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Interim Report – Comprehensive Solid Waste Management Plan
Task 3 – Evaluation of Current Programs



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Introduction

This interim report involves an evaluation of current City solid waste programs and initiatives for quality, efficiency, participation, cost performance, and achievement of any existing City goals. The program elements to be evaluated were identified and agreed upon among the Project Team members. Each element was assessed given available data, and evaluated through the lens either of standing goals and standards or industry and national best practices.

Evaluation of Program Elements

Each program element was identified as being part of one of five operational categories. The categories are primarily identified as three service sectors (services to Residents; services to Industrial, Commercial and Institutional (ICI) sectors; and services to the Community), along with solid waste facilities and internal agency operations. Data for the purposes of evaluation came directly from City sources, and most goals or standards came from the prevailing solid waste management plan or other City sources. Any external standards are based on the United States Environmental Protection Agency (EPA), established industry sources, and from common knowledge of exemplary programs.

1 Services to Residents

1.1 Curbside Collection of Garbage and Recycling

Program Description

Fort Worth single-family residents¹ receive collection of garbage and recycling once weekly from the City. Collection occurs Monday through Friday, and service is performed by a contracted collector. In return, the collector pays fees to the City based on its annual receipts. In 2015, there were 212,601 customers, and there are 217,422 residential garbage carts in distribution.

The City offers a Pay-As-You-Throw (PAYT) volume-based residential garbage container sizing system to encourage recycling and discourage waste generation. Three residential garbage container sizes are offered: 32 gallons, 64 gallons and 96 gallons. The City as of September



2015 charges a variable rate for each container size: \$12.50 per month for 32 gallons, \$17.50 per month for 64 gallons, and \$22.75 per month for 96 gallons.

As of April 2015, just over 60 percent of the garbage containers are 64 gallons in size, a little under 20 percent are 96 gallons in size, and a little under 20 percent are 32 gallons in size. All garbage and recycling carts are owned by the City. Customer service calls, emails, and issues received through the City solid waste app come in to the City's Call Center and are entered into the customer relations management

¹ Includes homes with one, two (duplex), or three (triplex) units.

system (CRMS). The collections contractor also has access to that system. Missed collections are collected within 24 hours. Drivers can report improper set outs or nothing-out (addresses with no carts set out).

In Fiscal Year (FY) 14-15, 233,674.87 tons of waste were collected from these customers. The average weekly set out (garbage and recycling) per household was 41.3 pounds: 32.7 pounds of garbage and 8.66 pounds of recycling. On an annual basis, each customer sets out approximately 2,149.5 pounds of garbage and recycling per household, per year. That same year, 31,879.4 tons of bulk waste and 28,973.5 tons of yard waste were collected from the residential collections contractor. With 217,422 households on the customer list, that is an average of 293.3 pounds of bulk waste per household and 266.5 pounds of yard waste per household, per year.

Participation in garbage collection is presumed to be 100 percent for serviced residential units, the recycling participation rate is estimated to be 69 to 70 percent, and the estimated recycling set-out rate is 65 to 70 percent. The current diversion rate is around 21 percent, and recent analysis shows more recyclable metal and plastic is going to landfill than to recycling. The FY14-15 budget (actual) for curbside collection is \$33,667,554.37, or approximately \$154.85 per household per year. This includes garbage, recycling, yard waste, and bulk collection.

Current Goals and Standards

The Texas state recycling goal is 40 percent; the national recycling rate average from U.S. EPA is 34.5 percent, and recent Columbia University research puts the national recycling rate average at around 29 percent. A January 2015 report called the Texas Recycling Data Initiative showed a tons-over-tons statewide municipal solid waste (MSW) recycling rate of 18.9 percent.



The current “Fort Worth Solid Waste Management Plan 1995-2015” (1995-2015 Plan) called for utilizing automated collection technology to reduce garbage collection from twice weekly to once weekly, and to collect recyclables once weekly and yard waste once weekly on a seasonal basis. It was anticipated that the outcomes of this change would include meeting the goals of reducing worker injuries and providing “cost-effective” service. The 1995-2015 Plan also called for implementing a PAYT fee structure as part of this change.

Regarding yard waste, the 1995-2015 Plan had a short-term goal of the provision of once weekly collection of yard waste; however, over the long-term, the 1995-2015 Plan’s goal was to reduce yard waste collection by encouraging residents to refrain from bagging yard waste and/or to manage it on their own property.

In addition to the goals in the 1995-2015 Plan, the FY14-15 City budget document set the following objectives for the curbside collection program:

- To provide once a week curbside garbage collection with less than one missed collection per 1,000 households.
- To provide once a week curbside recycling collection with less than 1 missed collection per 1,000 households.
- To increase the diversion rate of residential wastes from landfill disposal from 23 percent to 30 percent by FY14-15.
- To reduce curbside recycling contamination from 20 percent to 10 percent by FY14-15.

Program Evaluation

The 1995-2015 Plan goals and budget document objectives to provide once-weekly garbage service and recycling service have been fulfilled. Yard waste collection also continues once weekly. The continued residential participation in the yard waste program indicates that “Don’t Bag It” programs have not been successful in reducing the amount of yard waste set out at the curb to an extent that service can be reduced or eliminated.

Regarding misses of garbage at the curb, the City and its contractor are meeting and exceeding the objective of less than 1 miss per 1,000 households. Table 1-1 shows the miss rates for the past three years.

Table 1-1 Curbside Miss Rate per Thousand Customers

	Curbside Garbage Misses	Curbside Recycling Misses
FY2012-13	.75	.71
FY2013-14	.74	.42
FY2014-15	.53	.27

The 1995-2015 Plan goal to implement automated collection was completed, as was implementation of PAYT billing. The outcomes of the PAYT system are subject to analysis, as the high rate of contamination in the recyclables delivered to the MRF may be due in part to residents having chosen garbage carts that are too small for their needs or habits, resulting in “overflow” garbage being deposited in recycling carts. The FY14-15 budget document objective to reduce curbside recycling contamination from 20 percent to 10 percent by FY14-15 was not achieved; the contamination rate was 24.16 percent for FY14-15.²

The objective to increase the diversion rate to 30 percent by FY14-15 was also the objective in the FY13-14 budget document. This objective was not achieved for FY13-14, when the diversion rate was 21.24 percent, nor was it achieved in FY14-15, when the diversion rate was 20.71 percent. Regardless, a 30 percent diversion rate with yard waste diversion included is too low for a program as comprehensive and well-established as the one in Fort Worth. It is below not only the Texas state goal but also published figures for the national average, and achievable figures for a community with this level of access to recycling.

Figure 1-1 shows the characterization of the average Fort Worth curbside set-out. In recent years, not including yard waste,³ Fort Worth residents have source separated from the garbage 20 to 23 percent of

² The 2012-13 contamination rate was 20.56 percent, and the 2013-14 contamination rate was 20.64 percent

³ Yard waste was excluded for the purposes of this comparison because curbside yard waste set-outs were not counted in the waste characterization conducted in October 2014.

their waste. A waste sort conducted in March 2014 of garbage and recycling found that the subject residences source separated a bit more than average, at 28 percent. However, nearly that much recycling by weight—i.e., what *could* have been recycled—remained in the trash and was lost to landfill. This comparison shows that even *without* yard waste recycling, Fort Worth should ultimately be able to recycle much more than the 30 percent goal rate.

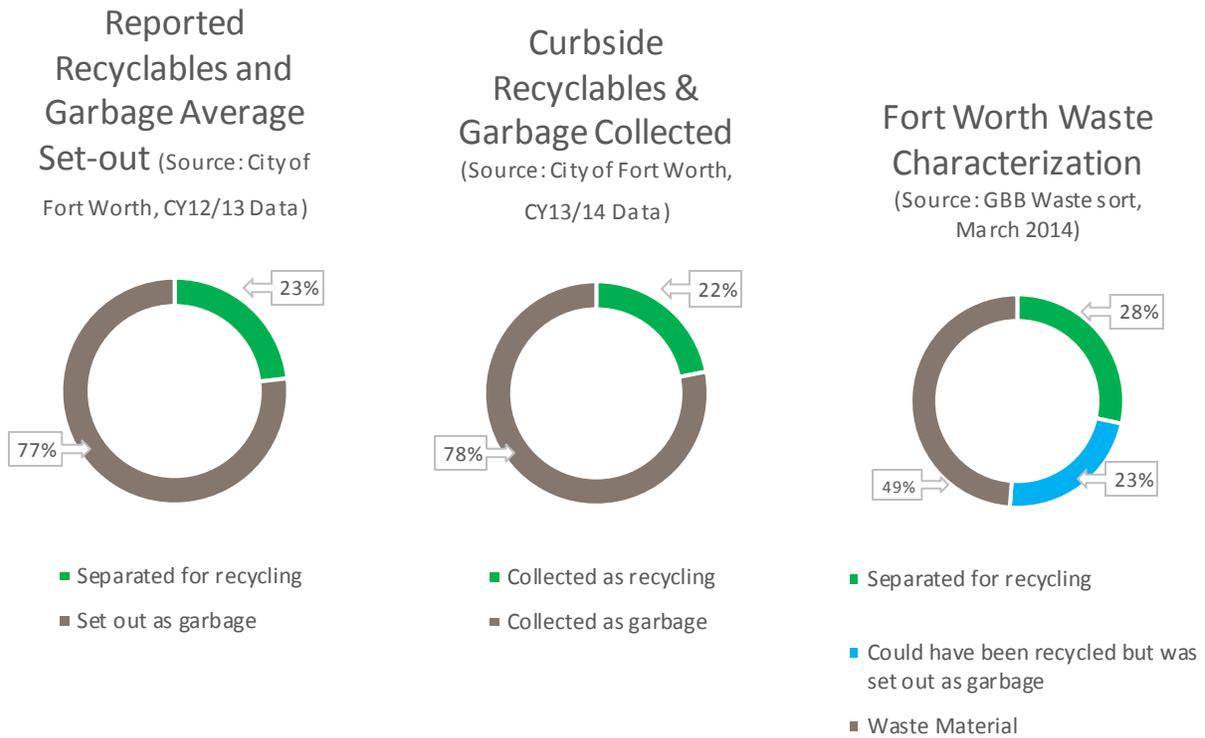


Figure 1-1 Average Curbside Set-out Compared to Actual Waste Stream Characterization

1.2 Bulky Item Collection

Program Description

Collection of bulky material is provided once monthly during a designated week. This service is for items that are too large, heavy, or otherwise unable to fit in a garbage cart. Bulk collection is not for excessive amounts of garbage, and bagged waste is not accepted. Other items not accepted in the bulk collection program include electronics, appliances containing coolant or gasoline, hazardous materials such as chemicals or poisons, automotive parts (including batteries and tires), glass, and rock, soil, concrete, or tile. Volume is limited to 10 cubic yards per collection.

Crews collect bulky set-outs throughout the designated week. Residents may set out their bulky items as early as 6 p.m. the Friday before the collection week, but no later than 7 am on Monday of the collection week, and crews have until 5 p.m. on the Saturday at the end of the collection week to pick up the material. During the life of the current 1995-2015 Plan, out-of-budget costs, or overages, for this program have reduced due to residents conforming to the set out instructions.

In a 2012 Customer Service survey, 70.4 percent of respondents indicated that they use the bulk program. In the same survey, 87.3 percent of respondents said they were “somewhat” or “very” satisfied with the bulk collection program.

Current Goals and Standards

The primary existing goal for this program from the current 1995-2015 Plan was to maintain the service level of once-monthly collection, with ambitions to “encourage” apartments, businesses, and institutions to recycle bulk items when possible. The intention for that effort was to reduce the amount of reusable items going straight to landfill.

Program Evaluation

The City has maintained the once monthly service level for bulk collection, and the reduction in out-of-budget expenditures reflects growing customer compliance with set-out instructions. Based on industry experience with bulk item collection programs, once monthly bulk collection at no additional cost is an above-average amount of access to this type of service. The lengthy time period provided to set out material (Friday night to Monday morning) also makes participation simple. There is no comprehensive data to indicate that residents mind that bulky items may be on the curb for up to a week, and it is not unreasonable to suppose that some residents have learned that they have until even later in the week than Monday to set out their items, expanding the set-out window even further. This exceptional level of “easy” access to a “free” program to dispose of bulk items provides no incentive for residents to seek other options to rid themselves of bulk items or material that could be diverted from disposal, such as selling, donating, or recycling. Therefore, while the program has met its goal of providing a certain level of service, it does not serve the larger goal of reducing waste sent to landfill.

In addition to not incentivizing waste reduction, this style of bulk collection is relatively expensive. City staff estimates that approximately 33 percent of the monthly per household charge by the contractor for waste collection is attributable to bulk waste collection (this also includes enhanced yard waste collection), but bulk materials account for only 12.3 percent of the tons collected. Proportionally, these charges are second only to garbage collection, which accounts for approximately 41 percent of the charge but over 60 percent of the tons collected. Figure 1-2 shows how disproportionately expensive bulk waste collection is.

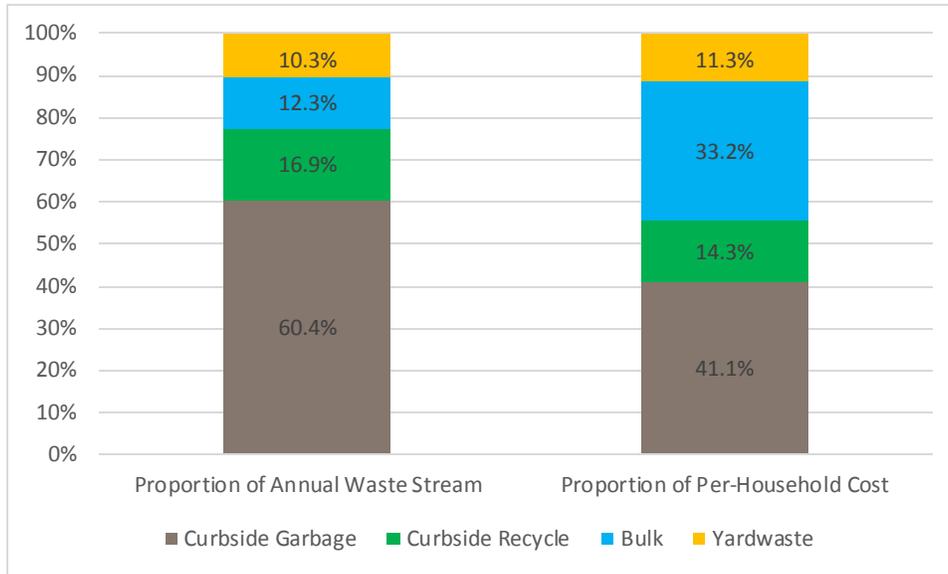


Figure 1-2 Collection Services as Proportion of Annual Waste Stream and Proportion of Per-Household Rate Charged by Contractor
(Source: City of Fort Worth Data)

Furthermore, a survey by the City in 2011 of the materials set out and collected as “bulk” found that up to 70 percent is organic materials, such as yard trimmings and brush. Effectively, this means many tons of organic material are being collected expensively and then disposed instead of recovered.

1.3 Incentive Programs

Program Description

Incentive programs are initiatives to provide a motivation—usually financial—to residents to reduce waste generation, recycle, or recycle more than previously. In 2012, Fort Worth began a Recyclebank program. The program is provided through the partnership between Recyclebank and Waste Management, Inc. (WMI). Recyclebank lets participants earn points by recycling, and those points can be “cashed in” for benefits such as vouchers or coupons good at local or national vendors.

During the first month of the program (April 2012), Recyclebank reported to the City⁴ that 21,168 of the 195,928 customers who were eligible for the program had registered to participate, representing a 10.8 percent subscription rate. Of those subscribed customers, 10,403 (or, 49.1 percent) actively participated in earning Recyclebank rewards, earning nearly 7 million points for recycling. In subsequent years,⁵ active participation has declined significantly. Subscription has increased to 16.7 percent; however, only about 10 percent of those subscribers are actively reporting, representing just 1.3 percent of all eligible customers. A customer service survey in 2012 indicated that many users were frustrated with the process of using Recyclebank, or were confused by how to participate.

Table 1-2 Fort Worth Recyclebank Subscription and Reporting Figures

⁴ “Recycling Reporting,” from Waste Management, Fort Worth, TX, April 2012.

⁵ “Recyclebank Recycling Education & Engagement Program Results,” reports from Waste Management, Fort Worth, TX, dated February 2015 and September 2015.

	April 2012 (Program Start)	April 2014 (24 months from start)	February 2015 (34 months from start)	September 2015 (41 months from start)
Number of subscribers	21,168	30,633	31,551	34,710
Subscription Rate	10.8%	14.9%	15.3%	16.7%
Subscribers Reporting/ Participating	10,403	3,812	3,667	3,523
Program Reporting/ Participation Rate	49.1%	12.5%	11.6%	10.1%
CITYWIDE Reporting/ Participation Rate	5.3%	1.85%	1.8%	1.3%

Current Goals and Standards

The existing 1995-2015 Plan recommended establishing “positive incentives” for businesses to recycle, but did not place the same priority for residential programs. The residential curbside goals are focused on service provision. There are no national standards for incentive programs, and their adoption is uneven.

Program Evaluation

While the initialization of the Recyclebank program in Fort Worth was promoted via channels such as City News;⁶ the web site currently provides a minimal description of the program and then refers readers to the Recyclebank web site. Recyclebank’s operational model does normally include their providing the outreach and education materials regarding the program. Budgetary information provided shows a \$50,000 expenditure for “Recycle bank / Recycle Right postcards,” which figure included both Recyclebank and general recycling outreach efforts. Approximate annual expenditures by the City for Recyclebank outreach were \$20,000 in 2012 and \$10,000 each year in 2013 and 2014.⁷ RecycleBank was required by contract to expend \$150,000 in the program for marketing purposes from April 1, 2014 through March 31, 2015, and \$150,000 April 1, 2015, through March 2016.

Recyclebank has been in place in Fort Worth for nearly three and a half years. The recycling rate for 2012 would likely not have been heavily influenced by the program, and in subsequent years, there has been no impact—in fact, the City’s diversion rate has decreased each year during the program and is now more than three percentage points lower than the reporting year in which the program began. The number of subscribers has increased, but the decline in active participation in Recyclebank by those subscribers is marked.

Additionally, one of the purported benefits of Recyclebank is promotion of local businesses via the rewards that participants can select and redeem. From March 2014 to February 2015, about 2 percent of members ordered rewards from Recyclebank. These were disproportionately identified as “local” rewards,⁸ although the reporting does not identify if the rewards are for truly local businesses or rewards that are limited to being spent at Fort Worth locations. That trend began to change, however. In the 12-month period from October 2014 to September 2015, a similar representation of members ordered

⁶ <http://fortworthtexas.gov/citynews/default.aspx?id=96026>

⁷ Email correspondence with Diane Covey, March 12, 2015.

⁸ Local to National rewards ranged from almost 3-to-1 to more than 5-to-1 from March 2014 to February 2015.

rewards from Recyclebank (just under 2 percent, on average). The ratio of local to national rewards changed significantly, however, and overall more than 82 percent of rewards ordered were national.⁹

1.4 Yard and Food Waste Collection

Program Description

The City offers yard waste collection services from single-family residences in several different forms through Waste Management, Inc., its collection contractor. Any yard waste including grass may be placed at the curb for weekly collection in Kraft paper bags. Residents are responsible for purchasing these bags at retail outlets. Tied bundles of yard waste up to 4 ft. long and 40 lbs. in weight may also be placed at the curb, along with stacks of brush and limbs up to 8 ft. long and 4 in. in diameter (piles with limbs larger than these dimensions are considered bulk) if they are no larger than 10 cubic yards. These materials are all collected weekly at no additional charge. Residents also have the option of paying \$75.00 one-time to purchase and receive a green, 96-gallon cart for any yard waste. None of these four options listed above represent an additional monthly fee to residents. Yard waste that does not meet these criteria may be collected at additional cost to the resident. To avoid additional fees, residents may take their yard waste to one of three drop-off stations.



City contractors deliver yard waste to the Southeast Landfill (SELF) where it is ground into mulch by Living Earth Technologies (LETCO) under subcontract to the SELF operator, Republic Services. Republic Services/LETCO is required to accept the material unless it contains “Unacceptable Waste” or loads with an “unreasonable amount of prohibited items”; however, the amount of contamination constituting an unreasonable amount is not defined in the Landfill Operating Contract Amendment 3 which addresses processing of yard waste. Republic/LETCO processed just under 29,000 tons of yard waste into mulch in FY14-15 according to the City’s Annual Report. The contamination rate, calculated using the amount of yard waste disposed by the mulching operation, was 6.85 percent by weight.

The City does not provide food waste collection in any form. Residences have no option for removing food residuals from their solid waste except to compost it if they practice back-yard composting, or by using under-sink disposers. Back-yard composting is a beneficial form of diverting both yard waste and food waste from disposal. Using an under-sink disposer is also a form of diversion from landfill because municipal wastewater bio-solids are typically land applied for beneficial use. The City currently incentivizes diversion of both food residuals and yard waste by providing a PAYT program, which allows residents to pay less for smaller solid waste carts without paying more for separate yard waste collection. The City has a limited back yard composting education program, offered twice -per-year at the Botanical Gardens.

Current Goals and Standards

Statewide, 15.8 percent of all reported material recycled from residential sources was made up of yard trimmings, brush and green waste in 2013 (Texas Recycling Data Initiative Biennial Report, 2014). However, this benchmark is believed to be low because of the very large number of small composters and mulch producers operating in the State, many of which were not accounted for in the statewide study.

⁹ Local to National rewards ranged from 1-to-2 to 1-to-18.8 from October 2014 to September 2015.

