a yard goat, the Transfer Station Operator pulls the loaded trailer from the compactor, closes the rear door, and parks it in the full trailer parking area. Full trailers are hauled to CHRL for unloading and waste disposal.

- Empty trailers, brought from CHRL, are stored in the empty trailer parking area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, backs it to the compactor.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically four FTEs are providing for transfer station operations and three FTEs are working in the scale house.

Skykomish Drop Box

- No-Fee Recyclables are collected within the partially fenced area of the facility. The Solid Waste Litter Crew maintains the recycling area. Signage provides information about accepted materials. Recyclables are hauled off-site to contracted processors by a contracted hauler.
- The solid waste drop boxes are located under an open-sided roofed structure. There are four customer stalls designated for solid waste disposal.
- Full drop boxes are removed from and replaced with empty drop boxes by the designated hauler. From there, they are hauled to the Houghton Transfer Station for unloading and waste disposal.
- The Skykomish Drop Box Facility is unstaffed. Personnel are dispatched to the facility at least weekly to inspect and to provide needed maintenance and/or repair. Solid Waste Division has an agreement with King County Roads, located next door to the facility, to provide support for the site. Staff are scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager.

Vashon

- No-Fee Recyclables are collected within the designated area on the west side of the transfer building. The area is accessible only during regular operating hours. Transfer station staff monitor and maintain the recycling area. Signage provides information about materials accepted. In addition, an area immediately to the northeast of the transfer building is designated for the collection of household appliances. A fee for deposit of these items is assessed at the Scalehouse. Recyclables are hauled off-site to contracted processors by a contracted hauler.

- There are two designated customer entrances to the partially enclosed transfer building, commercial customers and other large dump vehicles enter the building through a single door on the north side of the building and self-haul customers use a tipping floor on the east side of the building.
- As directed by the Transfer Station Operator, commercial and self-haul customers dump directly onto the pit floor. A loading vehicle on the pit floor is used to move, bulk sort, mix, and lift MSW into a compactor chute. The chute feeds a compactor located below the south end of the pit floor. The Transfer Station Operator cycles the compactor to compact the waste into a bale and push the bale into a docked transfer trailer. Using a yard goat, the Transfer Station Operator pulls the loaded trailer from the compactor loading dock at the southeast end of the transfer building, closes the rear door, and parks it in the full trailer parking area. Full trailers are hauled to CHRL for unloading and waste disposal.
- Empty trailers, brought from CHRL, are stored in the empty trailer parking area. As an empty trailer is needed, a Transfer Station Operator, using a yard goat, backs it to the compactor at the south end of the building, an entrance used only by Solid Waste Division vehicles.
- The facility is staffed as necessary to carry out daily operations. At a minimum one Transfer Station Operator is required to be present during hours that waste is accepted. Other staff members working at the facility may include Scale Operators, Waste Screeners, maintenance personnel, Truck Drivers, Supervisors, and Managers. Additional personnel are present as needed. Staff is scheduled to work according to operational needs, as assigned by the responsible Solid Waste Supervisor or Manager. Typically two FTEs are providing for transfer station operations when the station is open to all customers. When only commercial haulers are allowed to use the facility, only one FTE is required. The scale house is manned with RPTs.

General

- 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.

Facility Design and Layout

- 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.

- Algona: dump directly into the refuse trailers located in the trailer tunnel, under the chutes, from the tipping floor above.
- Enumclaw: commercial and self-haul customers dump directly into the refuse pit from the tipping floor above.
- Houghton: commercial and self-haul customers dump directly into the refuse trailers located in the chutes (trailer tunnel) from the tipping floor above.
- Renton: commercial and self-haul customers dump directly into the refuse trailers located in the chutes (trailer tunnel) from the tipping floor above.
- Vashon: commercial and self-haul customers dump directly onto the pit floor.

Technology and Equipment (Handling, Separation, Sorting, Baling)

Table 6. Transfer Station Technology and Equipment

Facility	Waste Transfer Technology	Equipment	Recyclables Haul off
Algona Transfer and Recycling Station	Direct Dump into open top trailers; stationary packer for tamping and waste distribution	Stationary Packer, Yard Goat	Not Applicable
Cedar Falls Drop Box Facility	Direct Dump into open top roll off boxes (3-40 cubic yard boxes; 6 unloading stalls)	None	By Contractor
Factoria Transfer and Recycling Station	Direct Dump into open top trailers; stationary packer for tamping and waste distribution	Stationary Packer, Yard Goat	Not Applicable
Enumclaw Transfer and Recycling Station	Pit/Compactor (waste dumped into pit then pushed to compactor hopper)	Loader, Yard Goat, Preload Stationary Compactor	By Contractor
Houghton Transfer and Recycling Station	Direct Dump into open top trailers; stationary packer for tamping and waste distribution	Stationary Packer, Yard Goat	By Contractor
Skykomish Drop Box Facility	Direct Dump into open top roll off boxes (2-40 cubic yard boxes; 4 unloading stalls)	None	By Contractor
Renton Transfer and Recycling Station	Direct Dump into open top trailers; stationary packer for tamping and waste distribution	Stationary Packer, Yard Goat	By Contractor
Shoreline Recycling and Transfer Station	Preload Stationary Compactor (waste dumped on floor and pushed to compactor hopper)	Preload Stationary Compactor, Loader, Yard Goat	By Contractor
Bow Lake Recycling and Transfer Station	Preload Stationary Compactor (waste dumped on floor and pushed to compactor hopper)	Preload Stationary Compactor, Loader, Yard Goat	By Contractor

- There is no processing equipment at any site (an in-floor conveyor and Baler exists at the new Bow Lake; Enumclaw and Vashon have a baler)
- Vashon: A loading vehicle on the pit floor is used to move, bulk sort, mix, and lift MSW into a compactor chute.

