

Denver Public Works Presents

A Master Plan for Managing Solid Waste in the Mile High City

Executive Summary

October 2010



DENVER[®]
THE MILE HIGH CITY

Letter from Denver Public Works



Dear Denverite,

I am pleased to present the Denver Public Works *A Master Plan for Managing Solid Waste in the Mile High City*, a vision for the future of waste management services for Denver residents.

We started this planning process in 2007 by studying cities similar to Denver, holding multiple public surveys and meetings, conducting waste and tonnage projection analyses, and seeking guidance and coordination from the Mayor, Denver City Council, Greenprint Denver and our residents.

The Denver Public Works Master Plan for Managing Solid Waste in the Mile High City was written as a roadmap to the City's goal of a 30% reduction in total landfilled waste. In fact, the Plan provides a comprehensive framework in which to eventually even exceed the 30% mark.

As with any high-context document, the Master Plan outlines vision, strategies and outcomes, and provides a menu of tactics, creating options for policymakers to consider — along with the technical components necessary for operational implementation. To make the implementation of the vision a reality, tough decisions need to be made, some of which may be controversial and will require public debate and consensus before we can proceed.

The vision that we have created calls for a clear, bold direction: To enhance the quality of life, health and beauty of the Mile High City through a comprehensive, sustainable and efficient waste-management system that will serve as a national model. Making the vision into a reality will require change in three strategic focus areas — legislative, operational and behavioral.

If we can fully implement this vision, the outcomes will be transforming:

- Solid waste services will become fully automated, with vastly improved collection efficiencies.
- Denver residents will be empowered to recycle and compost, reducing our landfilled waste by as much as 32%, which exceeds the original goal.
- Worker safety will be improved.
- Methane and greenhouse gas emissions will be reduced.
- Services will be maintained or expanded to Denver residents.
- New “green” jobs will be created.
- The life of the City's landfill will be prolonged.
- Ultimately, Denver streets and alleyways will benefit.

However, a vision this operationally progressive requires great resources and a strong partnership among our policymakers, operations experts and residents. While we can phase in some of the options in the Plan, the majority will rely on significant investments over the short- and long-term.

I hope you will use this Plan to understand where we want to go with the future of solid waste management in Denver, and to thoughtfully weigh the options put forward. I also want to thank all of our residents who participated in the surveys and feedback groups so critical to the development of the Plan, as well as the hard-working staff at Public Works' Solid Waste Management section for their dedication to customer service, efficiency, cost-containment, worker safety and environmental stewardship.

A handwritten signature in blue ink that reads "Guillermo Vidal". The signature is fluid and cursive.

Guillermo “Bill” Vidal, Manager, Denver Public Works

Letter from Greenprint Denver

Dear Resident,

Greenprint Denver applauds the release of *A Master Plan for Managing Solid Waste in the Mile High City* and congratulates the Department of Public Works for their hard work in creating this comprehensive Plan.

In 2006, the City of Denver developed a Greenprint Denver Action Agenda with goals that create a citywide vision for sustainability. These goals are designed to support and guide residents, businesses and the municipal government in developing conservation practices and protecting the environment. Among them is a goal to reduce landfill waste by 30%.

With the release of this Plan for managing solid waste in Denver, we now have a defined menu of actions and achievable goals for the future. The Plan clearly outlines progress made to date and opportunities to enhance the work underway to reduce landfill waste, and highlights future programs to manage our waste and promote us as environmental leaders.

We support this vision for responsible waste management, and encourage Denver's policymakers and community to consider all the options put forward in the Master Plan to realize a comprehensive and sustainable materials management system. Greenprint Denver looks forward to working together to ensure that Denver continues to secure cost efficiencies, greenhouse gas reductions and the environmental health of future generations through the intelligent management and reduction of our waste stream.



Michele Weingarden, Director of Greenprint Denver



Introduction

Denver Public Works' Solid Waste Management section provides solid waste management services to all single-family homes and multi-family homes with seven or fewer units within the City and County of Denver.