Program Evaluation

Although the reported yard waste and food waste diversion rates compare very favorably to the reported statewide rates, the reported statewide rates are believed to be lower than actual rates. Opportunities to increase diversion rates for these materials lie in increasing local opportunities for composting and mulching driven by market forces for economically favorable tipping fees and high-quality compost, soil blends, and mulches. Opportunities to increase diversion of food waste lie in providing processing capacity, including composting and other techniques, for food and yard waste generated by the residential sector. The March 2014 waste characterization study conducted for the City showed that 34.9 percent of the material set out as garbage, exclusive of recycling and yard waste, was food or food-contaminated paper, indicating that perhaps a third of current “garbage” could be diverted to composting, digestion, in-sink disposers, or other techniques.

1.5 Multi-family properties

Program Description

At present, the main service provided to multi-family residents by the City regarding recycling is information and outreach. The City does not provide any direct services. The City’s information and outreach provides guidance to individuals seeking to start or support recycling, including how to seek collection service from the private sector, and where drop-off services are available.

In 2014, an ordinance passed in 2011 went into effect which requires all multifamily housing complexes to have recycling programs and to submit documentation of their programs to the City. To bring about compliance, the City provided technical assistance, a checklist, and other resources such as a direct email address, AptRecycling@fortworthtexas.gov.

Current Goals and Standards

The existing 1995-2015 Plan provided programmatic goals for apartment recycling:

- Requiring apartments to provide recycling to residents;
- Providing City of support and enforcement for apartment complexes to recycle;
- Encouraging apartments to divert yard waste from disposal;
- Encouraging residents to recycle; and,
- Assisting in the formation of recycling cooperatives among complexes.

The 1995-2015 Plan also included this statement regarding recycling access for apartment residents:

It is the Committee's general opinion that, to the extent possible, residents of apartments should receive services comparable to services provided to residents of single family households.

This sentiment reflects a forward-thinking idea that with the advent of single stream recycling, there is no operational reason that apartment residents cannot recycle the same common materials as those living in single family homes.

Program Evaluation

As of January 2015, 545 multifamily housing complexes have complied with the program: 440 have a recycling plan in place and 105 have requested a waiver opting out of implementing recycling. While the compliance is remarkable, the ordinance has no service capacity requirements nor does it specify which

products must be recycled. Therefore, while the objectives related to this endeavor have been met, the achievement of providing a similar level of service for apartment and single family residents cannot be verified. Continued implementation of this ordinance will be essential for ongoing service provision to apartment residents.

The nonspecific goal to “encourage” residents to recycle is met by existing outreach programs, including the offer by the City to speak at community and civic groups. Efforts to encourage complexes regarding diversion of yard waste and the active support of recycling cooperatives appears not to have been accomplished.

2 Services to Industrial, Commercial, and Institutional Sectors

2.1 C&D

Program Description

Construction activities result in the generation of construction / demolition (“C&D”) wastes which are generally managed differently than other MSW. The TCEQ defines C&D waste as waste resulting from construction or demolition projects; includes all materials that are directly or indirectly the by-products of construction work or that result from demolition of buildings and other structures, including, but not limited to, paper, cartons, gypsum board, wood, excelsior, rubber, and plastics.¹⁰ C&D wastes can be disposed of in landfills dedicated to C&D disposal, referred to as Type IV Landfills. These facilities do not have to have as extensive a liner or final cover system due to the fact that the wastes that can be accepted at these facilities must be inert.

C&D debris often contains bulky, heavy materials that include:

- Concrete, wood, and asphalt (from roads and roofing shingles);
- Gypsum (the main component of drywall);
- Metals, bricks, glass, and plastics; and,
- Salvaged building components, such as doors, windows, and plumbing fixtures

C&D is the second largest waste type disposed in Texas. The TCEQ reports that 18 percent by weight of all material landfilled in Texas is C&D material, or about 0.2 tons per capita per year.¹¹ Using U.S. Census data, this rate equates to 173,920 tons per year of C&D waste generated in Fort Worth.

Current Goals and Standards

In order to provide for proper disposal of C&D wastes, it is the City’s goal to provide sufficient disposal capacity for all wastes generated by both residential and commercial sectors. Currently this is achieved through a combination of disposal capacity from both the public and private sectors.

Program Evaluation

C&D waste from new construction, major residential renovation and demolition projects make up much larger quantities than C&D material that is likely to be collected through the City’s curbside bulk collection program. This material is typically collected by private contract with haulers who may haul to Progressive Inc. C&D landfill, the Southeast Landfill (SELF) or elsewhere.

The SELF also accepts C&D wastes. However, C&D waste, unlike residential curbside garbage collection, is not directed to the SELF. In FY14-15, the SELF disposed of 50,188 tons of C&D waste. This represented approximately 7.9 percent of the total waste disposed of at the SELF that year.

The Progressive Inc. C&D landfill (formerly identified as IESI) is located in Tarrant County. This facility accepted a total of 356,826 tons in 2014. C&D waste accepted at this facility is generated by both the City’s residential sector, as well as Fort Worth and outside Fort Worth private haulers. The remaining capacity of this landfill is 9 years at current rates of disposal.¹²

¹⁰ 30 TAC 330

¹¹ *Municipal Solid Waste in Texas: A Year in Review – FY 2014 Data Summary and Analysis*, TCEQ

¹² *Municipal Solid Waste in Texas: A Year in Review – FY 2014 Data Summary and Analysis*, TCEQ

2.2 Commercial Collection

Program Description

At present, the main service provided to businesses—i.e., the commercial sector—by the City is information and outreach. The City does not provide any direct services, except for approximately 1,000 small business customers that are serviced by 96-gallon carts by the City’s residential collections contractor. Information provides guidance to individuals seeking to start or support recycling, including how to seek collection service from the private sector, and where drop-off services are available. The existing 1995-2015 Plan notes this condition, and that it should continue.

Their participation will have to be secured through largely voluntary measures, as the City currently exercises limited control in how waste is collected and disposed. It is the Committee's belief that this level of business sector flexibility should continue.

The commercial program also includes regulation of solid waste haulers.

Current Goals and Standards

The existing 1995-2015 Plan listed nine recommended actions for the commercial program, enumerated below, which are primarily aspirational in nature. The action statements were mostly “encourage,” “assist,” and “incentivize,” and the areas of focus included buying recycled content, reducing waste, recycling, and composting. The existing 1995-2015 Plan recommends that the City provide information to businesses on the importance of recycling and waste reduction, and on how to access markets for recyclable materials. The 1995-2015 Plan further recommends turning to organizations such as the Sierra Club and the Chamber of Commerce for assistance with these educational efforts.

The 1995-2015 Plan calls for the institution of the Grants of Privilege system, requiring haulers to have a license or permit and to pay fees, and to provide tonnage data to the City.

Program Evaluation

The City estimates that the proportion of waste from Fort Worth generated by the Commercial sector is at least two-thirds, as estimated in the current 1995-2015 Plan, but it may be as much as three-quarters. Accordingly, the importance of influencing this sector to reduce waste and recycle has increased in prominence. Below are the nine recommended actions from the existing 1995-2015 Plan and status on their implementation.

1. Encourage businesses to recycle
 - The City has started “Green Breakfasts” with tours of companies incorporating sustainable business practices. The City also hosts Business Smart workshops for area businesses on incorporating sustainable business practices including recycling and waste reduction best practices. As part of the rollout of the multi-family complex recycling program, the City held four workshops specifically for apartment managers on best practices.
2. Assist schools to establish in-house recycling programs
 - The City obtained grant funds for Fort Worth schools to receive recycling bins, and 3,000 bins will be placed in 2015. Keep Fort Worth Beautiful encourages the formation of school “Green Teams” and hopes to recognize them for their efforts. Only schools forming a

green team comprised of a student, a custodial staff person, an administrator, a teacher and a parent receive recycling bins.

- The City’s Neighborhood Education office does outreach in schools and neighborhoods educating students and citizens on how to recycle properly at home. In the period from January 1, 2014 through January 31, 2015 the former Neighborhood Education office (currently the Community Engagement Office) achieved the following:
 - 104 elementary schools were visited for outreach
 - 4,851 students were reached with the recycling presentations
 - 5,035 Fort Worth citizens were reached with the recycling presentations
 - 65,491 pieces of recycling collaterals were distributed
- 3. Establish positive incentives for recycling programs.
 - No programs.
- 4. Adopt business design standards that encourage use of recycled products
 - Business Smart program – to share best management practices with local businesses.
- 5. Encourage procurement of goods made from recycled/able materials
 - The City’s Sustainability Plan does encourage green purchasing.
- 6. Evaluate use of waste water treatment sludge for composting
 - The Solid Waste Services Division has had three meetings with the Water Department on this topic and current discussions are ongoing and show promise.
- 7. Encourage composting organic materials by private sector
 - Not accomplished yet.
- 8. Encourage lawn care companies to “don’t bag it”
 - Fort Worth has an active Master Composter program, which a few lawn care companies have attended.
- 9. Require data collection and reporting and franchise fees of haulers
 - This action has been accomplished. The Grant of Privilege program collected \$2.2 million in FY 13-14.

2.3 Food Waste Collection

Program Description

Collection of food waste in the non-residential sector is typically through self-haul by the generator or through contracts with hauling companies. In general, the primary impediments to food waste recycling are a lack of appropriate processing facilities within an economic haul distance, and lack of adequate route density to make collection and hauling more efficient and more economical. Food waste is typically heavy, which may also reduce haul efficiency.

Current Goals and Standards

There are no current goals or standards associated with food and yard waste from Industrial, Commercial, and Institutional (ICI) sources.

Program Evaluation

Opportunities to increase diversion of food waste lie in providing processing capacity, including composting and other techniques, for food generated by the ICI sectors.

3 Services to the Community

3.1 Away-from-Home Recycling Services

Program Description

The Solid Waste Services Division and Downtown Fort Worth, Inc. have implemented the “Recycle on the Go” program. This program provides 78 dual-use (recycling/garbage) cans throughout the downtown area: 66 purchased by the City and 12 purchased by the Downtown Public Improvement District (PID). There are also 10 “Big-Belly” automated recycling units. The recycling side of the dual-use cans provides an opportunity for recycling of paper, plastic, metal and glass. The collected materials are consolidated into a 3 cubic yard container, which is emptied once weekly. During winter months, it is estimated to be only two-thirds full when emptied.

This program was partly funded by a grant from Texas Commission on Environmental Quality. The Downtown PID spends about \$1 million annually on “trash removal,” which accounts for around 45 percent of its budget expenses. The Stockyards PID spends approximately \$10,775, or 16 percent of its budget, on waste removal annually. Waste removal expenditures for the TrinityBluffs PID have varied and markedly over the past five fiscal years, accounting for 26 to 39 percent of operating expenditures. In addition expenditures by the PIDs, the City pays Waste Management \$58,000 per year to empty 194 garbage cans.



Current Goals and Standards

There were not any goals or aspirations for away-from-home recycling in the current 1995-2015 Plan. Through the Recycle on the Go program, the City hoped to reduce the amount of waste disposed by 10 percent, or 10,000 pounds annually.

The most widely cited best practices for public space recycling, backed by research and public input, are found in a 2011 report¹³ by Eureka Recycling and a 2013 report by Keep America Beautiful.¹⁴

Eureka Recycling is a zero waste nonprofit organization in St. Paul, MN, and operates several programs to further its mission, including a curbside recycling program. Eureka Recycling offered the following best practices for creating a program of public space recycling:

- Clearly define the budget and scope of the program and identify phases of implementation;
- Consider prioritizing visible and popular public spaces first;
- Build strong partnerships with stakeholders, including the community;
- Design the program around both diversion potential and ensuring that the materials really get recycled; and,
- Develop systems to track and measure diversion, and communicate results.

Keep America Beautiful is the foremost organization dedicated to the care of public spaces, the host organization of the Great American Cleanup and America Recycles Day, manifested locally in Fort Worth as the Cowtown Cleanup in the spring and America Recycles Day in the fall each year.



Keep America Beautiful conducted a survey of communities who have public space recycling and in 2013 published ten best practices for such programs, based on the experience of the survey respondents:

¹³ “Development of Best Practices in Public Space Recycling,” Eureka Recycling, 2011. http://www.eurekarecycling.org/imageupload/file/Eureka-Public_Space_Recycling-final_web.pdf

¹⁴ Planning for Success: Ten Tips for Designing Public Space Recycling Programs,” Keep America Beautiful, 2013. <http://americarecyclesday.org/wp-content/uploads/2013/07/Public-Space-Recycling-Guide1.pdf>.

Best Practices for Public Space Recycling - Keep America Beautiful, 2013

- Recycling must be simple and convenient, removing the two primary barriers of lack of convenience and confusion over what to do;
- Know the waste stream before selecting containers, in order to properly identify what users will actually be generating;
- Place recycling bins directly next to trash bins, as isolated recycling bins will become trash cans no matter what the label says;
- Use restrictive lids, as small openings reduce contamination and force people to slow down and read;
- Use clear, simple labels and language with easy-to-recognize images and avoid cluttering signage with too much detail;
- Choose the right bin for the setting and the materials, and one that is distinct from the trash cans— blue is the most common color used for recycling;
- Be consistent, and pick a uniform bin style, color scheme, and message, coordinating with nearby residential programs and other venues or facilities;
- Keep bins clean and well-maintained, and emptied adequately—dirty, damaged, and overflowing bins turn people off;
- Conduct educational outreach, including special signage and recycling ambassadors to interact with users; and,
- Be prepared to evaluate and improve —when asked “have you made any changes to your system to address contamination or other issues?” 69 percent of the survey respondents said “no.”

Program Evaluation

The Recycle on the Go program had a goal of diverting 10,000 pounds of material per year. The following approximate estimates were made to evaluate the achievement of this goal.

The Downtown Fort Worth PID states that the 3-CY recycling container is emptied weekly, but that in the winter months it is only two-thirds full. Assuming that December, January, and February are the “winter months,” there are 13 winter weeks and 39 “regular” weeks each year.

$$(2 \text{ CY/week} * 13 \text{ winter weeks/year}) + (3 \text{ CY/week} * 39 \text{ regular weeks/year}) = 143 \text{ CY per year}$$

Recyclemania, a national collegiate recycling competition operated by Keep America Beautiful, provides several volume-to-weight conversion factors,¹⁵ one of which is most relevant to the PID recycling containers: 200 pounds per CY for commingled containers (glass, metal, and plastic bottles and cans).¹⁶

$$143 \text{ CY of recyclables/year} * 200 \text{ pounds/CY} = 28,600 \text{ pounds per year}$$

This would presume that the material placed in the recycling containers was all recyclable, which would be erroneous. However, even if the material in the recycling bins was 65 percent contaminated (residue), there would still be 10,000 pounds of recyclables to be sorted out at the MRF, and the goal of the Recycle on the Go program would be achieved. Therefore, it is likely that the 10,000 pound goal is met; however,

¹⁵ <http://www.recyclemaniacs.org/sites/default/files/documents/Volume-weight-conversions.pdf>

¹⁶ The Downtown Fort Worth recycling bins are designated for bottle and can recycling, and these are the materials most likely recycled by people on the go.

better information is required. The provision of weight tickets for the 3CY recycling container, for example, could provide such information. In addition, the dual-stream recycling containers are still outnumbered almost 2.5 to 1 by trash-only containers, meaning tens of thousands of additional pounds that could be recycled are being lost to landfill disposal each year in the Downtown PID.

Several public parks in Fort Worth have recycling containers installed for the use of visitors. Prominent among them is the Fort Worth Botanic Garden. There are more than 290 facilities operated by the Parks and Recreation Department, including 179 neighborhood parks, 20 community centers, 5 golf courses, 3 aquatics centers, 2 athletic centers, and 1 fishing lake. Every park has at least two recycling bins on site for visitors to use. An estimated 40 percent of the garbage cans in the parks have accompanying recycling bins.¹⁷

3.2 Special Event Collection

Program Description

Fort Worth has many public events and parades throughout the year. Attendance ranges from 2,500 at Prairie Fest to over 1 million for the Fort Worth Stock Show. The Texas Motor Speedway, with a capacity of over 181,000 people, is host to three NASCAR Series, an Indy Car Series, and various other races, events, and concerts. NASCAR has worked with partners such as Coca-Cola and Miller Coors to provide recycling at some of its events.¹⁸ There are potentially millions and millions of glass, plastic, and metal beverage containers generated at these facilities which could be diverted from landfill each year.

Waste collection service at special events is provided by one of several private haulers, and the presence of recycling containers also varies. Some of the events, like the Stock Show and NASCAR, have reported on the amount of recyclables they have collected, but others have not. Essentially, recycling at public events is at the discretion of the event organizers and the waste hauler servicing the events. For example, Ordinance No. 19255-08-2010 regarding Outdoor Events states that “Recycling at Events is strongly encouraged, but is not mandatory.”¹⁹ There is no mention of recycling in the permit guidelines for Neighborhood Events and Parades, although permit holders are responsible for “collection and disposal of all trash.”²⁰

Organizations and individuals can borrow recycling bins from the Parks and Recreation Department using an online form, located at <http://fortworthtexas.gov/parks/eventrecycling/>. The bins are free to borrow and easy to use, and are of the type shown in Figure 3-1. Borrowers may have as many bins as they need, and can bring the material they collect to the North District Service Center on Brennan Ave., along with returning the bins there. There is a \$55 charge for any bins damaged or not returned. In the first three quarters of FY16, eleven organizations borrowed a combined total of 126 recycling bins.



Figure 3-1 Example of Recycling Bin Available to Borrow from the Parks Department

¹⁷ Estimate provided by Parks and Recreation Department District Superintendent, July 1, 2016.

¹⁸ <http://green.nascar.com/partners>

¹⁹ Sec. 20-422. Additional Permits Required.

²⁰ http://fortworthtexas.gov/uploadedFiles/Public_Events/Outdoor_Events/NeighborhoodEvents.pdf?update=110720

Current Goals and Standards

There were no goals or aspirations for away-from-home recycling in the current 1995-2015 Plan. The FY14-15 budget document stated a goal to divert from landfill disposal 90,000 pounds of recyclables at special events in 2015. The goal for 2014 was 20,000 pounds.

Best practices for supporting event recycling programs include connecting provision of recycling to the event permit; supporting the recycling efforts with messaging, containers, service, or programmatic support; and, promoting recycling as a service that City Residents should expect when they are enjoying local events.

Best practices for implementing temporary event recycling operations are to some degree similar to those for permanent public space recycling, and include many of the same elements. This knowledge and information could be provided by the City to the event operators in the form of programmatic support:



- Messaging about recycling at both the point of purchase (such as food vendors) and at the point of discard (i.e., waste management containers or areas), and along the way;
- Prohibiting vendors from selling containers or packaging that will contaminate the recycling stream or confuse attendees;
- Pairing recycling receptacles with all waste receptacles;
- Utilizing recycling receptacles that are easy for attendees to recognize and use; and,
- Ensuring that on-site sanitation staff properly segregate recycling from garbage all the way from the receptacles to the collection points, and that the recyclable materials are properly routed from the event site to a MRF.

Program Evaluation

City staff provided data estimating that 90,432 pounds of recyclables were collected at various events in 2014, and that the 2014 objective was met. For the period October 2014 to September 2015, special event recycling was estimated at 95,502 pounds, and the 2015 objective was met.

3.3 Litter Abatement and Illegal Dump Clean-ups

Program Description

The City operates a significant program to clean up litter and illegal dumps. Sites in need of clean up are identified by Code Compliance officers, citizen calls, or the litter abatement crews themselves in the course of their work. A work order is created, and all orders are collected within five days, at which point a supervisor closes the order. Work is done during a regular daytime schedule, unless there is an emergency situation or a special event.

In FY14-15, the program collected 4,927 tons of material, up from 2,971 tons in FY12-13. The budget for FY14-15 for this activity was \$1,340,846.57, or \$272.14 per ton. The majority of these costs are for labor, equipment, and fuel to collect the materials, as disposal is generally only \$15 to \$18 per ton.



In addition to cleaning up, the City strongly supports Keep Fort Worth Beautiful (KFWB), an affiliate of Keep America Beautiful. A City staff person serves as the coordinator of KFWB.

Current Goals and Standards

The FY14-15 budget document stated an objective to collect 90 percent of all work orders within 5 days of receipt.

The current 1995-2015 Plan placed a high priority on continuing the City programs of litter abatement and illegal dump prevention and clean-up. It states that all services related to such should be maintained, and recommends two strategies to cut down on illegal dumping in the first place: making access to proper disposal more convenient, and increasing enforcement and prosecution efforts towards those who dump illegally.

The aim of Keep America Beautiful and its affiliates is to bring people together to make public spaces into beautiful places. In the past, efforts focused primarily on beautification and litter clean-ups; however, its mission has evolved in recent years to engage individuals to take responsibility for their community's environment. This mission adjustment including acquisition by KAB of the America Recycles Day intellectual property, and promotion of the criticality of recycling systems to environmental quality and quality public space.

Program Evaluation

The illegal dump cleanup program's goals were to maintain service levels, which it has done. All programs remain intact, with full-time and wide-ranging activity to clean up illegal dumps and litter. As of April 2015, 98 percent of incoming work orders are cleared within 3 days, exceeding the goal.



The cost per ton to collect this material is many times greater than operational costs to collect waste properly from homes and businesses, and is heavily driven by the transportation and vehicle costs. In FY14-15, costs associated with vehicles and fuel (not including any purchase of new vehicles) was more than \$238,000, or about 15 percent, of the operational budget. Like many programs, the single largest cost center was staffing salary, wages, and benefits. For

FY14-15, this was over \$850,000, or more than 51 percent, of the program budget.