Facility Material Handling, Separation and Loading Practices.

- Issues can be very site specific - most common issue is space. A site-by-site understanding will be necessary to understand the individual site constraints that may drive different solutions.
- Site flow diagrams for each facility have been reviewed
- Regulatory requirements can also be site-specific
- King County owns little hauling equipment

Training

- Training Documents: currently, no training documentation for staff on how to communicate recycling opportunities to customers.
 - Scale operators are limited by time to process customers as a queue forms behind - speed is key, limited amount of time to give guidance on recycling options for their load (with the exception of Shoreline, and Bow Lake where brochures are distributed)
 - Recycling occurs prior to transfer station operator contact with customers
 - Most scale house operators distribute brochures and fliers. Not all material distributed were developed by King County.

Facility Signage

- A Transfer Station Communication Team is working on protocol for sign requests only.
 - signs are produced in house, with consultant support
 - committee consists of planning, res, ops, scale house ops
- Bow Lake: has shifted to interim signs that replicates Snohomish County and successes in California:
 - Color themed: Red = no, Green = yes
 - Graphics/photos of materials
- Signage review should consider:
 - wording, content, compare with other messaging in other campaigns (county, city), equity issues

- Signage is currently attached to bins. Contracted haulers are supposed to bring the bins back to the original station, but frequently they end up at a different station. Because sorting requirements at Houghton differ from other stations, this can result in contaminated loads when a box is delivered to the wrong station.
- Inconsistent messaging across stations. Many 'generations' of signage are evident.
- Quite a bit of handwritten or makeshift signs are used - spray painted on bins, handwritten signs, etc.
- Most of the signs are fairly text heavy with few graphics, which could make it challenging for non-English speaking populations. A few examples had Spanish translations underneath.
- Magnetic signs (GreenTools jobsite container examples) are a good idea, but don't stick to all different kinds of bins.
- Consistent signage messaging and flexible tools can help more effectively communicate to customers.
- New signs for Bow Lake follow a Red/Yellow/Green theme to deliver No/Maybe/Yes messaging, as modeled after Snohomish County and examples from California.
- County has indicated a preference for graphics/photos of materials
- New approach of signage on a stand will bring added flexibility and cost savings: materials can be collected in bins as well as other methods, and the County can sell a large portion of existing bin assets (which cost about \$80K a year to maintain) and rent only those bins needed.

Education and Outreach Activities for Collection or At Transfer Stations

- Over a two year time span, 1,683 calls with general recycling questions were fielded. This shows a great opportunity to let people know about recycling options before they leave home, so on-site recycling efforts can be as efficient as possible.
- 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.
- 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.

- Customer behavior is still an issue in how viable recyclable materials are (ie. are they prepared properly, are they mixing in non-recyclable items with recyclable items, etc.)
- County looking to get rid of many of the bins at the stations (KC has to pay for repairs of hauler damage - not a model that makes sense); therefore need to restructure how signs are posted (on wheels/stands instead of posted on bins)
 - Possibility that newer stations will have 'collection bunkers' instead of bins
- Kiosks exist at stations with educational material, but there is no process for keeping up to date, refilling, etc. - often empty with outdated information.
- Brochures and signage do exist - but people don't read them and retain the information - they'd much rather talk to a person.
- Real estate constraints for recycling areas and signs - too many signs = ignored by customers (information overload in a small amount of space)
- Recycling options can change by location, and commodities markets - how can signage be flexible to show changing options?
 - Bow Lake does have electronic signs
 - Idea of QR codes?
 - Want a consistent style, but flexibility for different layouts and needs
 - Ex. Mix uses for areas currently devoted to recyclables and HHW.
- Shoreline Transfer Station as a new 'bar':
 - 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), 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.
 - 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.

Education & Outreach Programs/Campaigns – Countywide.

- County Recommendations:
 - Provide regional education and incentive programs to help residents and businesses improve their waste prevention efforts.
- Existing County programs
 - Through programs such as Green 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'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.
- City/County Programs
 - Many cities provide assistance to businesses to establish and maintain recycling programs
- There are good initiatives in place from a County level that support the importance of education - showing that increasing recycling rates is strongly supported by leadership (ie. waste prevention policies, recommendations and programs relating to education/outreach).
- Opportunities for continued city/county collaboration exist - grant funds for technical assistance and innovative waste prevention projects specifically.
- Funding opportunities
 - In addition, the county provides grant funds and technical assistance to cities to help further WPR programs and services within their communities. , King County Solid Waste distribute annually about \$1 million in grant funds to cities; these funds are supported by the solid waste tipping fee. 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.
- Cities, county, collection companies, WUTC - Continue education and promotion, and consider financial incentives, to encourage recycling and reduce waste.