Solid waste management is defined as the collection, transport, processing, recycling, and/or disposal and monitoring of waste materials, and programs to reduce overall waste. Denver Public Works' Solid Waste Management section provides a core City service in trash collection while striving to divert as much waste as possible from the landfill.



DENVER PUBLIC WORKS' SOLID WASTE MANAGEMENT SERVICE HIGHLIGHTS

- Provides trash collection service for approximately 170,000 households in the City and County of Denver every week, which is nearly 9 million collections per year that total approximately 220,000 tons of trash (this does not include collection of recyclables).
- Manages Denver Recycles, a voluntary program boasting more than 100,000 participants without mandating recycling, which makes more than 2 million collections per year totaling close to 30,000 tons of recyclables. The program has been growing almost every year since its inception in 1991.
- Denver Composts is a pay-to-participate pilot program for composting which has more than 2,200 residents reducing their waste by more than 50% by composting their food, soiled paper and yard debris (organics) for a small fee.

A MASTER PLAN FOR MANAGING SOLID WASTE IN THE MILE HIGH CITY

The Master Plan provides the City with a vision — and options for implementation — for Denver's future collection, transfer and disposal of solid waste, recyclables and organics. The Plan also assesses what is required by Public Works' Solid Waste Management section to achieve Denver's waste management goal of a 30% reduction in landfill tons, using 2004 as the base year.

While the vision for Denver's waste management future and achieving the diversion goals is clear, the options and paths leading there require varying degrees of investment, legislative changes, resource management, operational changes and the involvement of our residents. In an environment of reduced City revenue and spending, there are tough decisions to be considered, which may require legislative action and/or capital expenditures, when contemplating the implementation of this Plan.

There are some actions from this Plan that are currently underway or can be phased-in or expanded as resources become available. Other programs will require additional resource allocation, discussion and consensus among elected officials, Public Works management and our residents before action can be taken.

The Master Plan process was started in 2007 and included a study of cities similar to Denver for best practices and as a basis for comparison; multiple public surveys and meetings; a multi-season waste composition study; a tonnage projection analysis; and guidance from and coordination with the Mayor's Office, City Council, Greenprint Denver and other City agencies.



HOW TO USE THIS PLAN

This Master Plan can be used to learn all that the City does to manage Denver's waste and keep the Mile High City clean. The Plan can be used to understand the vision for Denver's waste-management future and the programs, opportunities, challenges, innovation and potential investment required.

Vision

A vision for the Mile High City, its residents and the Public Works department:

Denver will have a comprehensive, sustainable and efficient waste-management system that will serve as a national model and will enhance the quality of life, health and beauty of the Mile High City.

Every Denver household will have three standardized waste carts — recycling, composting and trash — so that residents can manage their waste material services to align with community values for high customer service, sustainability and efficiency.

Denver Public Works will have a fully-automated, efficient and comprehensive waste-management system that provides state-of-the-art customer service, reduces waste generation through innovative programs and policies, and encourages diversion of recyclables and organics. Denver Public Works will continue being a good steward of the environment, operating cost-effectively, protecting the safety of its workers and preparing Denver for the future.

FACT:

Denver Public Works' Solid Waste Management section annually collects approximately 250,000 tons of waste (220,000 tons of trash and 30,000 tons of recycling) from nearly 170,000 households in the City and County of Denver. With weekly pickups, this equals more than 11 million collections every year.

Strategies

To achieve this vision, there are three main strategic areas of focus:

1

LEGISLATIVE:

Reduce landfill waste through innovative programs and policies.

2

OPERATIONAL:

Improve operational efficiencies by moving Denver households to a fully-automated, three-cart system.

3

BEHAVIORAL:

Increase diversion by encouraging participation in citywide recycling and composting (organics) collections programs.

To implement these strategies, the Master Plan evaluated tactics in three groups: (I) programs and initiatives currently underway or planned; (II) a menu of short-term options for consideration; and (III) a menu of long-term options for consideration.