Keep Fort Worth Beautiful is a premier KAB affiliate. The keystone event, the Great American Cowtown Cleanup, engages over 5,000 residents of Fort Worth annually. The chapter has been distinguished many times for its excellence, including Gold Star status from Keep Texas Beautiful, President's Circle by KAB, Community Achievement Awards from the Texas Governor, and other recognitions.

3.4 Dead Animal Management

Program Description

As part of the City of Fort Worth Code Compliance Department, the Solid Waste Services Division is responsible for removal of properly prepared dead animals from residences. Article IV of Chapter 6 of the City Code governs this collection. The Division collects smaller animals from City streets or from private property that have been placed at the curb. Residents can call in for a pick-up, and people can also call in dead animals on public or business property. The carcasses are handled as a special waste at the landfill per Texas law.

The City provides this service, in part, because ordinances require that animals can only be buried at a pet cemetery or licensed landfill. Unlike in some other communities, they cannot be buried on a person's property. For larger animals, such as livestock, residents are directed to contact a rendering company to dispose of large animals.

Tonnage collected was steady FY03-04 through FY07-08; however, as shown in Figure 3-2, the tonnage has dropped by approximately 40 percent from FY07-08 to FY12-13. Tonnage always fluctuates due to natural animal population changes and dependent on how many large animals are collected; however, this precipitous drop is primarily attributable to a program change. Previously, animals were collected, (for a fee) from veterinary locations, but customers have not been calling for service.

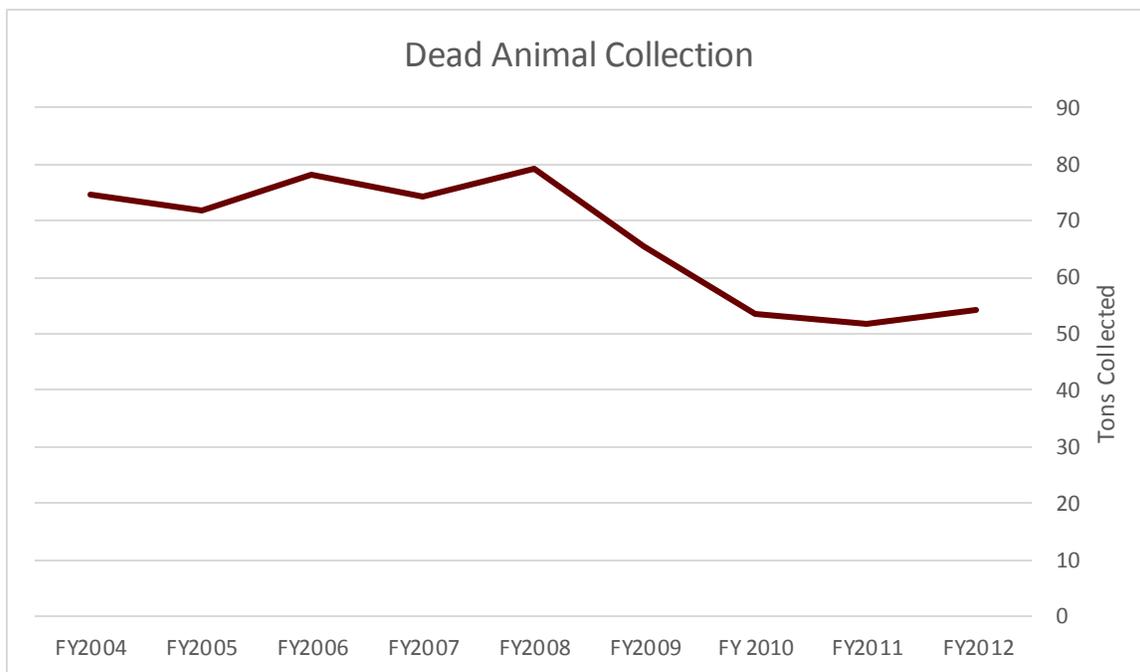


Figure 3-2 Tons Collected, Dead Animal Cleanup

The budgetary expenditures for the dead animal removal operation — shown for the past three years below — are primarily for salary and wages, and benefits. The next largest line item is vehicle fuel, followed by safety equipment. Table 3-1 shows recent expenditures and budget figures for this activity. The annual expenditures remain relatively stable while tons collected have decreased. The cause for this per-ton

increase in costs is not readily apparent but is likely affected by many uncontrollable factors such as fuel costs, climate, public interest in the matter, and animal population patterns.

Table 3-1 Recent Budget Figures for Dead Animal Clean-up

FY 2012-13 Unaudited Actual	FY 2013-14 Adopted	FY 2014-15 Actual
\$206,219	\$216,386	\$232,637

City ordinances do provide for collection of fines for improperly handling animal carcasses, up to \$2,000, and for collection of a fee for collection of animals from business property; however, such monies would be deposited into the General Fund and would not directly benefit the animal collection program. This program operates as a necessary public service.

Current Goals and Standards

The FY14-15 budget document states an objective for 100 percent of incoming dead animal work orders to be completed within 48 hours of receipt.

The other primary standards of evaluating this program lie in the current 1995-2015 Plan, which called for the City to continue removal of dead animals from the public right-of-way, identifying the effort as “necessary,” and noting that the Committee that evaluated the priority of this program ranked it as of the highest importance.

Program Evaluation

As of April 2015, 99.3 percent of all work orders are cleared within 24 hours; a report for FY14-15 shows that 94 percent are cleared in that time frame. These both exceed the stated goal. A 2011 media report also cites a City source as saying work orders are usually completed within 24 hours.²¹ Considering that the primary objective of this program is to exist and be responsive, and in the absence of any customer service evaluation, it can be said to currently fulfill its charge satisfactorily.

3.5 C&D Processing

Program Description

C&D waste associated with structures may be processed separately from other recyclables in a specialized materials recovery facility (MRF) designed for this purpose. A C&D MRF may be a stand-alone processing facility, or may be as simple as a controlled salvage/diversion operation at a landfill. Alternatively, C&D waste may be separated at the construction or demolition site into components that are marketable. This activity typically takes the form of placing several roll-off or similar containers at the job site, each dedicated to a certain type of marketable waste material, then marketing to various brokers, mills or end users. Recycling pavement materials such as asphalt and concrete is possibly the most common form of C&D recycling. This is typically initiated on a project-by-project basis based on market conditions for new and reclaimed paving materials. Asphalt is typically reprocessed into new paving material. Concrete and rock rubble are typically crushed and graded to meet specifications for use in roadway construction, bank stabilization, or other uses. Metals are highly marketable when properly segregated to meet market specifications. Asphalt shingles may be reprocessed into recycled asphalt shingles or into paving materials

²¹ “Advice on what to do when a dog or cat dies suddenly,” posted May 27, 2011 on the “Mom2MomDFW” blog, part of the Fort Worth Star-Telegram network. <http://www.star-telegram.com/living/family/moms/article3827833.html>

for use in pavement repairs. Glass from C&D activities may be recycled but markets are quite demanding. Markets for color-separated glass for use in terrazzo-like flooring and counter tops are emerging.

The City of Fort Worth does not own or operate a C&D MRF and there are no C&D MRFs in the area immediately in and around Fort Worth. However, numerous processors of materials that might be recovered from C&D activities are located in the area. These include scrap metal dealers, concrete crushers, shingle re-processors, asphalt re-processors, among others. These facilities are entirely market driven. It is difficult to determine the market capacity of these private operations.

Current Goals and Standards

Cities across Texas, including Austin, Dallas, Denton, El Paso, Flower Mound, Houston, McKinney and Plano have adopted some form of sustainable building/development standard, which incentivizes construction and demolition industries to avoid landfilling C&D waste. Often, these standards encourage waste reduction, reuse, and recycling of all wastes associated with the built environment. Examples include Leadership in Energy and Environmental Design (LEED) certification through the US Green Building Council, Envision certification of public works projects through the Institute for Sustainable Infrastructure, or custom-designed programs developed to meet specific local objectives. These programs not only reduce landfilling of C&D wastes, but they also indirectly support the development infrastructure such as independent processors of this waste stream.

Program Evaluation

The City of Fort Worth has no program designed specifically to require diversion of C&D wastes from landfills, thus supporting markets for new C&D waste processors. The City's Sustainability Plan finalized in 2010 does recommend promoting LEED certification of new buildings. However, there is no mandated certification addressing waste reduction or landfill diversion of C&D waste in place at this time. Such activities are voluntary for private and public development in the City.

3.6 E-Waste/Specialty/Hard-to-Handle Waste

Program Description

Specialty and hard-to-handle waste falls into several categories:

1. Electronic Waste (E-Waste)
2. Medical Waste (not Pharmaceutical)
3. Fireworks and Ammunition

E-Waste

To dispose of E-Waste, citizens are encouraged to:

- Visit the TCEQ website for recycling options offered by computer and television manufacturers. All computer and television manufacturers are required to offer recycling options for the equipment they produce.
- Conduct an Internet search for companies that are accepting and in some cases offering rebates for electronic items such as MP3 players, wireless phones, electronic camcorders etc. Some stores — such as Costco and RadioShack — sometimes offer trade-in programs for computers, monitors, digital cameras, camcorders, game systems and other gadgets. The City lists several websites that offer information on how to dispose of specialty E-Waste items, including the Texas Recycles

Computers Program (www.texasrecyclescomputers.com) and the Texas Recycles TVs Program (www.texasrecyclestvs.com).

- Take unwanted electronics to one of the City of Fort Worth’s drop-off stations for recycling.

The drop-off stations will accept computer equipment, many other electronic items and up to two televisions per Fort Worth household every six months. These items will then be recycled with an appropriate vendor.

Medical Waste

To dispose of medical waste, citizens are encouraged to:

- Sharps (needles, syringes, lancets)
 - Before throwing away sharps in a garbage receptacle, place them in a sharps disposal container or hard plastic/metal with a tightly-secured lid (detergent bottles with screw-on lids or a coffee can). When possible, break off syringe needles to prevent reuse.
- General Medical Waste
 - Place IV bags, plastic tubing and similar medical equipment in plastic garbage bags and throw them away in garbage receptacle. These items are not recyclable, whether they have been used or not.

Fireworks and Ammunition

Fireworks are illegal in the City of Fort Worth. By ordinance (Section 3301.1.3) the possession, manufacture, storage, sale, handling and use of fireworks are prohibited. Wildfires, structure fires and personal injury are common results of illegal fireworks use. City of Fort Worth residents) are directed to follow these recommendations:

- Contact the Fire Department at 817-392-6850 or FWFire@fortworthtexas.gov to schedule a drop off or arrange a pick-up of unwanted ammunition, ammunition loading supplies, and other explosives.
- Do not put fireworks or ammunition in garbage or recycling bins.
- Do not take fireworks or ammunition to the Environmental Collection Center or a Fort Worth Solid Waste Drop-off Station for disposal.

Current Goals and Standards

The FY14-15 budget document states no objective for e-waste, medical waste, or fireworks and ammunition management. The current 1995-2015 Plan also does not contain goals or standards for the management of these materials.

The North Central Texas Council of Governments (NCTCOG) noted in its SEE Less Trash Plan that emphasis in the region during the 1995-2011 period had been to increase the development of permanent collection facilities along with the use of mobile collection units in the more populated areas of the region. The City of Fort Worth followed this trend, and has developed both the permanent Environmental Collection Center (ECC) and the mobile collection units.

Program Evaluation

As greater quantities of special wastes are being diverted from landfills and water system, the special waste diversion program meets a baseline measure of success. However, as the City has no specifically established goals for expanding these programs, there is no current official benchmark against which to

compare, other than the constant expansion of the program and additional tons of materials diverted (and number of events held) every year. Now that these programs are established, and agreements are in place to extend access to special waste disposal and recycling services to residents in other communities in Tarrant County, a goal should be established for expansion of the program, whether by expansion of education (number of households reached per year with pertinent information) or tons diverted (by model or measure).

3.7 HHW and pharmaceuticals

Program Description

The City of Fort Worth, with TCEQ grant and City funding, has a permanent household hazardous waste (HHW) collection facility on three acres east of downtown near the intersection of I-30 and East Loop 820. It is open Thursdays and Fridays from 11 a.m.-7 p.m. and Saturdays: 9 a.m.-3 p.m. The phone number is 817-392-1234, and it is closed January 1, July 4, Thanksgiving Day and the day after, and December 25. This facility, known as the Environmental Collection Center (ECC), collects HHW from residents throughout Tarrant County and beyond through contracts with over 50 local jurisdictions. The facility also offers products for reuse, through a “give-and-take” area called the “Help Yourself Shelf.” Fort Worth also works with two other groups of cities in Tarrant County to implement three HHW Mobile Collection Units (MCUs) that can be loaned out to participating cities throughout the year to be used as one-day drop-off centers throughout the ECC service area.

The ECC is for residential waste disposal and recycling only. Commercial, business or industrial waste cannot be accepted under Texas regulations. Residents of apartments and condos are also not allowed. The interlocal agreements allow participating communities to use the ECC, schedule events where a MCU is present, and have HHW collected at mobile collection events disposed of under the City’s contract for disposal. In order to participate in the City’s program, communities’ signatory to the interlocal agreement must commit to also providing certain resources and funds toward collection of HHW and other waste materials during collection events.

Residents of the following municipal entities can access the ECC: 23 can do so without purchasing disposal vouchers, and residents of the other 29 (*denoted in the list below) are required to first purchase vouchers from their municipalities. Proof of residence (current water bill or valid driver’s license) or presentation of a voucher is required to use the ECC.

Arlington	Glenn Heights*	Mansfield
Azle	Godley	Midlothian*
Bedford*	Grand Prairie	North Richland Hills*
Benbrook	Grapevine	Oak Leaf*
Burleson	Haltom City	Pantego*
Cedar Hill	Haslet*	Parker County*
Cleburne	Hood County*	Richland Hills
Colleyville	Hurst	River Oaks Roanoke*
Crowley*	Johnson County*	Saginaw
Dalworthington Gardens*	Joshua*	Sherman
Decatur*	Keller	Southlake
Eules	Kennedale*	Stephenville*
Forest Hill*	Lake Worth*	Tarrant Regional Water District (TRWD)
Fort Worth	Lakeside*	



Task 3 – Evaluation of Current Programs — Interim Report

Trophy Club
Unincorporated Tarrant
County*
Upper Trinity Regional Water
District*
Watauga*
Waxahachie*
Weatherford*
Westlake*
Westover Hills*
Westworth Village*
White Settlement*

Of these citizens with access, approximately 6 to 7 percent of residents are presently using the Environmental Collection Center.

When residents come to the facility, they are instructed to bring products in original, clearly labeled containers, not in garbage bags. If any materials are leaking, residents need to place them in a second container of a like material (glass for corrosives, metal for flammables). All residents are instructed to place materials in the trunk of their car or bed of a truck, and to remain in the vehicle while the staff at the facility unloads material. There is an area of the facility that is accessible to residents, and it houses the Help-Yourself Shelf (See Figure 3-3), where chemicals, cleaners, and paint in like new condition are offered free of charge.



Figure 3-3 Images of HHW Services –Help Yourself Shelf

In an effort to publicize the availability of this collection facility, the City uses characters called “Captain Crud and the Cruddies” as part of a public awareness campaign highlighting the collection capabilities at the permanent center and with the mobile collection units, known as Crud Cruisers (see Figure 3-4).



Figure 3-4 Images of HHW Services –The Crud Cruiser

Participating cities can schedule one mobile collection event to be operated by Fort Worth personnel each year, or can conduct their own events using their own MCUs. The City has a Reserve MCU, which is a specially designed and equipped thirty-six (36) foot gooseneck box-trailer and one (1) ton pickup owned by Fort Worth. Any participating city may request the loan of Fort Worth's Reserve MCU free of charge for use in a HHW collection event. Fort Worth's MCUs are designed to hold the HHW of approximately 50 to 75 households. HHW from all mobile collection events is brought to the ECC, and is managed by the City of Fort Worth under contracts for disposal and recycling of HHW.

The ECC and mobile events allow residents to dispose or recycle many items, as shown in Figure 3-5.

Items Accepted	Items Not Accepted
<ul style="list-style-type: none"> •Automotive fluids •Batteries •Cleaners & chemicals •Cooking oil •Lawn/garden/pool chemicals •Light bulbs •Paint & painting Supplies 	<ul style="list-style-type: none"> •Ammunition & Explosives •Appliances & electronics •Building materials •Bulk trash & yard waste •Butane/propane cylinders •Medicines & Medical waste •Tires •Asbestos/PCBs/radioactive

Figure 3-5 Items Accepted and Not Accepted at the Environmental Collection Center

The City also suggests several options other than flushing (which is not recommended) for the disposal of expired, unused and unwanted over-the-counter and prescription (controlled and non-controlled) pharmaceuticals, as shown in Figure 3-6. These options are in order of preference.

Periodic Take-Back Events	Citizens can drop off unused and expired prescription drugs and over-the-counter medications at one of the take-back events sponsored by the Department of Justice.	Locations vary
Pharmacy Drug Take Back Programs	Certain pharmacies offer a mail-in system through which residents can safely dispose of unwanted medications.	Locations vary University of North Texas offers a drop-off
Trash	Only if citizens are unable to participate in any of the above mentioned programs, they may follow these steps to dispose of medication in the household trash.	Mix medicines (do not crush tablets or open capsules) with an unpalatable substance such as coffee grounds, cat litter or cottage cheese. Place the mixture in a sealed container or plastic bag. Throw the container in the appropriate trash bin.

Figure 3-6 Recommended Actions for Fort Worth Regarding Pharmaceuticals

Current Goals and Standards

Fort Worth’s current 1995-2015 Plan noted that the City’s state approved Storm Water Pollution Prevention Plan called for the construction and operation of a permanent collection center. The 1995-2015 Plan also established the goal that residents of apartments should have the same access to household hazardous waste collection centers that are available to residents of single family household. The Plan noted that apartment owners should encourage residents to use available facilities for HHW, as opposed to using disposal containers provided at the complexes.

The City is not required by its current 1995-2015 Plan to achieve a specific rate of resident participation.

Program Evaluation

The City has fulfilled the goal of creating a permanent collection center with the development of the ECC. However, the City has only partially fulfilled the goal of providing equal access for apartment residents because while they can utilize the mobile collection events, they are not allowed to use the ECC because it is paid for out of the residential collection fees, which they do not pay.

30 TAC §332.61 (c) states "any person who intends to conduct a collection event or intends to operate a permanent collection center shall comply with the requirements of Chapter 335, Subchapter N relating to Household Materials Which Could Be Classified as Hazardous Waste." 30 TAC §335.62(a) addresses the need of the applicant to demonstrate reasonable access to HHW collection using either of two options. In Option 1, the applicant demonstrates access to the collection of HHW based upon population. Figure 3-7 shows a breakdown of services required based on population.

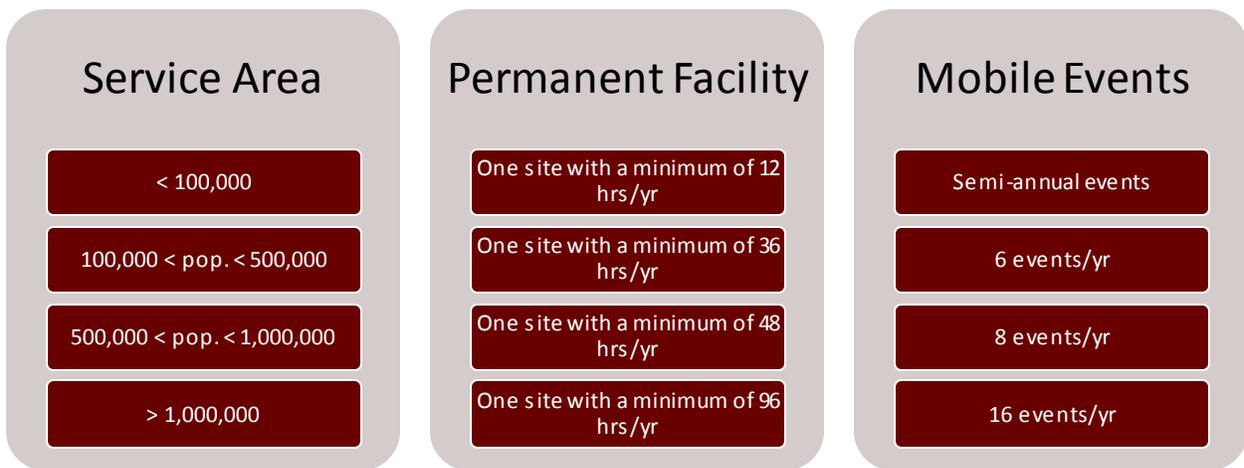


Figure 3-7 HHW Collection Requirements based on Service Area Population²²

Permanent Facility access hours must be outside of regular business hours. "Business Hours" means 8:00 a.m. to 5:00 p.m., Monday through Friday. Mobile collection events must be held with a minimum six-hour continuous period of access outside of regular business hours.

The City’s population puts it into the 500,000 – 1,000,000 category, though with the 17 participating communities, the population of the region exceeds 1,000,000. The ECC is open for over 1,100 hours per year (over 500 of which are outside of Business Hours), and holds over 60 mobile collection events per year, so exceeds the 30 TAC requirements for service. However, the mobile collection events are two-hours long, short of the 30 TAC six-hour requirement.

²² 30 TAC §332.62(a)(1)

4 Solid Waste Management Facilities

4.1 Alternative Energy & Emission Standards

Program Description

The efficient use of energy is key to keeping solid waste management costs reasonable, as well as meeting the City’s sustainable goals for energy conservation. The collection, processing and disposal of MSW requires fuel to power collection vehicles and landfill compactors and to power processing equipment. In addition to using energy efficiently, there are opportunities in solid waste management to both utilize alternative energy resources and to use waste to generate energy in a variety of forms. Some of these options include using compressed natural gas (“CNG”) in collection fleets, capturing gas generated from landfills to produce electricity or pipeline quality natural gas, or combust or gasify MSW to generate electricity or steam.

The operation of the solid waste equipment also generates air emissions. The control of these emissions is especially important in the Fort Worth region, as the City is currently in a non-attainment area for ozone air pollution. Specifically, Tarrant County is in moderate non-attainment for the 8 hour, 0.075 ppm standard. Ground-level ozone is not emitted directly into the air, but is created by chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, chemical solvents are some of the major sources of NOx and VOCs.

In addition to operating equipment, landfills generate emissions of methane gas as waste decomposes. The SELF is designed to capture these emissions. There is the potential to utilize this gas for energy generation, either as a replacement for natural gas or to be used for electric generation.

Collection

The City controls residential solid waste collection through contracts with Waste Management Inc. Currently, the City provides weekly collection of garbage, recyclables, yard waste and brush as well as monthly collection of large brush and bulk waste. The City also has an illegal dumping collection program. The City owns and operates the vehicles for the illegal dumping program. Republic Services Inc. (“Republic”) is responsible for the transport of both recyclables and waste from the City’s three drop-off stations. A fourth drop-off station is anticipated to be in operation in late 2016. Republic also provides collection of recyclables and garbage from City facilities at large.

On any given day, the City and its contractors will operate over 100 vehicles to collect waste, recyclables, yard waste and brush, bulk waste, illegal dumping collections and transport of materials from drop-off centers. These vehicles consume diesel fuel or compressed natural gas and generate emissions. Table 4-1 lists the number of routes for each service provided.

Table 4-1 Fort Worth Collection Program

Service	Households	Routes/Day
Garbage	207,691	38
Recyclables	207,691	30
Yard Waste	207,691	17
Bulk Waste	207,691	14
Total	207,691	99

Landfill Operations

The operation of the City’s Southeast Landfill (SELF) is managed through a contract with Republic. Republic has the responsibility to maintain equipment necessary to manage waste and address all of the operational requirements as defined in the landfill’s permit. Each of the pieces of equipment list below are operating at the SELF consume fuel and generate emissions.

- Two articulated dump trucks
- One excavators
- One motor grader
- Four garbage compactors
- Six track Dozers

The SELF has a gas collection system that collects the gas through a series of pipes that direct the gas to a flare and the gas is burned. Burning the landfill gas significantly reduces the amount of methane released to the atmosphere.

Another air emission associated with landfill operations is dust in the form of particulate matter. This is caused from heavy equipment operations. The landfill permit does include a dust control plan to reduce dust emissions. This is accomplished by paving high traffic roadways and using water on certain surfaces to reduce dust generation and other measures.

Current Goals and Standards

The City’s 2015 Comprehensive Plan promotes the use of renewable energy resources (page 187) and emission reductions (page 175 and throughout Chapter 18, “Environmental Quality”). A driving force in the need to reduce emissions is the fact that the Dallas/Fort Worth (DFW) region is currently in a non-attainment area for ozone as described above.

The City, in its Sustainability Plan is committed to reducing the generation of greenhouse gases.

In the latest request for proposals issued by the Solid Waste Services Division stated goals of increasing resource recovery and extending the life of the landfill. The approved technology must be demonstrated to be cost-effective.

Program Evaluation

Alternative Energy

CNG

CNG as a transportation fuel is considered an alternative energy technology. Natural gas has traditionally been used for residential heating and commercial/industrial uses, however, it has increasingly been used to fuel vehicles, especially in fleet situations. Natural gas can be either compressed or liquefied to be used as a transportation fuel.



In an amendment to its 2013 contract with WMI, the City required WMI to convert its collection fleet, and those of its subcontractors to CNG. This conversion is to be completed by June 9, 2017. It should be noted

that the City’s contract includes an escalation clause that takes into account both labor and diesel fuel price increases or decreases.

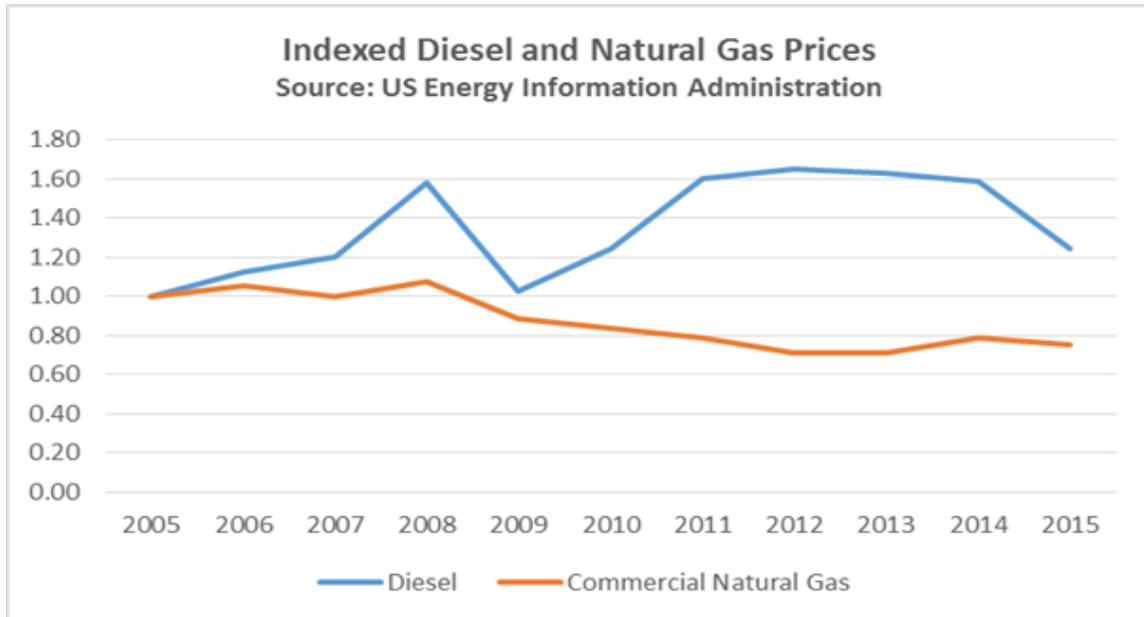


Figure 4-1 Diesel and Natural Gas Pricing

The conversion to CNG from diesel fuel has been occurring across the country as a means to reduce energy costs and vehicle emissions. There are capital costs involved in this transition and CNG vehicles cost more than conventional diesel collection vehicles, however energy savings are proving to generate pay-backs in 3 to 8 years. Figure 4-1 illustrates that natural gas prices have steadily declined since 2005. While oil prices have fallen significantly in the past two years, energy cost savings can still be realized. In addition, the fact that the Tarrant County area is in non-attainment for ozone, the use of CNG vehicles is important to reduce emissions.

In a US Department of Energy Report – Case Study – Compressed Natural Gas Refuse Fleet (February 2014), the report concluded the following.

The fleets in this study chose CNG to save money on fuel (around 50 percent, on average), and to satisfy corporate or municipal environmental initiatives.

- Fleets in this study saved approximately \$0.90 per mile in fuel costs by using CNG.
- The incremental cost of the CNG vehicles and fueling infrastructure can be recouped in 3–8 years.
- Driver feedback has been very positive: drivers appreciate the quieter operation of the trucks and noted the good acceleration performance.
- CNG trucks in this case study traveled around 14,500 miles per year on average and achieved fuel economy of 2.1 miles per diesel gallon equivalent.

Waste-to-Energy and Emerging Technologies

Technologies to convert waste-to-energy include the following:

- Converting landfill gas to energy by either converting the low-Btu gas to a high Btu gas
- Converting landfill gas to electricity by using it to power a generator

- Combusting MSW in a mass-burn incinerator with energy recovery
- Converting waste to refuse-derived fuel that can be used in a similar manner as coal
- Converting waste to gases or liquids through higher tech processes like gasification or pyrolysis

According to a recent Energy Information Agency Report there are 87 operating waste-to-energy facilities operating in the US, with a total generating capacity of 2500 megawatts. The majority of these facilities utilize either mass-burn or refuse derived fuel technologies. In general, these technologies are significantly capital intensive and have high operating costs. Total capital and operating costs for resource recovery facilities for energy recovery require a tipping fee ranging between \$75 and \$100 per ton (including energy revenues), versus landfills located in the NCTCOG region where tipping fees range between approximately \$17 to \$40 per ton (Fort Worth's contracted tipping fee is \$17.37 per ton in CY15). None of the technologies to convert waste-to-energy listed above are being utilized at this time by the City.

More advanced alternative energy technologies involve the generation of either steam, electricity or combustion gases include: gasification, and pyrolysis. These technology could generate more efficiently and generate fewer emissions. However, they are relatively untested technologies on a large-scale basis. Because of the high cost of construction, selection of these options should be done carefully and with a careful risk analysis as part of the overall process.

The EPA's Landfill and LFG Energy Project database, which tracks the development of U.S. LFG energy projects and landfills with project development potential, indicates that 636 LFG energy projects are currently operating in 48 states and 1 U.S. territory. Roughly three-quarters of these projects generate electricity, while one-quarter are direct-use projects where the LFG is used for its thermal capacity.

Bioreactor design or enhanced leachate recirculation (ELR) are landfill management approaches that are designed to accelerate the gas generation rate, thereby improving the economics of the operation. These processes are unlike traditional landfills, which operate in a manner to keep as much liquids out of the filled area. Bioreactors and ELR operations are designed to introduce liquids into the fill area as a means of accelerating decomposition of the waste, thereby accelerating the generation of landfill gas. This approach has the additional benefit of increasing the capacity of the landfill. Pilot demonstrations of this approach are taking place locally in Dallas and Denton, Texas.

However, the City is negotiating with Republic to develop a joint system to utilize landfill gas. The proposed system would convert the low-Btu gas to a high-Btu gas that meets commercial pipeline standards.

Solar Energy

The Old Hemphill Drop Off station is 100% powered by photovoltaic panel array on site. The soon to be built Drop Off station number 4 will also be solar powered.

The City's collection contract with WMI also stipulated that WMI agreed to provide the City with a total of 125 solar powered garbage compactors. These were to be delivered at a rate of 25 compactors per year beginning on April 1, 2013. The City has the responsibility to maintain, repair or replace compactors once they are delivered to the City.

Emissions

Collection

As mentioned, the City, through its contract with WMI is converting the collection fleet from diesel fuel to CNG. The conversion of the collection fleet is anticipated to reduce greenhouse gases emissions from the collection trucks between 21-26 percent.²³

Landfill

The City's SELF is in compliance with air emissions regulations. These regulations include the following.

- Standard air permit for MSW Landfill Facilities and Transfer Stations
- Landfill Gas Management Plan of the SELF Permit
- Dust Control Management per the Site Operating Plan of the SELF Permit

4.2 Disposal Capacity

Program Description

Providing for adequate waste disposal that is operationally safe, environmentally sound, and cost-efficient is a core function of an integrated solid waste management system and of the CSWMP.

Residential and commercial waste that cannot be recycled through either a MRF or a mulching/composting operation is disposed of at SELF. Commercial waste that is generated by the private sector is hauled to one of several regional landfills including SELF. SELF is owned by the City and operated by Republic Services, Inc., under a contract that expires December 31, 2033. The SELF permit was amended in 2010 to add additional capacity. The Landfill is located at 6288 Salt Road, Fort Worth. Figure 4-2 shows a recent aerial view of the site.

²³ *Clean Cities Niche Market Overview: Refuse Haulers*, U.S. Department of Energy, September 2011



Figure 4-2 Aerial View of SELF, January 2016

SELF is permitted to the City by the TCEQ. The permit requires that the City directly, or through its contractor, construct, operate, close and maintain post-closure care in accordance with both state and Federal MSW guidelines. Although some of the areas of the landfill’s footprint are pre-RCRA Subtitle D, all new disposal cells of SELF are constructed with a composite liner that is designed to reduce the potential of groundwater contamination. SELF also has an overliner system for the vertical expansion areas that will lay on top of pre-Subtitle D disposal areas. A leachate collection system is incorporated into the design as a means of capturing water that filters through the waste. The landfill design also includes a gas collection system; however, the City is not yet collecting gas for commercial energy use. The City is in discussions with Republic to determine the feasibility of a landfill gas to energy project. Operations at the Landfill are designed to reduce potential nuisances, to protect the quality of water resources and to provide for safe operations. The permit defines the requirements for closing the Landfill once it has reached capacity, as well as post-closure care requirements for 30 years following closure.

Included in the agreement with Republic is a requirement for Republic to provide brush-mulching services. Source-separated brush material is delivered to the site by the curbside collection and drop off stations transportations trucks and processed into mulch. The contract expires December 31, 2018, with one 5-year extension option. In FY14-15, the City reports that 26,889.46 tons of brush were mulched at the SELF. That same year, SELF reported to TCEQ that 33,132.86 tons of “yard waste or brush” were diverted by the facility.

Figure 4-3 shows all the types of material that were accepted at the landfill in 2015, and that total intake was 637,034 tons. This is almost 21 times more than the previous year’s figure of 5,519 tons.

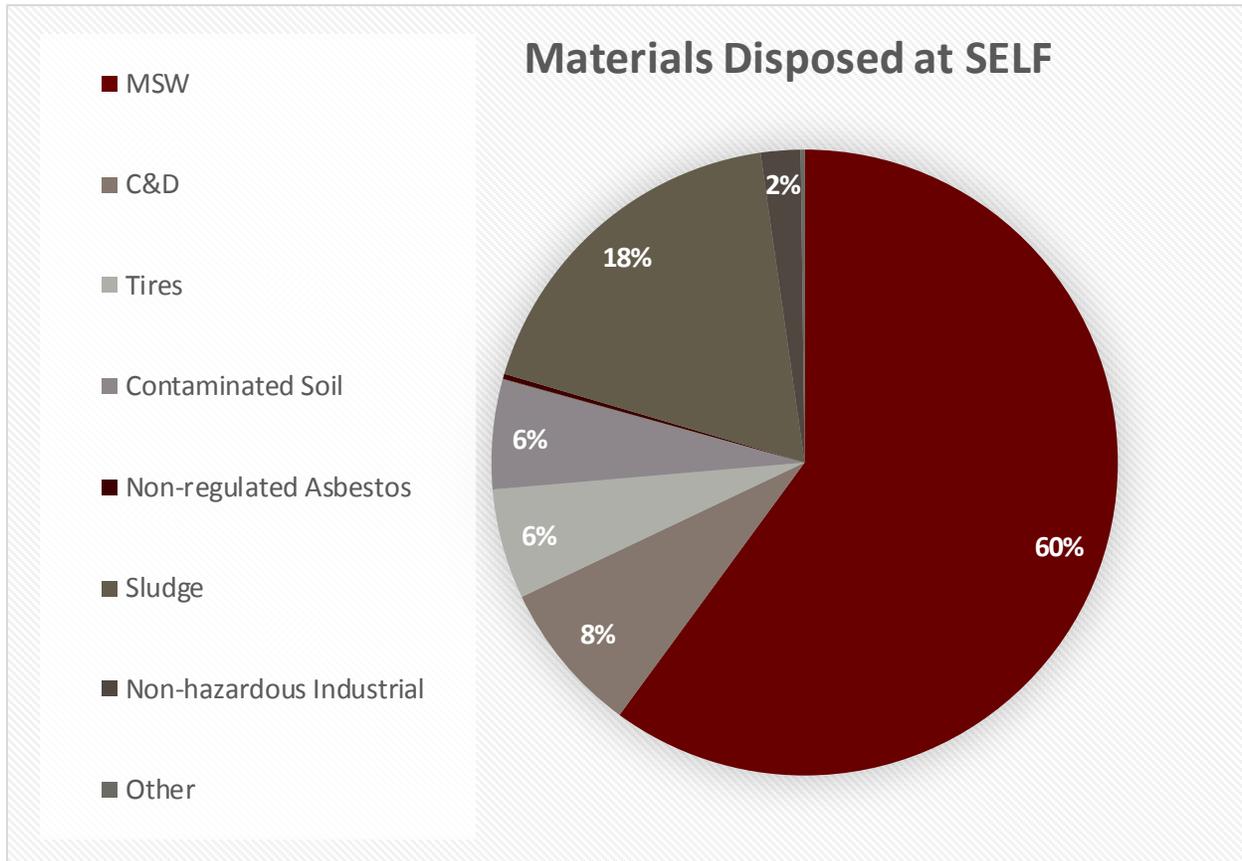


Figure 4-3 2015 Southeast Landfill Disposal, by material
 Source: *Municipal Solid Waste in Texas: A Year in Review – FY 2015 Data Summary and Analysis*

The contract that the City has with Republic also provides for a minimum annual rental payment from Republic to the City. In FY13-14, this payment was \$3,174,967; in FY14-15, it was \$3,087,474.²⁴ This could increase depending on the quantities of waste accepted at the Landfill. There are no limitations on the amount of waste Republic is allowed to dispose at the landfill, as long as they maintain efficient service to the City. **Error! Reference source not found.** Construction and demolition (C&D) waste generated in Fort Worth is disposed at either one of the several Type I landfills (MSW landfills), or the Type IV C&D landfills. There is one permitted Type IV Landfill in the area and it is owned and operated by Progressive Waste. This C&D landfill is located on Dick Price Road. It currently accepts approximately 359,000 tons per year and has 10 years of remaining permitted capacity.

Table 4-2 summarizes the active landfills that are located within the region. Figure 4-4 shows the facilities on a map.

²⁴ FY13-14 figure is unaudited actual, FY14-15 figure is Budgeted

Table 4-2 Active Landfills in North Central Texas Region, 2014 – Source: TCEQ

Landfill	Owner	Operator	Location	Disposal Tons	Remaining Capacity (years)	Remaining capacity (tons)	County	Permt #
City of Fort Worth	City of Fort Worth	Republic	Fort Worth	637,034	30	18,892,730	Tarrant	218C
City of Arlington	City of Arlington	Republic	Arlington	971,614	46	44,606,653	Tarrant	358B
IESI Fort Worth C & D Landfill*	IESI	IESI	Fort Worth	380,511	6	2,235,258	Tarrant	1983C
Charles M Hinton Jr. Regoinal Landfill	City of Garland	City of Garland	Rowlett	448,734	47	19,764,560	Dallas	1895A
City of Dallas Mccommas Bluff Landfill	City of Dallas	City of Dallas	Dallas	1,707,182	44	74,201,362	Dallas	62
City of Grand Prairie Landfill	City of Grand Prairie	City of Grand Prairie	Grand Prairie	180,988	40	7,221,802	Dallas	996C
Waste Management Skyline Landfill	WMI of Texas	WMI of Texas	Ferris	1,161,354	30	20,894,285	Dallas	42D
Hunter Ferrell Landfill	City of Irving	City of Irving	Irving	162,236	65	10,475,464	Dallas	1394B
IESI Weatherford Landfill	IESI	IESI	Weatherford	192,385	5	1,046,562	Parker	47A
City of Stephenville Landfill	City of Stephenville	City of Stephenville	Stephenville	16,368	65	489,636	Stephenville	664
DFW Recycling and Disposal Facility	WMI of Texas	WMI of Texas	Lewisville	1,371,253	7	9,071,166	Denton	1025B
Camelot Landfill	City of Farmers Branch		Lewisville	256,710	16	4,374,172	Denton	1312B
City of Denton Landfill	City of Denton	City of Denton	Denton	231,990	22	5,177,349	Denton	1590A
Lewisville Landfill	Lewisville Landfill Tx LP	Lewisville Landfill Tx LP	Lewisville	216,331	78	16,953,657	Denton	1749B
Ellis County Landfill	Pine Hill Farms Landfill TX LP	Pine Hill Farms Landfill TX LP	Ennis	68,709	344	23,638,346	Ellis	1745B
CSC Disposal and Landfill	Republic Waste Services of Tx LTD	Republic Waste Services of Tx LTD	Avalon	365	365	15,838,139	Ellis	1209C
Itasca Landfill	Itasca Landfill Tx LP	Itasca Landfill Tx LP	Itasca	225,385	136	37,742,119	Hill	241D
IESI Turkey Creek Landfill	IESI	IESI	Alvarado	517,391	13	7,098,931	Johnson	1417B
121 Regional Disposal Facility	North Texas Municipal Water District	North Texas Municipal Water District	Melissa	876,665	81	70,709,670	Collin	2,294
Republic Maloy Landfill	Republic Waste Services of Tx LTD	Republic Waste Services of Tx LTD	Campbell	109,490	32	3,484,028	Hunt	1195A

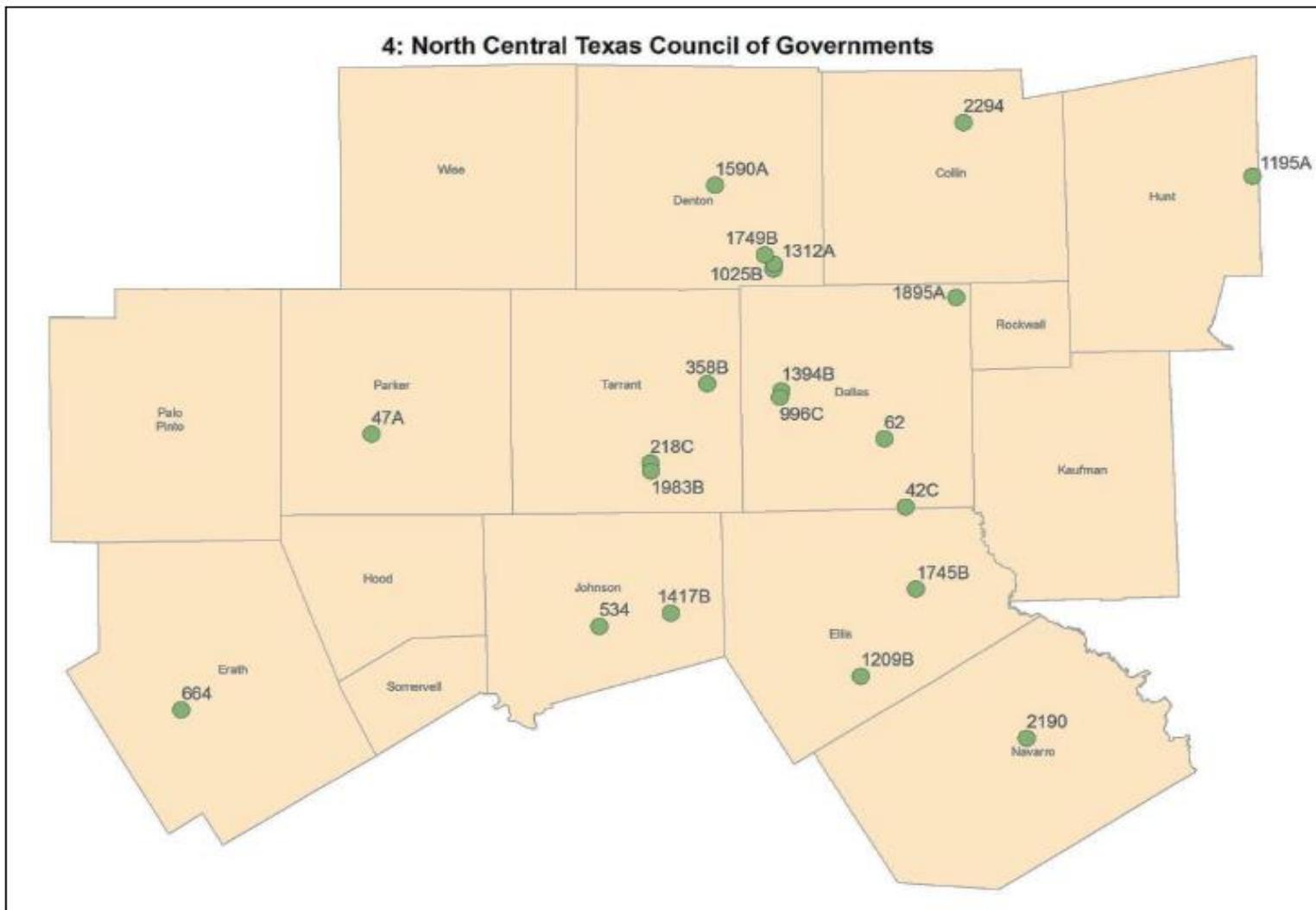


Figure 4-4 Map of Active Landfills in North Central Texas Region, 2014 – Source: TCEQ

Current Goals and Standards

The major criteria for the City’s disposal program are fourfold:

- 1) Is the City’s landfill operating in an environmentally acceptable manner?
- 2) Does the City have sufficient disposal capacity to meet long-term waste management needs?
- 3) Is the landfill operating efficiently?
- 4) Is the cost of disposal reasonable?