Key Findings



Outcomes

Investing in the Plan's vision and implementation strategies will create favorable outcomes:

- Improve collection efficiencies and reduce vehicle needs.
- Reduce solid waste disposal by encouraging residents to increase waste diversion through recycling and composting.
- Offset or contain, and in some cases, reduce costs.
- Improve worker safety.
- Maintain and expand waste management services to Denver residents.
- Reduce waste transportation.
- Reduce methane and other greenhouse gas emissions.
- Create green jobs.
- Prolong the life of the City's landfill.
- Beautify the city's streets and alleyways.

Additionally, investing in this vision will help the Mile High City achieve the City's goal of a 30% reduction in total landfilled waste.

- 1 Denver has a number of unique waste system components, including: residential dumpster collection, limited drop-site and organics collection, and comparatively frequent overflow/large item pick-up (LIP);
- 2 Denver residents have expressed moderate to strong public support for increased waste diversion citywide (more recycling and organics, less solid waste disposal);
- 3 Based on industry trends and consumer behavior changes, Denver's total municipal solid waste (MSW) generation (including both disposal and diversion) is expected to decrease from 250,000 tons in 2011 to 245,100 tons in 2030, or about 0.2% per year; and
- 4 Denver's greatest opportunity for waste diversion is organic waste — in 2008, nearly 14% of the landfill waste stream (by weight) consisted of food waste and 29% was yard waste.

Tactics

PROGRAMS AND INITIATIVES UNDERWAY OR PLANNED

These programs and initiatives are currently underway or planned and were evaluated based on the three strategies of the Master Plan and the cost-efficiency of implementation. Additionally, most of the initiatives have even more growth potential in terms of achieving our vision.

1. Work with Denver Public Schools to grow recycling at schools.
2. Grow organics (composting) collection programs.
3. Add a drop-site for large items, recyclables and organics at existing City facility at Cherry Creek Transfer Station (CCTS).*
4. Encourage and increase recycling through public outreach.
5. Continue Household Hazardous Waste (HHW) collection and secure additional electronic waste (e-waste) programs.
6. Expand latex paint collection in the current HHW service by seeking retail partners to establish paint collection sites at convenient locations for residents.
7. Large Item Pickup (LIP)/Overflow reductions — in 2010 LIP collections were reduced from once every five weeks to once every nine weeks. Overflow was reduced to every three weeks from weekly collection. These reductions saved an estimated \$600,000 annually.

Table 1, found on page 13, provides additional detail on these activities.

**Two additional drop-sites are being considered in the short- and long-term options. Drop-sites encourage legal disposal of large items, recyclables and organics.*

NOTE: An initiative to convert dumpsters to barrel service (carts) was initiated in southwest Denver in late 2008; 1,500 homes were assigned barrel service and 300 dumpsters were removed. This initiative is currently on hold, limited by resource availability.

MENU OF SHORT-TERM OPTIONS FOR CONSIDERATION

The short-term options were evaluated on the basis of implementation needs/challenges, diversion potential, capital/operating costs and avoided costs/additional revenues, and could be implemented if resources become available and, in some cases, if legislation is passed. *Table 2, found on page 14, summarizes the quantity of waste that would be diverted and total implementation cost estimates for each option.* A description of the short-term options is provided below:

- 1. Phased Standardization of Refuse Collection** — weekly refuse collection with automated cart equipment to increase system-wide collection efficiency and facilitate consumer acceptance of recycling and composting. The standardization of collection with a three cart system for trash, recycling and composting is key to meeting our diversion goal:
 - Would require switching manual containers (currently provided by individual residents) and dumpsters to wheeled, 95-gallon carts (every household would receive their own cart provided by the City);
 - By limiting the amount of trash disposed to one cart per household, residents would be motivated to utilize the recycling and composting carts, thereby significantly increasing the amount of waste diverted from the landfill.
 - Would require standardizing all collection vehicles to automated side loader units; and
 - Would continue to service narrow alley neighborhoods with semi-automated collection.
- 2. Citywide Household Composting (Organics) Collection** — to decrease landfilled waste:
 - Based on voluntary subscription;
 - Would provide residents with wheeled 65- or 95-gallon collection carts and will collect with automated, side loader vehicles;
 - Would collect food, soiled paper and yard debris (organics) at no additional cost to the residents; and
 - Would provide organics processing by private contractors.
- 3. Add Second New Drop-Site (Central Denver)** — to provide additional collection options for residents; drop-sites relieve overflow of recyclables, compostables and large items by allowing residents to “drop off” materials that don’t fit in their carts (recycling and composting) and to bring in large items on weeks when there are no collections:
 - Would be located at an existing City facility at Central Platte Campus (CPC);
 - Would accept recyclables, organics and large items; and
 - Would decrease the need for additional litter and alley collection.
- 4. Expand and Improve Public Outreach** — communicating with our residents is essential to the success of waste diversion. Limited communications and marketing plans continue to be implemented, however accomplishing the vision outlined in the Plan requires that community engagement be a priority and must be adequately resourced.
- 5. Expand Household Hazardous Waste (HHW) and Latex Paint Collection** — increasing these services is central to diverting hazardous materials (our most dangerous materials) from landfill disposal.
- 6. Further reduce LIP collections** — to once per quarter from once every nine weeks. In 2010, LIP collections were reduced from once every five weeks to once every nine weeks.
- 7. Explore eliminating refuse overflow collections** — in 2010, overflow collection was reduced to every three weeks from weekly collection. Standardized collection and the expansion of composting and recycling services would naturally eliminate overflow collection as all refuse would be collected in carts provided by the City.



FACT:

According to a public survey of Denver residents conducted in 2009 as research for this Master Plan:

- *70% felt reducing the environmental impact of their personal lives was important;*
- *72% felt that recycling should be mandatory for City residents;*
- *62% indicated a willingness to pay for instead of reducing services, given current economic conditions; and*
- *58% felt that increased recycling and decreased landfilling was the most important component in solid waste management for maintaining the health, safety and welfare of neighborhoods.*



FACT:

One ton of recycled aluminum saves:

- 14,000 kilowatt hours of energy;
- 40 barrels* of oil;
- 238 million BTUs of energy; and
- 10 cubic yards of landfill space.

One ton of recycled newsprint saves:

- 601 kilowatt hours of energy;
- 1.7 barrels of oil;
- 10.2 million BTUs of energy;
- 7,000 gallons of water; and
- 4.6 cubic yards of landfill space.

* One barrel = 42 gallons

Additional Options for Policymakers — all would require legislative action.

CONSIDER: A Hauler Licensing Program — could increase diversion opportunities for generators outside of the Public Works service area and could collect data needed for evaluating/improving future Denver solid waste system success:

- Private haulers could provide collection of recyclables and organics to customers at a reasonable cost if requested;
- Set minimum operating and safety standards for collection citywide; and
- Private haulers report customer/service/quantity data to Public Works annually.

CONSIDER: Denver Restaurants Diverting Food Waste — to increase diversion of organics:

- Could be applicable to full-service restaurants with 10 or more employees;
- Could require comprehensive stakeholder input process; and
- Could capture waste destined for landfill to be used for agricultural food production.

CONSIDER: Large Multi-Family Units (MFUs) Verifying Refuse Collection Service — to control misuse of current residential services:

- Could require MFUs with more than seven units to prove that they obtained refuse collection service by a private hauler; and
- Could include recycling service.

MENU OF LONG-TERM OPTIONS FOR CONSIDERATION

The long-term options were evaluated on the basis of implementation needs/challenges, diversion potential, capital/operating costs and avoided costs/revenues and could be implemented if resources become available and, in some cases, if legislation is passed. *Table 3, found on page 15, summarizes the quantity of waste that would be diverted and total implementation cost estimates for each program.* A description of the long-term options is provided below:

1. **Add Third New Drop-Site (Northeast Denver)** — to further expand collection options for residents:
 - Would require a new location in northeast Denver; and
 - Would accept recyclables, organics and large items.
2. **Construct a New Refuse Transfer Station in Northeast Denver** — to meet current and expected growth, improve service area coverage, and increase efficiency of current transfer system (besides CCTS, Public Works also utilizes two private transfer stations):
 - Would require new location, land in central northeast Denver;
 - Would require significant capital, new permit; and
 - Would be owned and operated by Public Works.

Additional Options for Policymakers — all would require legislative action.