The landfill must comply with TCEQ regulatory requirements, as well as compliance with federal regulations. The permit that the City has for the landfill affects the design, construction, operation, closure and 30-year post-closure of the landfill. In addition to its ownership of the landfill and its desire to have it operated in an environmentally acceptable manner by a contractor, the City has both a disposal capacity and financial interest in the landfill. Republic’s operating contract provides requirements that encourage Republic to operate the landfill in an efficient manner.

Program Evaluation

Providing for adequate waste disposal that is operationally safe, environmentally sound, and cost-efficient

At the start of the planning process, the 2014 Annual MSW Report to TCEQ regarding SELF estimated the facility had 43 years remaining capacity.²⁵ Due to increases in waste volumes, this capacity is now estimated to be significantly less. The 2015 report estimated the remaining capacity to be 30 years.²⁶ In the latest report to TCEQ, the City reported 30 years remaining capacity.

The City conducts aerial surveys to validate and cross-check the estimates made using the TCEQ reporting data. Based on the 2016 annual aerial survey, which reports on usage in 2015, 1.1 million cubic yards of airspace was consumed since the previous survey. This is about 25 percent more capacity consumption than in the prior year, and more than double the capacity consumption occurring in 2011. The 2016 survey reported 24 million cubic yards of remaining airspace. All things being equal, and barring major changes to waste generation, rate of disposal, or facility capacity, the landfill has approximately 22 years remaining capacity.

Table 4-3 Waste Disposed, Airspace Used, and Remaining Capacity for Southeast Landfill
 Source: City of Fort Worth Aerial Survey conducted on January 28, 2016, by Weaver Boos Consultants, LLC

Year	Annual Tons Accepted	Annual Airspace Used (cubic yards)	Total Remaining Airspace (cubic yards)	Estimated Years of Remaining Capacity
2011	557,474	540,000	27,475,700	50.88
2012	643,519	731,000	26,935,700	36.85
2013	642,640	785,500	26,204,700	33.36
2014	722,555	880,200	25,419,200	28.88
2015	920,981	1,103,900	24,539,000	22.23

²⁵

<http://www15.tceq.texas.gov/crpub//index.cfm?fuseaction=iwr.findrpt&CFID=1305495&CFTOKEN=ff79df5dc62fc73f-8BABFB70-CF08-9ECD-FD13351FA16A25B0>, retrieved July 1, 2016.

²⁶

<http://www15.tceq.texas.gov/crpub//index.cfm?fuseaction=iwr.findrpt&CFID=1305502&CFTOKEN=38a433e77b88ee1e-8BC5612D-A14C-0585-C873B1B7CAB896EB>, retrieved July 1, 2016.

Waste volumes accepted at the Southeast Landfill (SELF) have increased substantially in the last five years. **If waste volumes remain at current rates, the facility would reach capacity in 2036.** This provides a twenty year planning horizon to make decisions regarding future waste disposal options. With anticipated continued growth in the region, it is reasonable to assume that waste volumes accepted at SELF may continue to increase. In addition, the possible closure of the IESI C&D landfill could impact the life of SELF, since a significant portion of the waste currently disposed there is expected to go to SELF (see Regional Business Actions, below). For information on projected closure dates for SELF, assuming different parameters and scenarios, see Table 4-6, below, in the Scenarios and Landfill Life Projections subsection.

Factors Affecting Available Capacity

A critical question that must be answered in order to fulfill the mandate of the CSWMP remains: when will additional capacity be required for the City’s waste stream?

Waste Volumes Accepted and Population and Economic Increases

Based on data provided by the City, waste volumes have increased significantly since 2010. Figure 4-5 illustrates waste volumes for City Waste and non-City Waste. City waste increased at an average annual rate of 10% and non-City Waste increased at an annual average rate of 15%. The total waste volumes increased at an annual average rate of 13 percent. From 2010, the amount of Non-City Waste has increased from 62% of the total landfilled to 71% of the quantities landfilled.



Figure 4-5 Historical Waste Tonnages at SELF, City and Non-City Waste, 2010-2015

Source: City of Fort Worth

In the 2016 Aerial Survey, Weaver Boos reported that a total of 1-Million cubic yards of airspace was consumed during the year. The report indicated that Republic achieved a compaction rate of 1,647 pounds

per cubic yard. For the purposes of this analysis, airspace utilization will be used in forecasting future landfill utilization.

Market Practices by Republic and Private Haulers

The City allows private haulers, regardless of the location of waste generation to utilize SELF. The City receives royalties for waste accepted at the facility, and the greater amount of waste accepted, the greater the amount of royalties paid to the City. Hauler decisions on where to deliver waste are based on the distance that has to be traveled to a landfill, the tipping fees charged at the landfill, and company affiliation with the landfill utilized. There are a number of public and private landfills located throughout the North Central Texas region, as shown in Figure 4-4 on page 35.

Tipping Fees

TCEQ has data on tipping fees charged at facilities. It should be noted that these data do not take into account all contract rates a landfill owner may charge to preferred customers. Fort Worth is reporting tipping fees at the lower end of the average charged in the region. The reported SELF rate was \$20.88 per ton versus the average North Central Texas Regional Council of Governments area rate of \$30 per ton. Actual rates will vary considerably depending on the relationship between the landfill and the hauling company, long-term versus short-term contracts and other factors. Table 4-4, below, highlights the published tipping fees for 2015 for the selected regional landfills to which Fort Worth waste would most likely be delivered, if not to SELF.

Table 4-4 Published Tipping Fees for Select Landfills (2015)
Source: TCEQ

Landfill	Rate
Fort Worth Landfill (City owned / Republic Operations)	\$20.88
Arlington Landfill (City owned / Republic Operations)	\$26.00
IESI's Progressive C&D Landfill (IESI owned and operated)	\$23.12
Camelot Landfill (Farmers Branch owned / Republic Operations)	\$30.63
DFW Waste Management Landfill (WM owned and operated)	\$23.50
City of Dallas (City owned and operated)	\$21.50

**Based on reports to TCEQ, actual rates will vary depending on user and landfill contracts*

These relatively low tipping fees provide an incentive for private haulers to use SELF. There is an incentive for the City to allow for high quantities of disposal in the form of royalties, but greater quantities will result in the landfill reaching capacity sooner. A possible way to decrease tonnages going to the landfill would be to increase fees. Currently, Republic has the ability to set rates within the bounds of the contract between the City and Republic.

Regional Business Actions

In addition to price and available capacity, the business decisions made and acted upon by the companies that own and/or operate landfills in the region can influence the market. Two current examples for Fort Worth are management of two close-proximity landfills managed by Republic, and a pending permit application by Progressive.

The City of Arlington Landfill, which is owned by the City and operated by Republic, has an estimated 46 years of remaining capacity, according to TCEQ data. This is the same firm that operates SELF. These two landfills, in the same region and operated by the same firm, have had very different waste activity in recent years. From 2011 to 2015, waste volumes reported at Arlington show a 6 percent increase, while

Fort Worth reported a 65 percent increase. There could be several reasons for this disparity, including contractual obligations to the City of Arlington; maximum landfill throughput capacity; or, other factors. Those possibilities notwithstanding, Republic is in a position to make business decisions which determine, in effect, which landfill is utilized for regional waste. This is relevant because it demonstrates that Republic’s business decisions regarding waste disposal facility utilization will likely continue to impact SELF.

Table 4-5 Comparison of Fort Worth & Arlington Landfill Disposal Quantities
 Source: TCEQ Reporting

Year	Fort Worth Disposal Quantities (tons)	Fort Worth Facility Years Remaining	Arlington Disposal Quantities (tons)	Arlington Facility Years Remaining
2011	557,474	54	Not available	
2012	643,519	42	811,061	13
2013	642,640	46	781,354	21
2014	722,555	43	806,545	48*
2015	920,981	30	971,614	46
% Increase (2010 to 2015)	65%		6%	

In 2015, the Progressive C&D Landfill had an estimated six years of remaining capacity. The landfill accepted a total of 380,000 tons of C&D waste in 2015. If this landfill were to exhaust its capacity, it is reasonable to assume that some or all of the waste currently going to that landfill would be directed to SELF. An additional 380,000 tons per year would increase the waste acceptance amount at SELF to over 1 million tons per year—more than double than the amount in 2011, and almost triple what was accepted in 2010.

Progressive is currently in the process of securing a permit amendment which would increase capacity of the site, as illustrated in Figure 4-6. This application was determined to be technically complete on March 1, 2016. Public comments and determination of a public hearing are pending. The permit amendment, if granted, would add approximately 6.4 million cubic yards of additional capacity and approximately 12 years of life to the facility.

SUMMARY OF CURRENT PERMIT AND PROPOSED EXPANSION – IESI FT WORTH C&D LANDFILL

Item	Units	Current Condition (Permit 1983B)	Increase due to Expansion	New Condition (Permit 1983C)
Permit Boundary Area	acres	151.73	No Change	151.73
Waste Disposal Footprint Area	acres	77.7	No Change	77.7
Buffer/Other Area	acres	74.0	No Change	74.0
Buffer/Other Area as a Percentage of Permit Boundary	percent	48.8%	No Change	48.8%
Total Waste Disposal Capacity	cubic yards	12,056,000	6,368,000	18,424,000
Remaining Capacity as of 6/11/2014 (latest aerial flyover survey)	cubic yards	3,818,000	6,368,000	10,186,000
Projected Remaining Site Life (approx.) from the date of the aerial flyover survey	years	8	12.5	20.5
Maximum Elevation of Final Cover	ft, MSL	721.5	99.0	820.5
Elevation of Deepest Excavation	ft, MSL	550.0	No Change	550.0

Figure 4-6 Summary Table of Current Permit and Proposed Expansion, from Progressive Landfill Permit Application

For the purposes of the CSWMP, analysis of future landfill disposal capacity available to the City includes consideration of the impacts of a successful or unsuccessful permit amendment application by Progressive.

Waste Reduction and Recycling

As previously described, the amount of waste that is recovered through residential recycling programs is approximately 23 percent. There are not available data on the amounts of commercial waste recycling that is currently being achieved. Aggressive reduction and recycling programs have demonstrated an ability to achieve rates of 40 percent or more, such as in Austin. To achieve these rates would require significant investments in recycling efforts. For the purposes of the CSWMP, analysis of future landfill disposal capacity needed by the City includes consideration of the following scenarios: no increase in the current recycling rate, and a 20 percentage-point increase in the current recycling rate.

Potential Disaster Events

The City’s landfill may need to be used for the disposal of large quantities of waste that would be generated from a major natural or man-made disaster. These events include tornadoes, wind storms, ice storms and flooding. Each year, the City has to respond to weather related events, and these data are captured in the historic quantities of waste. No event has yet to have a significant impact on the landfill’s disposal capacity. A large quantity of material can be processed and recycled, as in the mulching of wood debris. However, there is the potential that in the next few years the City could experience a major disaster event. The tornado events in Moore, OK, generated close to 4 million cubic yards of disaster debris. A 4 million cubic yard event would reduce existing capacity at SELF by approximately 25%.

Landfill Infrastructure Constraints

Waste increases are anticipated over the coming years due to increases in both population and economic activity. Evaluating scenarios that assume high rates of annual increases also requires a careful assessment of infrastructure that is necessary to deliver waste to the landfill, as well as available equipment and space to accept ever increasing amounts of waste. Infrastructure includes access roads to the landfill, scale facilities to weigh the waste, interior roads, and sufficient working face area to effectively manage large quantities of waste. In 2015, the landfill disposed of approximately 1 million cubic yards. This is equivalent to approximately 3,000 tons per day (assuming an in-place density of 1,650 pounds per cubic yard). Trucks of a variety of sizes use the landfill. For preliminary assessment, assume a mix of collection and transfer vehicles having an average of 8 tons per truck. This is equivalent to 360 trucks entering and leaving the facility per day (based on a six day week). Based on data from the City, Wednesday has the greatest average number of trucks per day – 423 per day. Saturday has the least number at 125 trucks. The SELF is closed on Sunday. Additional data that will need to be evaluated for a more detailed feasibility analysis include: the City’s landfill permit, throughput capacity of the SELF scales, and maximum area that could be utilized for working space.

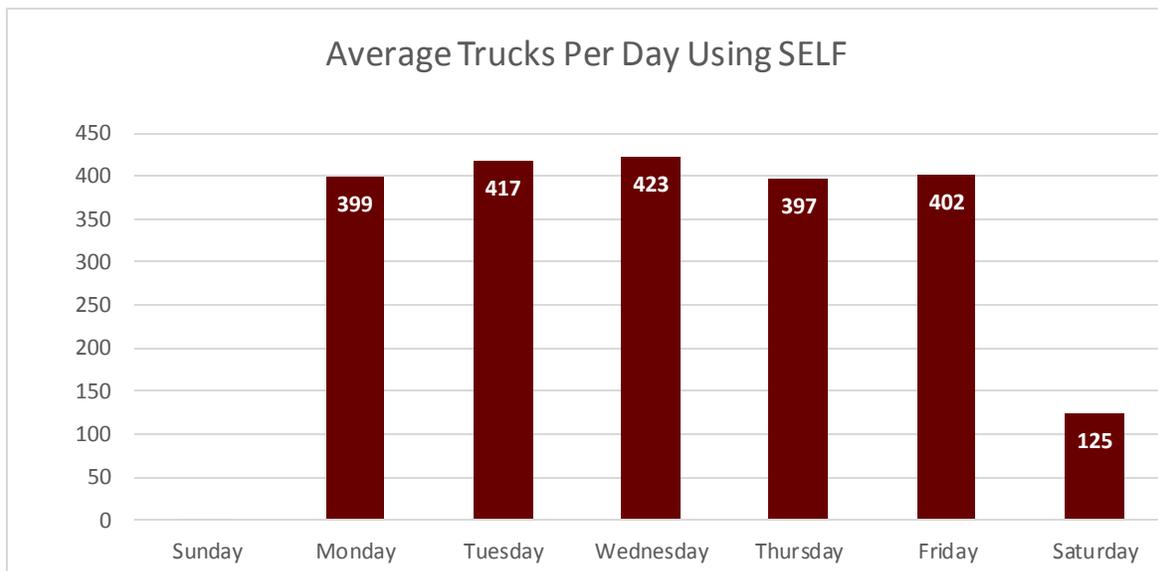


Figure 4-7 Truck Traffic at SELF, 2016
Source: City of Fort Worth

For comparison purposes regarding a landfill’s ability to accept waste quantities, the McCommas Bluff Landfill accepts 1.8 million tons per year. This is the most waste accepted by any NCTCOG regional landfill. It is equivalent to approximately 5,800 tons per day. In 2009, the City of Dallas reported that this landfill was managing a total of 1 million tons per year, delivered by a total of 500 vehicles per day, an average of approximately 11 tons per vehicle. In the most aggressive projections for SELF—the highest average annual increase in tonnages—this would be the traffic situation at SELF by 2020.

Scenarios and Landfill Life Projections

The table below presents anticipated dates when the SELF could reach capacity. As stated above, there are a number of variables that could influence these timelines. **If waste quantities are delivered at a steady rate of 1 million cubic yards per year, as reported in the last aerial survey, the landfill capacity will be reached in 2036.** Table 4-6 shows the projected closure dates when different assumptions and parameters are applied.

Table 4-6 Scenarios Projecting SELF Capacity and Year of Anticipated Closure

Scenario	Population Increase Only, Recycling flat	Residential Recycling 20-point increase	Commercial Recycling 20-point increase	Overall Recycling 20-point increase	No C&D permit expansion, Recycling flat	No C&D permit expansion, C&D Recycling 20-point Increase	Landfill Expanded Granted, Recycling flat	Landfill Expanded, Recycling 20-point increase
2% Population Increase								
Year SELF reaches Capacity	2032	2034	2036	2036	2039	2031	2039	2043
Average CY delivered per day in final year	1,620	1,590	1,450	1,380	2,220	2,000	1,840	1,600
5% Population Increase								
Year SELF reaches Capacity	2030	2030	2032	2032	2027	2028	2033	2037
Average CY delivered per day in final year	2,300	2,200	2,120	2,020	2,960	2,690	2,660	2,580
10% Population Increase								
Year SELF reaches Capacity	2027	2027	2028	2028	2025	2026	2029	2031
Average CY delivered per day in final year	3,460	3,320	3,200	3,050	4,270	4,070	4,190	4,050

The “best-case” scenario is that waste volumes increase only moderately—about 2 percent each year—while recycling is increased by 20 points, and the Progressive Landfill is expanded and continues to accept C&D. In this scenario, SELF closes in 2043. This scenario would still require action by the City during the planning horizon of this CSWMP to provide for additional future capacity, but the facility would likely remain active until the next CSWMP planning period.

However, the more likely scenarios are those with waste quantity increases. Fort Worth’s population is projected to increase from about 812,000 to 1 million between 2025 and 2030, and to almost 1.4 million by 2040. The scenarios with 5 percent growth in waste amounts project that SELF will close between 2027 and 2037, while the scenarios with 10 percent growth project that the SELF will close between 2025 and 2031. These years are all within or narrowly outside the planning period for this CSWMP.

The “worst-case” scenario is that waste volumes continue to skyrocket, recycling does not increase, the expansion at the Progressive landfill is denied, and the waste from that landfill heavily impacts SELF. That is the scenario wherein SELF closes in 2025, less than ten years from the initial year of the CSWMP.

4.3 Public Sector Facilities

Program Description

The following section describes solid waste facilities that are owned and/or operated by the City with the exception of SELF, which is discussed in the Disposal Capacity Section of this report. The types of facilities that the City maintains include: drop-off stations and an equipment maintenance yard.

Drop-off Stations:

The City maintains three drop-off stations, shown in Figure 4-8 with one planned for operating in late 2016. A primary programmatic intention of the drop-off stations is to provide affordable and convenient disposal and discourage illegal dumping. Drop-off stations are located at the following locations.

Drop-off Station	Location
Brennan Drop-off Station	2400 Brennan Ave
Southeast Drop-off Station	5150 Martin Luther King Freeway
Old Hemphill Station	6260 Old Hemphill Road
Drop Off Station No. 4 (yet unnamed)	301 Hillshire Drive

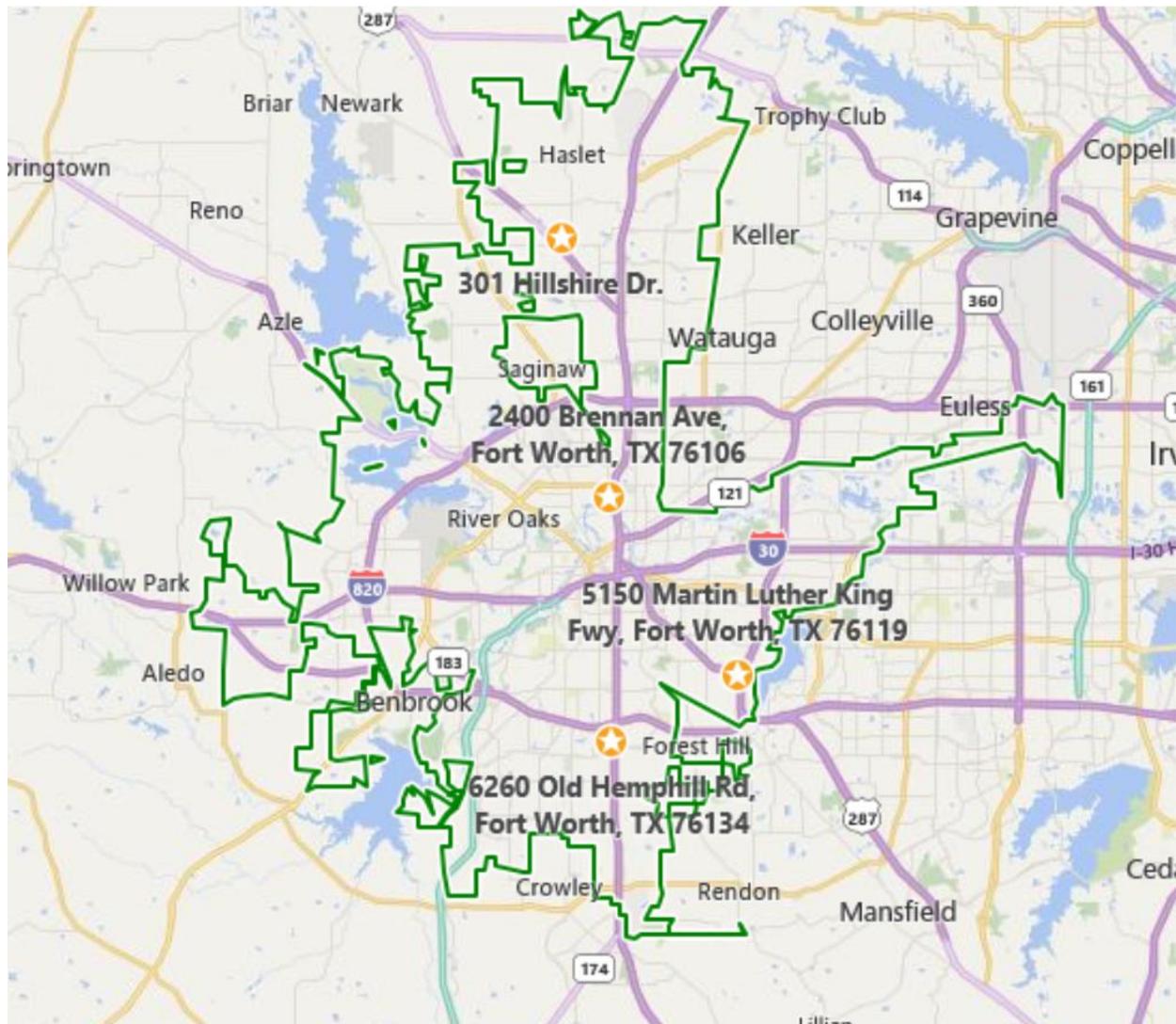


Figure 4-8 Listing and Map of Drop-off Station Locations

Drop-off Stations will accept the following materials:

- Bagged garbage
- Recyclables (including scrap metal)
- Bulky items
- Brush
- Yard trimmings
- Tires (limit four per household every six months)
- Old furniture
- Minor remodeling debris (10 cubic yards per month)
- Appliances such as refrigerators and air conditioners that do/do not contain Freon® or other coolants
- Appliances that do **not** contain gasoline or oil
- Electronics and computers (including televisions - limit two every six months)

An aerial view of the Brennan Drop-off Station is shown in Figure 4-9.

Figure 4-9 Brennan Drop-off Station



Fort Worth residents may pick up free mulch at any of the three (soon-to-be-four) drop-off stations. Mulch is generated from the yard trimming processing at SELF. Piles are clearly labeled, and are self-serve.

Swap Shops are setup at each Drop-off station to provide residents an opportunity to shop for free. Residents can bring reusable items such as bicycles, books, useable lumber and other construction materials, furniture, garden tools/equipment, exercise equipment, etc. to any Drop-off station for re-use by other residents.

Drop-off station staff will make final determination for acceptance into the Swap Shop. Although items can be dropped off and taken at no cost, residents are required to sign a liability waiver before utilizing the shop.

Drop off station staff are currently stockpiling scrap bicycles, fire extinguishers, propane cylinders, and reusable pallets into lots for periodic City surplus equipment auctions.

Environmental Collection Center (also see section 2.3.7 above)

The Environmental Collection Center (ECC) is open to Fort Worth residents and participating cities. The ECC is for residential household hazardous waste disposal and recycling only. Commercial, business or industrial hazardous waste cannot be accepted under Texas regulations.

Mobile collection for household hazardous wastes are held in Fort Worth and participating entities throughout the year.

Current Goals and Standards

The City's solid waste management program is designed to reduce the overall impacts of solid waste generation. To accomplish this, the City provides a range of services that make it convenient to properly dispose of municipal solid waste. A high level of convenience increases the opportunities for residents to recycle materials, especially those that are not served directly through the City's curbside program. These would include residents who live in apartments or condominium complexes.

The options available through the drop-off stations also reduces the amounts of illegal dumping that occurs. The City has made a major push to reduce the amount of illegal dumping.

Program Evaluation

A total of 30,340.84 tons of material was collected at the drop-off stations in FY14-15. This includes 26,511.95 tons of municipal solid waste, 3,828.88 tons diverted recyclables. Other materials collected at the drop-off stations include: 646.82 tons of scrap metal; 270.3 tons of scrap tires; and 452.35 tons of electronics. The enhanced availability of drop-off stations has helped reduce the amount of illegal dumping occurring in the City, as shown in Figure 4-10.

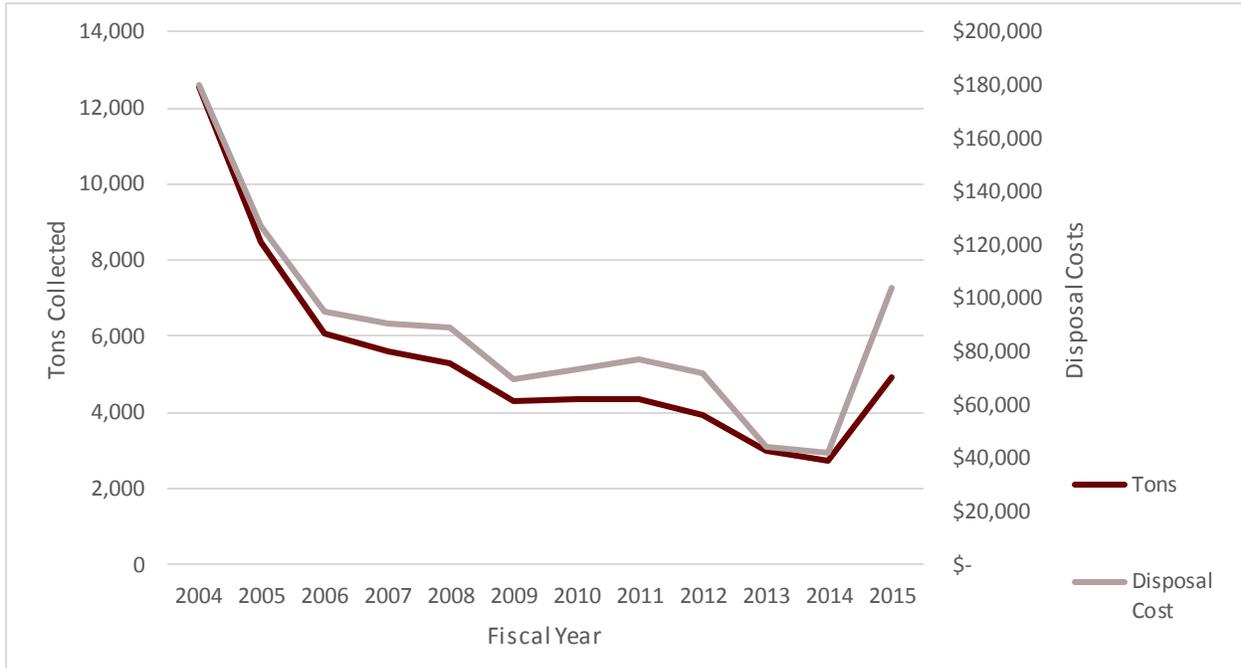


Figure 4-10 Illegal Dumping Cleanups – Tons and Disposal Costs

Combined with increased enforcement and greater public education, the disposal cost of illegal dumping clean-up has decreased from a high in 2004 of \$179,862 per year to dispose of 12,534 tons of material to \$42,078 in FY13-14 to dispose of 2,752 tons. This occurred even though the city population grew by 31% during the same period, and represented a four-fold reduction in both disposal costs and tons; however, in FY14-15, 4,927 tons were collected and disposed of at a cost of \$104,259. Table 4-7 presents data on the continued decrease in illegal dumping from 2004 to 2014.

Table 4-7 Illegal Dumping

FY	Tons	Disposal Cost
2004	12,534	\$179,862
2005	8,487	\$127,305
2006	6,087	\$94,835
2007	5,618	\$90,505
2008	5,277	\$88,917
2009	4,294	\$69,777
2010	4,336	\$73,712
2011	4,327	\$76,977
2012	3,946	\$71,975
2013	2,971	\$44,565
2014	2,752	\$42,078
2015*	3,508	\$52,620

*In 2015, City IDC teams assisted WMI in cleaning up yard waste and bulky items after a storm. Drivers were directed to deliver that waste to the SELF, and not to the Progressive C&D Landfill where they usually take their IDC loads. The City suspects, however, that some of those storm clean-up loads were delivered to the Progressive landfill and were erroneously attributed to the IDC totals. Presumably, this is the primary factor for the 27.5 percent increase in IDC tons from FY14 to FY15.

4.4 Private Sector Facilities

Program Description

The private sector plays an important role in meeting the City’s solid waste management needs. Services that are provided by the private sector in Fort Worth include the following.

- Collection of solid waste and recyclables under a contract with the City;
- Collection of solid waste and recyclables under individual contracts with businesses and institutions;
- Transportation of solid waste and recyclables from the City’s drop-off stations to disposal/processing facilities;
- Brush mulching operations located at the City’s landfill and other locations in the City;
- Operation of the City’s landfill under contract with the City;
- Operation of material recovery facilities in the region to process materials recovered from curbside recycling and other recycling activities; and,
- Operation of other municipal solid waste landfills throughout the north central Texas region.

In addition to the eight private landfills that are located in the region (see Table 4-2, above), there are ten private recycling companies and six private mulching and composting operations. In addition, there are

several for-profit businesses like thrift shops and resale stores and non-profit organizations like Goodwill and Salvation Army that provide recycling services.

Mulching and Composting Operations

There are six mulching and composting operations in the area: LETCO; Silver Creek Materials (permitted composting); Earth Haulers Inc.; Green Ground Composters; Thelin Recycling; and the Organic Recyclers of Texas. Of the six, all but The Organic Recyclers of Texas and Earth Haulers are located within the city limits of Fort Worth.

Recycling Facilities

Depending on the type of material, there are several businesses located throughout Tarrant County and the region that accept recycled materials. TimetoRecycle.com is a website designed for easy access to recycling programs available in the North Central Texas region. The goal of this web site is to increase awareness of the benefits of recycling and encourage all citizens in the region to participate in local recycling programs. This web site was developed and is maintained by the NCTCOG in cooperation with the Regional Recycling Coordinators Roundtable. Table 4-8 shows a list of recycling facilities from the 2015 TCEQ Directory of Permitted & Registered Facilities.

Table 4-8 Recycling Facilities in Tarrant County

Recycling Facility	City							
		Paper	Cardboard	Metals	Glass	Plastics	Electronics	Other
American Scrap Metal	North Richland Hills			X				
Big City Crushed Concrete	Fort Worth & Arlington							X
CSI Arlington Recycling	Arlington	X	X			X		
Evergreen Paper Recycling	Fort Worth	X	X	X		X		
Foam Fabricators	Keller							X
Gachman Metals	Fort Worth			X				
Penn Tex Plastics	Fort Worth					X		
WM Recycle America DFW	Arlington	X	X	X	X	X		
Tree Hugger Recycling	Fort Worth	X		X			X	
Westex Iron & Metal	Fort Worth			X			X	X
Republic Services MRF	Fort Worth	X	X	X	X	X		X

Source: North Central Texas Council of Governments; Time to Recycle; March 2015

Transfer Stations

Transfer stations are facilities that are designed to reduce haul costs by transferring waste from collection vehicles to larger transfer vehicles. Generally, a ratio of 3 collection vehicles to 1 transfer vehicle can be achieved. These facilities allow for more efficient use of the collection vehicles and reduces the traffic to the landfill. The advantages have to be compared to the cost of constructing and operating the transfer station. In the NCTCOG Region there are a total of 17 transfer stations; 4 are located in Tarrant County. The Tarrant County transfer stations are listed in Table 4-9.

Table 4-9 Transfer Stations in Tarrant County

Transfer Station	2014 Annual Tons
North Texas Recycling Complex, 6100 Elliott Reeder Rd, Fort Worth	15,059
IESI Transfer Station, 2120 Minnis Drive, Haltom City	14,096
Southwest Paper Stock Inc., 2301 Hemphill St., Fort Worth	21,818
Westside Transfer Station, 12220 Camp Bowie West Blvd, Aledo	124,062

Municipal Solid Waste Landfills

As discussed in the Disposal Section, there are 21 total landfills in the NCTCOG region. This includes both public and private landfills. The majority of these landfills have open gates, meaning they will accept waste from any source. Ten of the 21 landfills are owned by the private sector.

Current Goals and Standards

The City’s goal to reduce the environmental impacts associated with solid waste management is dependent on a public/private partnership. Historically, the City of Fort Worth has maintained these partnerships to collect, process and dispose of municipal solid waste.

In order to maintain competition for services and to provide greater security of service, the availability of multiple resources and facilities is preferred to reliance on only a few options.

The City also understands the economic value of managing waste within the city boundaries. Facilities to process and dispose of waste can create jobs and other economic development benefits.

Program Evaluation

Regionally, the City has available to it a wide range of facilities for managing municipal solid waste. Over 20 other landfills are located in the NCTCOG region, with a total capacity of approximately 413 million tons, or approximately 48 years of remaining capacity in the region. The City’s residential solid waste is disposed of at the City’s landfill which is operated by Republic, and the City has a contractual obligation to deliver waste to this facility till the year 2033.

Collection firms providing service to the City’s commercial and institutional establishments have the option to deliver waste to the City’s SE Landfill or any other landfill in the region. Collection firms do have options, but must weigh potential lower tipping fees with the cost of transporting waste longer distances.

There are a number of companies providing processing services to either mulch, compost or process recyclable materials. As of April 2015, the City was taking its recycling material to the Waste Management facility in Arlington under its processing contract; however, procurement activity in the short term could change that arrangement.

5 Solid Waste Services Division Activities

5.1 Education

Program Description

Since FY2008, marketing, education, outreach and media relations activities for the City's Solid Waste Services Division were developed and managed internally by the Division. A portion of the Solid Waste outreach efforts are delivered by the Community Engagement Office. The targeted audiences are neighborhood associations, schools, community centers and similar organizations. The program evaluation provided herein pertains to activities conducted from 2008 onwards.

For the evaluation of the Division's education program, a review was conducted of a variety of materials the City furnished. Numerous items were shared that had been implemented or distributed from 2011 to 2015. In addition, a campaign plan document was also furnished. We understand from staff that the materials provided do not comprise the whole of what Solid Waste has created for outreach to its citizenry.

From the plan and the materials reviewed, it was noted that the educational program develops integrated campaigns for many of their major projects to include but not limited to the "E-Recycling" campaign, "Recycle Right," Recyclebank, and the "Mark It Out" campaigns. Through conversations with City staff, it is also understood they are using social media, City website, targeted mass emails, attendance at community events and internal communications to help achieve their goals.

Here is a description of the materials that were reviewed using GBB's Six-Point Checkup®:

- E-Recycling campaign (Regional Campaign with eight municipal partners):
 - Billboards — campaign messaging was shared throughout North Texas on billboards of various sizes within target markets.
 - Information cards — for distribution at events and key locations providing highlight information on electronic waste recycling and direction to the campaign website for detailed information.
 - Collaterals printed in Spanish and English for demographic consideration.
 - Posters and banners — materials to promote the campaign at events.
 - PowerPoint presentation — displayed during the campaign kick-off press conference introducing the campaign, and providing education on electronic recycling.
 - Website content — detailed information on the campaign was shared on the website: timetorecycle.com/e-recycling.
 - Social media calendar — each partner municipality received a social media calendar complete with content to promote the campaign on their platforms.
 - Press conference — held at the Goodwill Industries of Fort Worth Inc., this well-attended event included campaign kick-off speeches by a City Council member and the Code Compliance Solid Waste Services Assistant Director, Goodwill CEO and attendees participated in a tour of the ComputerWorks recycling facility, and a give-away promoting electronic recycling.

- **How Green Can You.....?**
 - This media-friendly and press-engaged education program included both activities and campaign components to raise awareness of Recycling Right and Recycling More through being Green.
 - Social media education joined with an invitation to all citizens to enter a drawing to be part of the Green-Off competition while learning more about sustainability in their homes and in everyday activities.
 - An environmentally focused reception/ press conference announcing the selection of the two competing families.
 - Personalized education by the City of Fort Worth Sustainability Team for the two families on techniques they could use to lower their water consumption, help reduce energy usage, and lessen their environmental footprint. Additionally, the families shared their journey through online blogs.
 - Promotion of the competition learnings through city-wide communications.
 - Post-competition support for continued education.
 - Components supporting the campaign include:
 - Logos — Each of the logos created reflect an education session used during the competition, and within social marketing promotion.
 - Info Cards — Distributed during the reception / press conference as educational pieces.
 - Powerpoint Template — Displayed during the reception / press conference introducing the campaign, the competition, and providing education and relevance to the campaign.
 - Communication materials — Both printed and electronic communication reached citizens giving campaign and recycling updates.
 - Web graphics and water bill insert.
 - Post-competition marketing signage and handouts for continued education activities by the two families.

- **Recycle Right**
 - The City of Fort Worth, through a partnership with their waste collections service provider, Waste Management, entered into a program with Recyclebank to encourage all homeowners of Fort Worth to “Recycle Right!” based on an incentive rewards program.
 - The City was looking for an opportunity to further promote recycling with the following goals in mind:
 - Increase recycling participation and community engagement;
 - Provide residents with rewards for recycling; and
 - Enhance outreach and engagement activities.
 - Messaging:

Keeping the messaging simple, direct, and positive; educational pieces both created and reiterated a mindset of “Recycle Right!” while being rewarded for these actions.
 - Marketing Components and Media Assessment:

The program launched on April 6, 2012 with a very unique press conference hosted by Fort Worth Mayor, Betsy Price. With both radio and television cameras rolling, a City garbage truck dumped a load of just-collected waste at the conference. Mayor Price and City dignitaries donned gloves and sorted out recyclable elements to make a point on how much the City needs to Recycle Right!
 - For the next 6 months, homeowners received and were exposed to:

- An introduction letter from Mayor Price;
- Multiple postcards in direct mailings;
- Water bill inserts;
- Social media outreach; and
- Print advertisement.
- After a year of relationship with RecycleBank, the City re-launched the program through a first anniversary “mini-campaign” consisting of:
 - 1st anniversary – social media blasts; and
 - An all-City mailing of a 1 year anniversary card reminding citizens of the program and incentivizing to participate through gifting.
- **Mark It Out!**
 - Messaging:

Mark It Out became the call-to-action as a tag-line to “Recycle Right!” This message was developed as a direct outcome from the research and recommendations developed by Action Research.
 - Marketing Components and Media Assessment:
 - Residents stated that junk and other mail having personal information on it prevented them from disposing of it in the recycling cart; and
 - To protect their privacy, some residents stated that they shred mail, but others stated that they toss it in the garbage cart.
 - The marketing component(s) developed for this education program consisted of an informational rack card and marker provided to homeowners in four recycling routes within the City of Fort Worth.

Current goals and standards

The outreach plan that was provided offered some insight into the City’s goals and objectives, explained what messages they were designed to convey, and for what purpose. It listed a number of strategies and tactics used, which were evidenced by the materials provided for this review.

The City listed several goals in the plan. Two general goals listed are:

- Messaging should resonate and invoke change; and
- Effective design that promotes "the need to read" action.

The following goals were listed for each campaign the City is promoting:

Recycling Education Outreach Campaign

- Increase the amount of recycling in Fort Worth from its residential customers; and
- Decrease the amount of recycled contamination.

Litter Education Outreach Campaign

- Create a general awareness amongst the City of Fort Worth residents regarding the effects of litter; and
- Decrease the amount of litter within the City of Fort Worth.

Commercial Recycling Education Outreach campaign

- Foster the development of commercial recycling in Fort Worth;

- Educate local businesses on the benefits to recycling; and
- Educate the local businesses on methods of selecting a quality recycling service providers.

Solid Waste Services

- Increase the awareness of the Solid Waste program to include:
 - Yard waste;
 - Bulk and Brush; and
 - Drop-Off Stations.