CONSIDER: Variable Rate Collection Pricing (or Pay-As-You-Throw, PAYT) — to encourage residents to divert recyclables and organics from waste:

- Could require a new solid waste fee structure for refuse collection with variable rates based on residential waste quantities generated (this also gives homeowners the opportunity to reduce fees by diverting more recyclables and organics); and
- Would include the cost of recycling and composting in the fee.

CONSIDER: Construction and Demolition (C&D) Waste Diversion Policy — to increase diversion of C&D waste:

- Could require generators of construction, renovation, demolition or deconstruction projects to divert minimum thresholds of recyclable materials; and
- Could potentially require deposit fees.

Conclusions

In 2004, the base year for this Master Plan, the total trash collected and taken to the landfill was 254,489 tons. The City's Greenprint goal of achieving a 30% diversion requires that 76,347 tons of that trash either be reduced or diverted to recycling and composting.

By the end of 2010, it is estimated the City will have already reduced the annual landfill tonnage by approximately 34,500 tons — almost half of our goal. This has been accomplished by increased consumer participation in recycling (nearly double the tonnage in six years); operational changes that encourage consumer recycling and reduction of waste; and consumer behavior and market changes (i.e., reduction of packaging materials) that have reduced waste creation.

As investments or resource allocations become available, we can achieve (and exceed) the goal of 30% diversion if the following short-term options are fully implemented:

- **Standardization of Refuse Collection** — facilitates the diversion success of the options.
- **Citywide Household Composting (Organics) Collection & Growth in Recycling** — 34,600 tons diverted.
- **Further Reduce LIP Collections/Explore Eliminating Refuse Overflow Collections** — 7,100 tons diverted.
- **Add New Drop-Sites** — 4,100 tons diverted.
- **Expand Household Hazardous Waste (HHW) Collection and Add Latex Paint Collection** — 125 tons diverted.

If these options were adopted, it is estimated it would take five years to fully phase in these changes. The changes, combined with our work to date, would potentially divert 80,425 tons of waste from the landfill, or a 32% reduction of waste since 2004.

In addition, if we agree to implement some of the short- and long-term options presented for consideration in this Plan — some of which will require legislative or regulatory changes by policymakers — the City can divert even more waste from the landfill, and reap other environmental, economic and social benefits as well.

Furthermore, this Plan also provides ideas and options for standardizing waste management services and creating greater operating efficiencies and cost-containment or cost-reduction while continuing to provide Denver residents with high-quality customer service.

In summary, the Denver Public Works Master Plan for Managing Solid Waste in the Mile High City provides a comprehensive roadmap complete with a menu of options for:

- Meeting or exceeding the City's Greenprint goal for waste diversion.
- Increased operating- and cost-efficiencies of Public Works waste management services.
- Sustainable expansion of solid waste services to meet a growing population.
- Being responsive to Denver residents' request for increased recycling and composting services and continued customer service.
- Environmental and economic benefits.
- A smart investment in our future.



Next Steps



FACT:

One ton of recycled plastic saves:

- 5,774 kilowatt hours of energy;
- 16.3 barrels of oil;
- 98 million BTUs of energy; and
- 30 cubic yards of landfill space.

One ton of recycled glass saves:

- 42 kilowatt hours of energy;
- 0.12 barrels of oil;
- 714,000 BTUs of energy; and
- 2 cubic yards of landfill space.

As the next steps in this Master Plan, Public Works will:

- 1 Continue to implement the programs and initiatives currently underway or planned.
- 2 Discuss — and prioritize — the short- and long-term options of this Plan — especially those that require legislative or regulatory change from policymakers.
- 3 Evaluate incrementally implementing components of this Plan as resources become available or through natural windows of opportunity, i.e., adding standardized automated trucks as old ones reach their replacement cycle.
- 4 Review the Master Plan and revise, as needed, to reflect consensus on prioritized options, changes and progress in Public Works and the City solid waste system.
- 5 Refine cost estimates for short- and long-term options as potential implementation schedules are further defined, and the marketplace/industry evolves.