Program Evaluation

Regarding the goals and objectives listed above, the City did not list any measureable objectives or state how success would be measured, making it difficult to assess how well any of the goals or objectives were met. In addition, for most of the materials produced and outreach efforts undertaken, qualitative descriptions and metrics of performance were not available. Examples of the types of information that can be used to evaluate an education program include:

- Intended purpose or goal of an output or media buy;
- Duration of media buys; distribution of outputs; number of households receiving a message; and,
- Effort results such as event attendance, incoming calls, program compliance, message recall, coverage of the message or event by earned media (e.g., local news), etc.

Without these data to evaluate – that are primarily quantitative in nature – GBB employed its Six Point Checkup® as a means for appraising the City’s outreach program. This is a technique for evaluating education programs that looks into six basic elements of outreach.

GBB Six Point Checkup®

1. Communications plan

Do you have a plan? What are your goals and objectives? Who are your target audiences? Have you included research - measurement and evaluation methods?

2. Messaging

What are your messages? Are your messages compelling and persuasive? How could you fine-tune your messages to make them even more persuasive?

3. Education program components

How are you conveying your recycling messages? What methods/tactics are you using – and what additional methods might you use? Do your brochures, website, direct mailers and program elements work well together? Are there new tools that could help you achieve your goals?

4. Education program “branding”

Are your brochures, website and other outreach materials creatively designed and consistently “branded”? How might they be improved to better align?

5. Program and operations data

How has your budget changed over the past five years and how is it likely to change in the near future? Do you have call-center data on complaints? How can you conduct research of your target audiences on a shoestring budget?

6. Media assessment

What kind of media coverage are you receiving? How can you better harness the positive power of the media?

Communication Plan

The outreach plan that the City furnished has many of the elements one would expect for an effective plan, including goals and objectives, research, and a list of strategies and tactics. But there are some key elements missing from the plan, that are likely hindering City staff’s ability to effectively determine whether their campaigns are working for them. For example, for research and evaluation, it mentions that various agencies have conducted research to understand the behaviors of solid waste customers. Other research referenced in the plan offered insight into why consumers don’t recycle, how effective the Blue Crew is at influencing recycling behavior, and what residents consider to be the most important environmental issue. Insights from the plan are as follows:

Behavior Modification Study, completed by Action Research

- The City of Fort Worth’s Solid Waste Services Division partnered with Action Research to employ a community-based social marketing approach to improve the City’s recycling program. The current program in Fort Worth is a pay-as-you-throw program, with households paying by size of garbage carts. Households have access to a single stream recycling program as an alternative to throwing their recycling materials in the garbage. As it stands, there is a 22 percent diversion rate in Fort Worth. However, 22 percent of the recycling is contaminated with non-recyclable materials.
- The research goal for this study was to increase residential recycling rates in single-family households. The community-based social marketing process was utilized in order to determine the barriers and benefits of recycling specific materials; develop strategies to overcome the barriers and enhance motivation; and design a pilot project. The study was conducted to better understand garbage and recycling behaviors in order to increase recycling rates among residents in single-family homes in the City of Fort Worth, Texas.
 - To achieve the research goals for this study the team conducted a waste characterization (audit) study of garbage and recycling carts, and an in-person survey of households. The waste audit data (garbage and recycling carts) was linked to the household survey data. The combination of the garbage and recycling-cart data and household survey data provided a unique way to learn about recycling attitudes that are associated with the residents’ actual behaviors. The largest number of household respondents stated their biggest reason for not recycling is:
 - They are too busy
 - It takes time to separate
 - Don’t think about it
 - Respondents were mostly confident that they knew what items should and should not be recycled however there was still some uncertainty about what to do with unmarked plastics, Styrofoam, and soiled chipboard.

Typically, education and outreach are measured in two ways: outcomes and outputs. Outcomes are changes in level of awareness, changes in attitudes or changes in behavior as a result of seeing or hearing the City’s messages (clicks to the website, change in surveyed response on awareness, changes in materials/volume collected). Outputs are just the number of times a message is disseminated to the target audience (number of press releases sent; number of fact sheets distributed, number of events attended,

etc.). It appears neither measurable specific outcomes or outputs were created in the plan, so the City cannot clearly evaluate whether progress was achieved.

The City has a sound list of overarching goals, but it appears that comprehensive research has not been done to support measureable objectives. For example, if from a baseline survey it is known that 75 percent of the public believe the Blue Crew is effective at increasing recycling, then there should be a measurable objective stating a new target for that specific data point—or for another data point deemed critically important. Also, the research can help determine which portions of the general public should be targeted with information, how to target them, and in what context should messaging be provided, so that hours and dollars are spent most efficiently and effectively.

Another component of the plan missing is implementation. This plan lacks a chart explaining, by calendar month, who will do what tasks and what kind of budget is needed. This kind of project management plan is critical for the team’s understanding of where resources need to be allocated and when, as well as, where dollars are being spent and why.

Messaging

Effective program messaging isn’t just about being clever, unique or memorable. Real effective messaging is relevant and accessible to the target audience. It makes sense to them and matters to them in their lifestyle. Good messaging is also consistent, like branding should be, in order to build familiarity with, and recall of, the topic. The right messaging bridges the way to understanding and support for a topic, which ultimately lead to trial and adoption of the desired behavior. This requires a concerted effort, over time, of redundancy and layering of consistent messaging conveyed through a variety of means.



Program Components

Positively, the City seems to be employing a very good mix of strategies and tactics to conduct outreach on recycling to the citizens of Fort Worth. What is not apparent, from the outreach plan, is why certain strategies and tactics were selected, or the audience for which they were intended. Strategies such as advertising or earned media, brochures or billing inserts, social media or

digital advertising, are not something one selects at random; rather, they are selected based upon what one knows about the audience one is targeting. An effective suite of components is created and chosen for the very specific purpose of reaching the target or selected audience in the most economical and effective way possible.

Component Branding

Best practice calls for consistent and unique branding or packaging of information, to build familiarity with the topic through the cumulative effect of distributing materials and to distinguish the topic and be memorable. Typically, a certain look and feel is applied throughout all materials to build the consistent look and set expectations for information. This would include use of a certain color or group of colors, certain consistent imagery, a tagline possible and a consistent typeface.

The materials provided by the City use branding related to individual campaigns with the single unifying use of the City’s logo. As an example, the Recycle Right campaign uses the same color palette, font and

overall look. This allows for a consistent look that helps the viewer to identify the message. **However, no cohesion or consistent branding, except for the City logo is used for all the individual campaigns.**

Program Operations Data

It's important to look beyond expenditures on media buys and printing to the resources (i.e., the people) allocated toward plan development, implementation, and management of the program. In Fort Worth, responsibility of outreach with regards to solid waste is shared between SWSD staff and Code Compliance staff. It is not clear how much of each full-time staff is devoted to the task, but it is clear that everyone is balancing several different responsibilities, and, that the team members charged with outreach are not just located within different divisions, their offices are physically separated, and staff are in different buildings. This physical separation and sharing of oversight makes it potentially difficult for all team members to be aligned on execution of the plan. It may be hard for them to stay aware of who is doing what, and to know in a timely fashion of any pertinent new information, that may influence changes in the plan.

Media Assessment

The last piece of the Six Point Checkup© is the media assessment, where we examine how well SWSD is harnessing the power of proactive, earned media. The City regularly garnishes earned media coverage on nearly every major program or project developed. This includes the development and distribution of media releases, media fact sheets and media pitches. The SWSD staff has, over the years, built strong interpersonal relationships with local media.

5.2 Customer Service, including 311

Program Description

Customer Service is one of four major service areas within Solid Waste Services. Calls to Solid Waste go to the City call center, a separate branch on the organizational chart. Staffed by City employees, this group “handles incoming calls from individuals seeking new service arrangements, registering complaints, modifying existing service arrangements or inquiries of the services provided.”²⁷ The Call Center also handles incoming calls for all divisions of the Code Compliance Department, Transportation and Public Works, Parks and Recreation, and the City Manager’s Office. The main published telephone for the City, 817-392-1234, the number published for Solid Waste, 817-392-EASY, and several other 10-digit phone numbers come to the call center. Ultimately, the City intends to implement a 311 system, whereby all incoming calls to the City Fort Worth would be answered by dialing a single number, or simply dialing 311 from a landline. The City call center would be the first operation to be folded into the 311 system; however, that transition is unscheduled as of the end of FY14-15.

²⁷ City of Fort Worth FY2015 Budget Document, Solid Waste Fund section

Customer Service

Report an issue by phone:
817-392-1234

The call center is open 7 a.m. to 6 p.m., Monday through Friday, and 7 a.m. to 4 p.m. Saturdays.

Assistant Director:
Kim Mote



The City also offers online customer service opportunities for its collection customers and residents in general. On the web page for Solid Waste Services, there are several interactive features:

- Address lookup to find out your collection schedule and set up reminders;
- Information for the City call center at 817-392-1234;
- A brief survey where one can provide feedback about a customer service experience; and,
- Information and links on how to download a mobile app that provides information and reminders about collection service.²⁸

Download

Get collection reminders and look up how to dispose of waste on your smartphone with the new City of Fort Worth Garbage & Recycling app.






At the higher level, Code Compliance has a Customer Service email form at <http://fortworthtexas.gov/codecompliance/customerservice/>, online reporting for complaints, and a Customer Service Advocate to address issues, speak to groups, and other support.

Another special customer service effort in the field is the Disabled Carryout Service, wherein customers who are not capable of transporting their garbage and recycling carts to the curb can receive collection at their door. Residents who meet the application criteria receive this service at no additional charge; other customers may apply for the service and pay an additional \$30 per month.

According to the FY14-15 Budget document, Customer Service accounts for 2 percent of expenditures by the Solid Waste Fund. The General Fund supports five positions in the call center; Code Compliance supports one position; Animal Care & Control supports three; and, Transportation and Public Works supports one. The center is funded by the Solid Waste Fund, General Fund, and Stormwater Fund and it is assigned to the consolidated customer service center.

Current goals and standards

The 1995-2015 Plan stated a goal of providing “Quality service to residents,” and also stated several goals to “assist” ICI organizations with waste management.

The curbside collection Performance Goals from budget document, mentioned previously in 2.1.1, also reflect customer service as they address “miss” rates for garbage and recycling collection. The same is true for the “turn-around time” goals associated with dead animal work orders and illegal dump work orders, described in 2.3.4 and 2.3.5. As noted, the City meets or exceeds those goals.

The City call center has four performance measures. The first is to answer all calls in an average of 60 seconds or less. The second is to achieve a service level to answer at least 80 percent of calls within 60 seconds. The third is to achieve 90 percent average in our quality monitoring program. The fourth is to achieve 95 percent of working scheduled adherence for representatives compared to their activities.

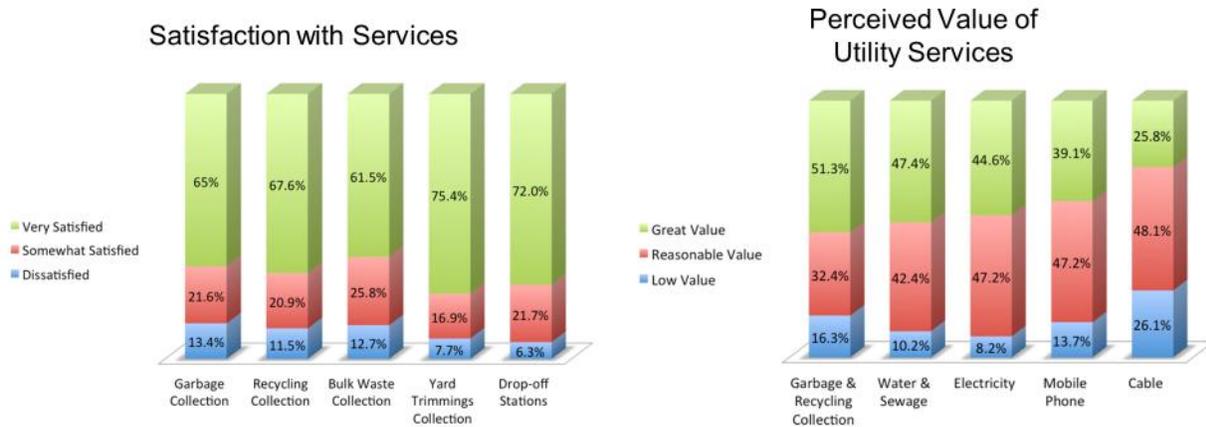
²⁸ The Google Play and Apple Store web pages indicate that app is very well reviewed by users and has been downloaded by thousands of people.

Program Evaluation

The use of social media, online reporting and complaint tracking, and the mobile app are all sophisticated customer service interfaces that appear to be well-received. Considering that the 2012 survey indicated that more than 57 percent of the respondents still listed “telephone” as their most preferred form of contact with the City, it is important and responsive that the City’s efforts to improve telephone access proceed.

Surveys indicate that customers are satisfied with the solid waste services offered by the City. They also find the service level to be a good value to the price paid, more so than other utilities / basic services, as shown in Figure 5-1.

Figure 5-1 Customer Survey Responses – Satisfaction, Value



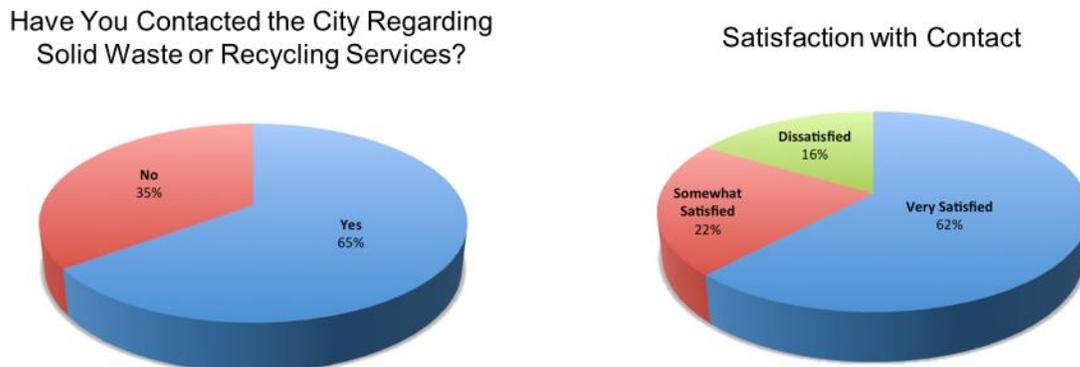
Source: City of Fort Worth 2012 Customer Satisfaction Survey

Evaluation of the survey indicated response overlap of “dissatisfied” and “low value.” This could indicate that many of those answers came from the same individuals.

Given the opportunity for open-ended feedback, the respondents’ most frequent suggestion was regarding their recycling bins being improperly returned to the curb after collection, allowing them to blow around.

As shown in Figure 5-2, survey results also indicate that approximately 84 percent of individuals who contact the City about their solid waste services were “satisfied” or “very satisfied” with the experience; however, the open-ended response indicated that those who were not satisfied were irate about it and willing to escalate the issue to elected officials, etc.

Figure 5-2 Customer Survey Responses – Engagement, Satisfaction



The Code Compliance call center currently meets its goal to answer all incoming calls within an average 60 seconds; the 2015 average was 54 seconds. The goal to answer at least 80 percent of incoming calls

within 60 seconds was not met in 2015. However, staff monitoring the performance has worked to improve performance by 40 percent and expects the overall goal will be met in 2016.

5.3 Organizational Structure

In order to evaluate the current state of the Solid Waste Services Division (SWSD), which is a division of the Code Compliance Department (CCD), and identify key issues related to organization's structure affects performance, the following were completed:

- Review of the SWSD's existing organizational structure, specifically the organization chart and personnel responsibilities;
- Limited benchmarking assessment of the City's program in comparison to other communities; and,
- Internal review of organizational performance and opportunities for improvement through interviews with key staff.

Program Description

The City of Fort Worth's solid waste management services are provided by the SWSD. Key responsibilities include the following:

- Collect waste through contracts with private haulers;
- Manage the City's SELF through a contract with a private firm;
- Collect Illegally dumped material;
- Manage the Citizens Drop-off centers;
- Manage the City's recycling program;
- Management of landfill sites donated to the City;
- Solid Waste related activities associated with City events;
- Emergency management operations for solid waste and disaster debris; and,
- Solid waste work related to non-profit organizations.

To meet all the demands of the solid waste management program, it is necessary to coordinate with a variety of regional, state and federal agencies. The City accomplishes this by participating in organizations such as NCTCOG's Regional Review Committee (RRC), Texas Solid Waste Association of North America (TxSWANA), and other waste related organizations such as the State of Texas Alliance for Recycling (STAR).

In addition to local organizations, the City also coordinates with regional, state and in some cases federal agencies. The NCTCOG has the responsibility to develop regional solid waste management plans and to manage state grant programs locally. The City of Fort Worth is represented on the NCTCOG's Resource Conservation Council. The Texas Commission on Environmental Quality (TCEQ) has the responsibility for permitting municipal solid waste facilities and the management of other state-wide solid waste management regulations, including those related to collection. The Texas Emergency Management Division (TEMD) is responsible for managing the state's emergency management program. The TEMD will review Disaster Debris Management Plans to determine compliance with state and federal guidelines.

SWSD collaborates with a variety of City departments to provide various services to residents:

- Code Enforcement Area Command provides assistance during disaster events;

- Transportation and Public Works Department (TPW) and the Park and Recreation Department provide assistance during disaster events;
- Environmental Management division of the Code Compliance Department manages the household hazardous waste collection program at the ECC;
- Emergency Management Office provides overall management during emergency events;
- Administrative Departments such as Human Resources, and Financial Management Services provide administrative support to the SWSD; and,
- Communications and Public Engagement for public information programs.²⁹

The City also relies on a range of community and neighborhood organizations as part of the City’s public information programs, including backyard composting and disaster alerts.

Budget and Organizational Structure

The solid waste management fund is an enterprise fund. This means that the City’s solid waste program is funded almost entirely from fees charged for the services provided by the SWSD. Other funding sources include recycling sales revenue, landfill lease payments, interest on investments, and grants.

Existing Organizational Structure

The existing organizational chart for the Solid Waste Division is presented in Figure 5-3. Note that the organization chart presented below is in the midst of a transition. There are currently plans to split the Field Operations to be under the direction of two supervisors instead of one; the customer care division is now responsible for IT management and there are potential plans for moving planning to become a separate section under Code Compliance.

²⁹ This was a relatively recent development, documented in the 2015 City Budget document. Responsibility for public information programs has been transferred to Communications and Public Engagement; previously, and as described in the “Education” section of this document, the program was conducted by staff in SWSD and CCD.

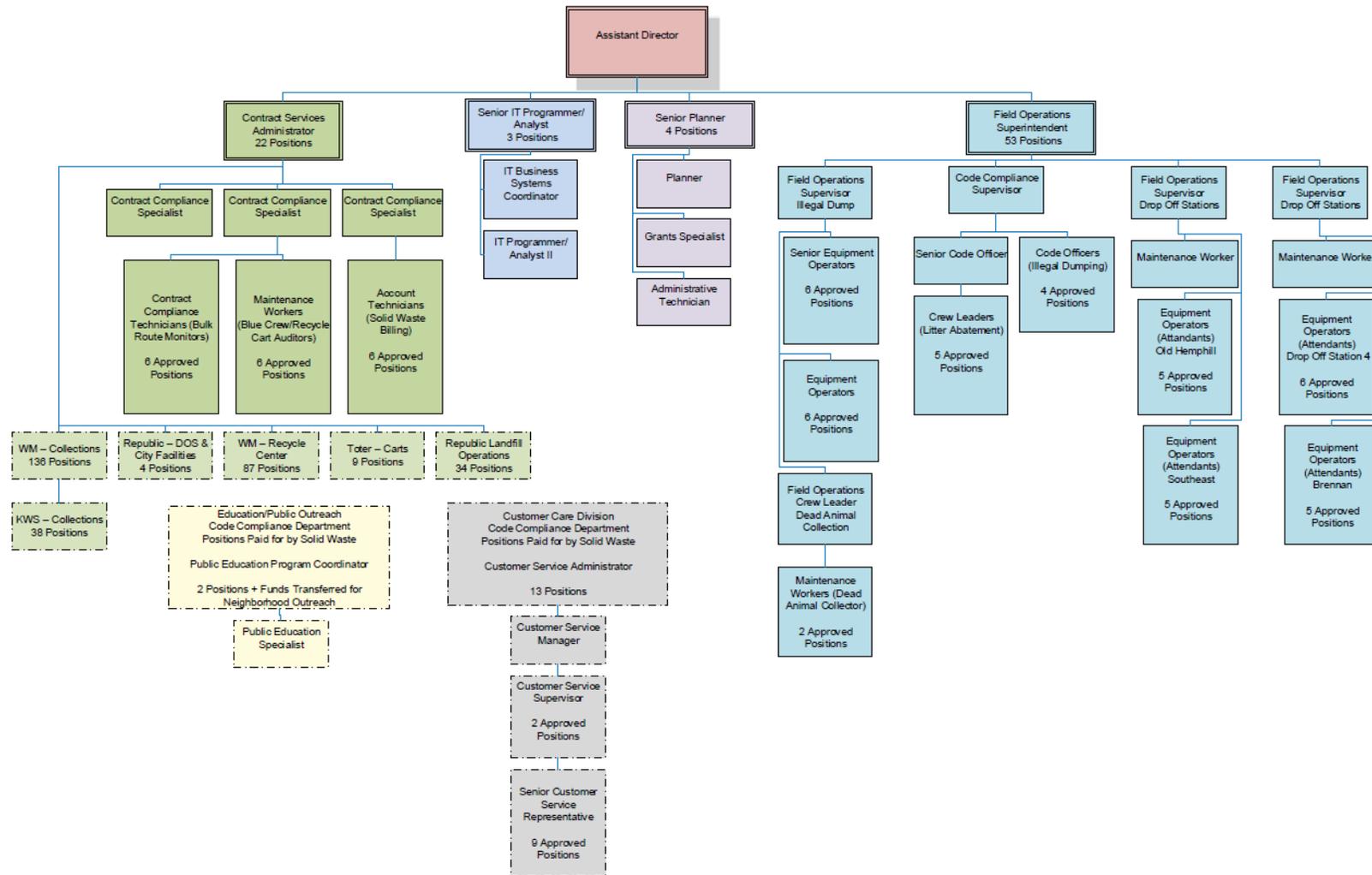


Figure 5-3 Solid Waste Services Division Organization Chart

2016 Budget

The staff has a total of 85 to 90 employees to manage a budget of \$58.5 million in revenues and \$51.5 million in expenditures. The chart in Figure 5-4 shows that 69 percent of the SWSD budget is allocated toward professional services and technical services. The \$35.6 million spent on this category is for services primarily to collection waste, operate the City’s landfill and provide solid waste containers.