About Denver Public Works' Solid Waste Management Section

The Department of Public Works oversees solid waste services in the City and County of Denver through Denver Solid Waste Management — one of three sections of the Operations Division of the Department.

Through this section, Public Works provides solid waste management services to approximately 170,000 single-family homes and multifamily homes with seven or fewer units and within the City and County of Denver.

Public Works collects approximately 250,000 tons of total waste (includes recyclables and organics) — an average of 1.47 tons per household per year — through an integrated program of collecting solid waste (trash), recyclables and organics (composting). The solid waste section operates under four guiding principles: exceptional customer service, worker safety, environmental stewardship and efficiency/cost containment. Table 4, found on page 16, presents a Summary of Denver Public Works' Solid Waste Management operations over the last six years.

The City and County of Denver owns the Denver Arapahoe Disposal Site (DADS) Landfill (operated under contract by others). All City-managed trash and construction and demolition debris (that cannot or is not recycled) must be disposed of at DADS. Public Works owns and operates the Cherry Creek Transfer Station (CCTS), and manages a number of other services and programs, including:

Denver Recycles — a voluntary program that encourages environmentally responsible disposal habits in homes, schools and municipal buildings by providing every-other-week collection of recyclable materials and numerous special programs. More than 100,000 Denver households (60%) have voluntarily subscribed to Denver Recycles program, and approximately 118 Denver public schools and 120 municipal buildings have service.

Seasonal and Special Recycling Programs — includes leaf drop-off programs in the fall, Christmas tree recycling in the winter, and a mulch giveaway and compost sale in the spring.

Large Item Pickup — scheduled collections every nine weeks of large items (such as furniture, mattresses and other bulky items) set outside near trash collection containers. In addition, appliances are collected by appointment.

Removal of Graffiti Vandalism — residents can call 3-1-1 to report graffiti vandalism and crews remove graffiti from public and private property upon authorization. Creates partnerships among the City, public and private property owners and Denver residents to maintain clean and safe neighborhoods.

Household Hazardous Waste — residents can schedule a door-to-door pickup (once a year) of potentially hazardous household waste such as paint, pesticides, cleaners and motor oil — items that should not be poured down a drain or sewer, or left at the curb or alley. A hazardous waste disposal kit is delivered before the scheduled collection.

Keep Denver Beautiful — Keep Denver Beautiful provides support and direction for neighborhood organizations in maintaining the aesthetics of the city and coordinates volunteer litter, graffiti removal and cleanup projects throughout the city.

For more information on Denver Public Works' solid waste management programs, please visit www.DenverGov.org/Trash.

TABLE 1: DETAIL OF PROGRAMS UNDERWAY OR PLANNED

Programs and Action Items	Benefits
<p>Work with Denver Public Schools to grow recycling at schools</p> <ul style="list-style-type: none"> • Work with individual schools to explore opportunities to capture more recyclables through waste audits, education, and children related activities. • Work to add composting service to schools that are currently in the residential service areas for the composting collection program. 	<ul style="list-style-type: none"> • Increases diversion by encouraging recycling • Responsive to public sentiment regarding increased recycling
<p>Grow Composting (Organics) Collection Programs</p> <ul style="list-style-type: none"> • Continue to refine and seek opportunities to expand the composting collection program. • Expand drop-site options for the Denver Leafdrop program. • Expand Master Composter Training and Outreach program to continue efforts to promote backyard composting. 	<ul style="list-style-type: none"> • Increases diversion by encouraging composting • Responsive to public sentiment regarding sustainability
<p>Add one new drop-site for large items and recyclables</p> <ul style="list-style-type: none"> • At existing City facility at Cherry Creek Transfer Station. • Accept large items, recyclables, organics. 	<ul style="list-style-type: none"> • Increases diversion by encouraging recycling • Responsive to public sentiment regarding increased recycling
<p>Encourage increased recycling through public outreach</p> <ul style="list-style-type: none"> • Annually, purchase and place approximately 8,000 recycling carts with new customers. • Continue distribution of the annual Wastewise newsletter and service guide. • Continue and expand monthly communication with neighborhood organizations and interested community groups. • Continue to test marketing approaches and pilot programs to increase participation in areas that have historically low participation. • Continue to develop education and outreach resources to encourage greater recycling among current recycling participants. • Expand partnerships with nonprofits and community groups working in Denver neighborhoods. • Expand recruitment for the Denver Recycles Action Network volunteer program. • Seek opportunities to partner with private corporations to support recycling education. • Continue to expand Denver Recycles presence in electronic media through web and e-mail. 	<ul style="list-style-type: none"> • Increases diversion by encouraging recycling • Responsive to public sentiment regarding increased recycling
<p>Continue Household Hazardous Waste (HHW) collection</p> <ul style="list-style-type: none"> • Secure additional electronic waste (e-waste) programs. • Expand latex paint collection by seeking retail partners to establish paint collection sites at numerous locations convenient for residents. 	<ul style="list-style-type: none"> • Increases diversion by encouraging recycling • Responsive to public sentiment regarding increased recycling
<p>Large Item Pickup (LIP)/overflow reductions</p> <ul style="list-style-type: none"> • Reduced from once every five weeks to once every nine weeks. • Reduced overflow from once every week to once every three weeks. 	<ul style="list-style-type: none"> • Improves operating efficiencies • Cost-savings

TABLE 2: SUMMARY OF SHORT-TERM OPTIONS

Program	Benefits	Action Items	Landfill Diversion At Completion ^a	Estimated Plan Costs ^b (in 2010 Dollars)
Phased, Standardization of Refuse Collection	Increases efficiency and worker safety, more consistent service, facilitates consumer recycling and composting	Accelerates vehicle replacement, re-deploys workers, dumpster removal	Indirectly encourages diversion through standardization and ease of use	\$21.9M costs \$20.2M cost reductions
Grow Recycling, Add Citywide Household Composting	Greater resource conservation, green jobs, extended landfill life, responsive to public sentiment	Ongoing public outreach, partial participation by subscribers	34,600 new tons	\$21.7M costs \$1.5M avoided costs \$0.4M revenues
Add Second New Drop-Site	New service location at an existing City facility at Central Platte Campus	Residential service only, no refuse accepted, limited hours	4,100 tons	\$1.0M costs \$0.2M avoided costs \$0.3M revenues
Expand Public Outreach	Ongoing outreach to increase communication with residents about available programs and initiatives	Increases distribution of educational material, adds programs, informs more residents	Indirectly encourages diversion through standardization and ease of use	\$1.2M costs
Expand Household Hazardous and Retail Paint Collection	Provides HHW collection service to more city residents, increase accessibility to paint recycling through retail drop sites	Coordination with retailers	125 tons	\$2.6M costs <\$0.1M avoided costs
Further Reduce Large Item Pickup and Explore Eliminating Overflow Collections	Increases efficiency, greater waste diversion	Requires enforcement	7,100 tons	\$10.1M re-allocated costs (not new costs) \$0.5M avoided costs \$0.4M revenues
Short-Term Options (totals upon completion)	Landfill Diversion: 45,925 additional tons in Public Works service area Costs: \$48.4M Reduced/avoided costs/revenues: \$23.5M Estimated increase to annual operating budget: \$3M per year over 2010			

ADDITIONAL OPTIONS FOR POLICYMAKERS (requires legislative action)

CONSIDER: Hauler Licensing	Regulates commercial generators, sets minimum collection standards, increases landfill diversion, provides data	Requires new City ordinance, enforcement, organics collection challenges	68,800 tons (<i>outside of Public Works service area</i>)	\$0.1M costs \$1.1M avoided costsc \$1.0M revenuesc
CONSIDER: Restaurant Food Waste Diversion	Increases landfill diversion	Requires new City ordinance, enforcement, organics collection challenges	15,700 tons (<i>outside of Public Works service area</i>)	<\$0.1M costs \$0.3M avoided costsc
CONSIDER: Large Multi-Family Service Verification	Minimizes unauthorized use of Public Works services	Requires new City ordinance, enforcement	Not applicable	<\$0.1M costs

^aQuantities of waste materials diverted from landfill disposal through recycling, organics recovery, HHW/electronic waste management or other means; percent diversion references ratio of tons diverted compared to total tons generated (i.e., diverted plus landfill tons)

^bDefinitions:
 • Costs include amortized capital and equipment costs, equipment, labor, services, supplies and facility tipping fees for full implementation
 • Reduced costs include collection savings achieved through system changes

• Avoided costs include landfill tip fees associated with diverting recyclables, organics and other materials
 • Revenues include payments for collected recyclables and new service fees
 • Re-allocated costs are not new costs; rather, they represent a re-allocation of existing budget line items reflecting changes in how materials would be managed in the future

^cPotential avoided costs/revenues realized by haulers or restaurants (not Public Works)

TABLE 3: SUMMARY OF LONG-TERM OPTIONS

Program	Benefits	Action Items	Landfill Diversion At Completion ^a	Estimated Plan Costs ^b (in 2010 Dollars)
Add Third New Drop-Site	Expands residential service	May require new Public Works site in Northeast Denver, residential service only, no refuse accepted, limited hours	3,900 tons (in addition to CCTS and CPC sites)	\$0.5M costs \$0.1M avoided costs \$0.2M revenues
New Northeast Denver Transfer Station	Improves service in growing sector, improves control/cost of transfer operations	Requires new site development, intensive capital cost construction/operation	Not applicable	\$1.4M costs (includes amortized capital & equipment costs)
Long-Term Options (totals upon completion)	Landfill Diversion: 3,900 additional tons in Public Works service area Costs: \$3.9M capital/equipment costs Reduced/avoided costs/revenues: \$0.3M Estimated increase to annual operating budget: \$1.6M per year over 2010			

ADDITIONAL OPTIONS FOR POLICYMAKERS (requires legislative action)

CONSIDER: Variable Rate Collection Pricing (or Pay-As-You-Throw)	Increases waste diversion, equitable fees for all residents, individual control over fees charged	Requires standardized refuse collection first, Public Works billing function, new fees	20,900 to 33,700 tons (depending on other diversion programs implemented)	\$0.1M costs \$0.3 to 0.5M avoided costs \$0.2–0.4M revenues
CONSIDER: Construction and Demolition Diversion Policy	Greater waste diversion	Requires new City ordinance, enforcement	36,100 to 180,500 tons	\$0.1M costs

^aQuantities of waste materials diverted from landfill disposal; percent diversion references ratio of tons diverted compared to total tons generated (i.e., diverted plus landfill tons)

^bDefinitions:

- Capital costs include site development, foundations, buildings, fees for engineering, contractor/construction, permitting, contingencies
- Equipment costs include mobile equipment and contingencies
- Annual costs may include amortized capital/equipment costs, equipment, labor, services, supplies and facility tipping fees
- Avoided costs include landfill tip fees associated with diverting recyclables, organics and other materials
- Revenues include payments for collected recyclables and new service fees

TABLE 4: SIX-YEAR SUMMARY OF DENVER PUBLIC WORKS' SOLID WASTE MANAGEMENT OPERATIONS

Program	2004		2006		2008		2010 Estimated	
	HHs	Total Tons						
Dumpster	63,840	120,040	64,210	109,180	65,000	103,980	65,000	108,900
Barrel Collection	52,480	78,480	54,330	74,375	54,890	68,790	56,300	65,400
Manual Collection	43,850	48,300	46,229	43,436	47,990	40,630	48,700	38,700
LIP Collection*	n/a	7,669	n/a	7,068	n/a	6,275	n/a	7,000
Total Trash	160,170	254,489	164,769	234,059	167,880	219,675	170,000	220,000
Recycling Tons		15,925		21,760		28,550		30,000
Total Waste	160,170	270,414	164,769	255,819	167,880	248,225	170,000	250,000

Recycling Participants	80,987	66,298	87,227	104,000
Recycling Revenue	\$ 1,079,400	\$ 681,374	\$ 900,743	\$ 900,000
Budget	\$ 18,163,100	\$ 22,710,400	\$ 23,006,800	\$ 23,737,500

*LIP Collection occurs throughout Public Works' entire service area.



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City and County of Denver
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www.DenverGov.org/Trash



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