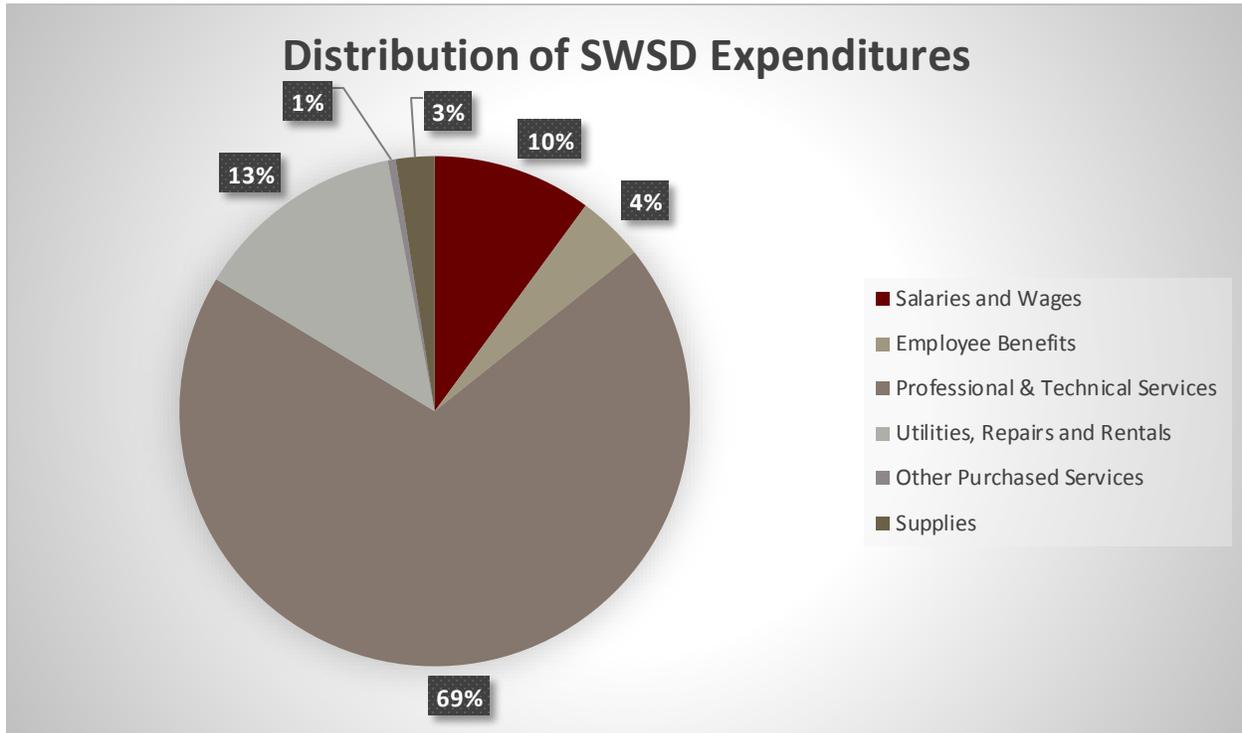


Figure 5-4 Distribution of SWSD Expenditures FY15-16

The City’s SWSD currently has a total of 83 authorized positions (AP) to implement a \$58.5 million program (\$704,819 per AP). To achieve this level of efficiency, the City coordinates with other departments and relies on the private sector to provide services. For comparison purposes, the overall City has a budget of \$1.5 billion and a total of 6,407 appointed positions (\$234,000/AP).

Organizational Responsibilities

Administration

The SWSD is managed by the Assistant Director (AD). The AD has responsibilities for managing the programs operated by the SWSD, human resource management and overall performance of the SWSD. The AD reports directly to the Director of Code Compliance.

Contracts Management

The City’s organizational structure recognizes its reliance on the private sector for all operations, except for operation of the drop-off centers and illegal dumping collection. Contracts management has a total of 22 positions to manage the following contracts, with an estimated total cost of \$42 million per year (professional services + utilities and rentals).

Not including professional and other services, the SWSD manages the following contracts for waste collection, processing and disposal.

- WM Collections
- Republic Drop off Stations
- WM Recycling Center
- Toter
- Republic Landfill Services
- KWS Collections

The Contracts Management group also manages the revenue streams for the SWSD. Total revenues are equal to \$58 million. Refer below to a summary of the SWSD budget.

Planning

The Planning Section is responsible for various planning activities associated with the City's solid waste management program. Major activities include the completion of a City-wide Disaster Debris Management Plan and the completion of a Comprehensive Solid Waste Management Plan. The Planning group also manages planning activities related to expanding solid waste services to new developments in the community. This group also manages recycling and public information programs, such as master composter programs and commercial waste management efforts.

Field Operations

Field operations are responsible for managing the illegal dumping collection program and the operation of the drop-off facilities. This group also responds to disaster debris events by providing collection support in the event of a disaster that requires additional resources beyond what WMI can provide with its resources.

Information Technology

The IT group is responsible for managing the SWSD information technology program. This group is now being managed by the Customer Care Division.

Public Information

The Public Information Division is outside of SWSD, but provides services to SWSD for public information efforts and citizen communications.

Staff Responsibilities

The organizational structure shows that the Division is led by the Assistant Director. The position has the following key responsibilities:

Assistant Director in charge of Solid Waste Services Division

To direct, manage, supervise and coordinate the activities and operations of the Solid Waste Services Division and the Fort Worth Clean City program or the Environmental Services Section including, but not limited to, development, recommendation, and implementation of policy, coordination of service delivery, contract management, interaction with regulatory agencies; to coordinate assigned activities with other divisions, departments and outside agencies; and to provide highly responsible and complex administrative support to the Environmental Management Director.

Other key staff include:

Senior Planner

To perform advanced planning assignments and projects in assigned area of responsibility; may include functioning as a historic preservation officer; and may include supervising, overseeing, and coordinating the work of an assigned division.

Contract Services Administrator

To perform a variety of duties in administering and monitoring provider service contracts or city/federally funded grant programs for a department or division; to ensure services provided and funds expended are in compliance with contract or grant fund specifications; and to perform a variety of administrative and technical tasks in support of assigned area of responsibility.

Senior IT Programmer

To formulate and define system scope and objectives; to solve complex problems considering computer equipment capacity and limitations, operating time, and form of desired results; to prepare detailed specifications from which programs will be written; to design, code, test, debug, and document those programs. Competent to work at the highest technical level of all phases of application systems analysis and programming activities in their area of expertise.

Field Operations Superintendent

To supervise, plan, coordinate, and oversee various assigned field construction, maintenance, repair, or operational activities within an assigned division which may include water, wastewater, parks and community services, golf courses, signs and markings, public events, solid waste management, transportation/public works and other related services; to coordinate assigned activities with other divisions, outside agencies and the general public; and to provide highly responsible and complex staff assistance to assigned senior management staff.

Customer Service Manager

To direct, manage, supervise and coordinate the activities and operations of the Customer Service Division within the Water/Wastewater, Development or Environmental Management Departments including customer billing, revenue collection, and service delivery methods for high volume call centers of assigned department; to coordinate assigned activities with other divisions, departments and outside agencies; and to provide highly responsible and complex administrative support to the Assistant Director of assigned department.

Public Education Coordinator

To manage, oversee and coordinate all department programs within an assigned department; to develop media relations and publicity activities; and perform as the primary spokesperson for a department; to review and monitor all department communication before distribution; and to participate in the preparation and administration of assigned budget; to implement goals and objectives; and to perform a variety of tasks in support of assigned area of responsibility.

Current goals and standards

The City's goals are to provide quality services in an efficient manner. To accomplish this, the City has relied on a blend of both public and private sector organizations to achieve these goals. Specific goals for the solid waste program include the following:

- Efficient use of staffing to achieve the overall program's goals and objectives;

- Clear lines of communication to eliminate duplication of effort;
- A quality management program that focuses on making sure that services provided to residents achieve high standards of quality and efficiency;
- Accountability for performance throughout the program;
- Full utilization of alternative resources to help fund programs, such as NCTCOG grant funding, FEMA funding for disaster debris management and other resources; and,
- Maximizing the benefits of public / private partnerships.

Program Evaluation

SWSD Interviews

The interviews focused on the SWSD mission, its strengths and areas for improvement. In general, the interviews indicated common themes. These include the passion that staff have for providing quality customer service. Staff have a sense that they provide very economical service to residents. They also believe that there is a need to improve the amount of public information efforts to the commercial sector and that the IT system that serves the organization needs significant upgrades to meet the needs of a growing community. The following presents specific comments related to the interviews. Specific observations are described below.

Division Mission and Responsibilities

- The mission of the Division as defined by staff is to provide quality customer service as it relates to the collection of municipal solid waste and recyclables.
- The Division also recognizes its role in protecting the health of the community and enhancing environmental quality. They want the program to be a role model for how to meet the community's needs.
- The SWSD is part of the Code Compliance Department. Major tasks that are conducted by other divisions of the CCD affect solid waste in a significant manner. One example is the operation of the call center and information technology which is staffed by personnel who provide services to other divisions within the department. Specifically, the administrator of the call center is also responsible for Code Enforcement Department IT, Customer Service Analyst and Safety Training.
- Additionally, the SWSD relies on public information staff from the Public Information office of Code Enforcement. This person spends approximately 60% of their time on solid waste, 30% on animal shelter issues and 10% on the remaining issues related to Code Enforcement. There is coordination with the SWSD concerning the topics of public information campaigns. Major responsibilities for Public Information include marketing, education, outreach and media relations. The program has a manager and a marketing specialist. Certain special skilled media work are contracted out.
- The other department that has an impact on operations is that the Water Department is responsible for billing.
- The SWSD also has a major role in disaster debris clean-up. In the event of a disaster, the organization must work with Public Works, Parks and Recreation, Emergency Management Operations, Code Enforcement, Public Information, Police and Fire and potentially state and federal agencies.

A Division in Flux

- At the time of this analysis, changes have and are being undertaken to modify the organization's structure. These include dividing the Illegal Dumping and Transfer Stations Operations into two sections versus one section; the Call Center and IT have become combined in to one section. There is discussion of moving the Planning Group to become a separate planning group that serves all sections of the Code Compliance Department.
- These moves will have varying impacts on the availability of staff to undertake programs for solid waste management.
- In addition to the changes that are taking place structurally, the SWMD has a new director.

Customer Satisfaction

According to an August 2015 survey conducted by ETC Institute of Olathe, Kansas, more than three-fourths were satisfied with the quality of curbside recycling; 76 percent were satisfied with residential garbage collection; and 70 percent were satisfied with drop-off stations for garbage, brush, recycling and bulk trash. Staff placed a high degree of focus on providing a high level of customer satisfaction. The results are average for cities of similar size. Higher rates were reported in city budgets including above 95% have been reported in Plano and 87% in Austin.

Additional or changed services

The City provides a range of services primarily to the residential sector. These services include once per week collection of solid waste, once per week collection of recyclables, brush and bulky collection, availability of drop-off centers, illegal dumping collection and public information programs. The individuals interviewed were asked about additional services that should be provided by the SWSM. These are not necessarily short-term or long-term opportunities, but thoughts by staff on potential services that in the future the SWSD could provide to either reduce waste generation or improve the level of service to customers.

- Modify bulky and brush collection to allow for greater recovery of materials
- Enhanced commercial sector program – focus first on education / public information
- Commercial organics collection and processing –if there is infrastructure to implement
- Potential development of conversion technologies once those technologies become economically viable
- Enhanced focus on commercial sector waste reduction and recycling
- Enhanced public information / education programs / social media program
- Enhanced communication programs for field crews to utilize apps for tracking complaints and other issues including monitoring disaster debris –will require major changes to ITMS System – this will involve converting to a web based system
- Expand Drop-off programs to include collection of HHW – will require significant staff training regarding HHW management at these sites
- Fourth Drop-off facility anticipated to be operational October 2016
- More inclusion of law enforcement into illegal dumping program
- Electronics collection services
- Textiles collection service
- Implementation of City MRF
- Establishment of Green Purchasing ordinances

Program Strengths

The individuals interviewed were relatively consistent in the assessment of organizational strengths. These generally include:

- A very motivated and dedicated staff who work together to provide high level of service to residents
- Self-directed teams with a degree of autonomy and responsibility
- A sense that tasks conducted are very strategic in development and implementation
- Efficient service to residents – based on ability to keep rates at same level of long period of time
- A sense that the organization is supported of their mission

Areas Requiring Improvement

The individuals interviewed were relatively consistent in the assessment of organizational areas of improvement as well. These generally include:

- Need to improve direct resource allocation to SWSD for public information programs. There is also concern for potentially moving planning out of SWSD when important issues such as implementation of Disaster Debris Management Plan, Comprehensive Solid Waste Plan and the MRF procurement are being undertaken.
- The IT system for solid waste needs a major re-haul in order to better utilize technology for both internal services and field services
- Need to implement programs focused more on the commercial sector
- Need to implement bulk and brush waste separate collection services as a way to improve
- Public information programs and the need for more FOCUSED programs
- Marketing the Division's programs to its customers as a means of improving program participation and compliance with program requirements
- Need to audit grants of privilege program

Need for Resources

- As mentioned, the organization is in a state of flux. Changes in the structure are moving resources within the Code Compliance Department. There were comments suggesting that the process of hiring individuals is a barrier to meeting needs. This is primarily a Human Resources issue, not a SWSD issue.
- The Public information office is about to secure an additional marketing assistant. Even with this additional staff, it is felt that because this group provides service throughout the Code Compliance Section is short on public information staff for a City of 800,000.
- Additional staff is needed in the IT section to assist in resolving issues with the ITMS system.
- Additional staff will also be required to manage the additional drop-off station and to manage the collection of HHW at these facilities.
- City should evaluate the use of cameras on City vehicles for improved reporting on potential issues related to customer service

Cost Savings Opportunities

- In general, staff believed that they are operating at a very efficient level, with the exception of the ITMS system. Field operations has demonstrated over the years, the ability to cut staff significantly as issues such as illegal dumping is reduced.
- While not an immediate cost savings measure, it was pointed out that the City has responsibilities for closure and post-closure care of the landfill. Republic is responsible for contributing funds for closure and post-closure care based on reporting to TCEQ. It is uncertain whether these funds accurately reflect the City’s current liabilities for closure or post-closure care.

Contractor Performance

The City relies heavily on private contractors for both collection and disposal services. In general, staff were satisfied with the performance of the contractors. However it was indicated that contractors will generally provide the level of service defined in their service agreement. Because the City has limited collection or other services, it is limited in its ability to provide “additional services” without major revisions to contracts. This may have an impact on the level of community satisfaction with the services being provided.

Benchmarking Analysis

The City of Fort Worth is unique among its peers as it relates to municipal solid waste management. Cities including Dallas, San Antonio, Austin, El Paso, Garland, Plano, Denton, Corpus Christi, Lubbock and Amarillo all maintain either their own residential collection program or landfill. The closest match to Fort Worth’s program is the City of Arlington where waste is collected by the private sector. Arlington also owns a landfill, and also leases this facility similar to Fort Worth.

Public vs Private Ownership and Operations

To accomplish its mission, the City relies heavily on contract services. Unlike most other large cities in the state except for Arlington, Fort Worth does not directly operate either the residential collection service or the operation of its landfill. The table below illustrates how other cities manage these elements of their solid waste program.

Table 5-1 Benchmarking City Operations: City or Private Operations

City	Collection Service	Recycling Service	Landfill Ownership	Landfill Operations
Fort Worth	Private	Private	City	Private
Arlington	Private	Private	City	Private
Dallas	City	City	City	City
Austin	City	City	Private	Private
San Antonio	City	City	Private	Private
Houston	City	City	Private	Private
Denton	City	City	City	City
Garland	City	City	City	City
Plano	City	City	NTMWD*	NTMWD*
Amarillo	City	City	City	City
Lubbock	City	City	City	City

*North Texas Municipal Water District – a public agency

There are benefits and costs associated with both public and private ownership and operations. Mainly these differences relate to the level of risk a community is willing to accept in providing service, the flexibility in service levels desired and what benefits of private sector efficiencies can be secured. Some cities reviewed that provided municipal collection services showed data for customer satisfaction well above Fort Worth’s level of satisfaction (note that there are several factors that account for level of satisfaction). Efficiency of operations is one of the primary reasons for privatization. The table below illustrates data from various cities for collection and landfill operations where data is available.

Table 5-2 provides a comparison of various cities’ solid waste management budgets.

Table 5-2 Solid Waste Budget Comparisons for Major Metropolitan Areas in Texas

City	Revenues (millions)	Expenses (millions)	Expenses per Customer	Employees	Customers	Waste Collected (1000 tons)	LBS. per Customer per Week	Reported Recycling Rate
Fort Worth*	\$58.4	\$58.4	\$286	92	204	228	43	23%
Austin	\$82.1	\$82.1	\$425	414	193	123	25	43%
Dallas	\$86.5	\$86.5	\$360	861	240	233	37	20%
Denton**	\$31.2	\$31.2	NA	124	NA	185	NA	35%
Garland**	\$35.8	\$23.5	NA	117	NA	NA	NA	NA
Plano	\$24.6	\$26.4	\$361	76	73	58	31	41%
San Antonio	\$100.7	\$100.7	\$291	577	345	NA	NA	30%
Houston***	\$4.8	\$73.6	\$192	438	382	NA	NA	30%

NA - not available

* Expenses include a \$6 million interdepartmental transfer

**Denton provides residential and commercial collection service

*** Houston revenues do not include fees to residents - general fund account

Staffing

By relying on private contractors, the City is able to maintain a much smaller staff than other large cities in Texas. Table 5-3 presents staffing levels for other large cities. When private sector employment is added into the evaluation, the total employment is still less than the other cities evaluated. The table below provides a summary of collection and disposal program staffing. Care should be taken when evaluating these numbers as the data is sourced from City budgets which combine multiple services and tasks into either collection or landfill line items. For example, one city may have a separate program for public information that is budgeted outside of the collection program, while others include those staff in the total staffing profile. Program variations also exist in the manner in which solid waste is collected (for example, manual versus automated), extent of recycling efforts, whether a composting program is in place and other programs that may be included in the solid waste budget. Some of the cities cited below operate transfer stations as a means of reducing haul costs. The source of the information presented in this table are city annual financial statements.

Table 5-3 Texas City Solid Waste Staffing Levels

City	Collection				Landfill				
	Conducted by	Customers	Staffing	Customers per Staff	Owned by	Operated by	Landfill Tons	Staff	Tons/Staff
Fort Worth*	Private	265,000	196	1352	City	Private	529,000	34	15,559
Arlington	Private	NA	NA	NA	City	Private	806,000	NA	NA
Dallas	City	NA	NA	NA	City	City	1,631,000	144	11,326
Austin	City	193,000	157	1229	Private	Private	NA	NA	NA
San Antonio	City	345,000	577	597	Private	Private	NA	NA	NA
Houston	City	382,000	362	1055	Private	Private	NA	NA	NA
Garland	City	52,000	63	825	City	City	406,000	29	14,000
Plano	City	72,000	54	1333	**	**	NA	NA	NA
Amarillo	City	62,000	91	681.32	City	City	231,000	20	11,550

*Includes staffing of private companies to collect waste and operate landfill – total SWSD staffing is between 85 and 90

** owned and operated by North Texas Municipal Water District

Rates Charged

Table presents a summary of rates charged by other cities evaluated where data was available from either their budget documents or web sites. Of particular note is the fact that in past years, a rate analysis was fairly straight-forward: each community had a monthly fee for solid waste collection. Now that more communities are moving toward a multiple cart program, rate structures vary depending on the carts.

Table 5-4 Solid Waste Residential Collection Rates in Texas Cities

City	Cart Size				Other	
	24	32	64	96		
Fort Worth		\$12.50	\$17.50	\$22.75		
Austin*	\$16.90	\$18.15	\$23.30	\$41.85	\$7.65	Per additional environmental fee
Arlington					\$13.36	Twice / week bag
Dallas				\$24.67	\$10.56	Additional cart fee
Denton		\$19.75	\$20.75	\$25.65	\$5.25	Recycling Charge
El Paso				\$17.00	\$17.00	Additional cart fee
Garland				\$19.58	\$ 6.10	Additional cart fee
Houston					\$5.00+\$2.21	Admin fee + bag tag fee
Plano**			\$11.25	\$15.10	\$13.25	Additional cart fee
San Antonio***		\$20.43	\$20.93	\$22.18		

*Note that Austin residents generate 27 lbs. of waste per week compared to Fort Worth at 43 lbs./week; the City of Dallas is 37 lbs./week

** Plano cart sizes are 68 gallons and 95 gallons

***San Antonio carts are 48, 64 and 96

Public Information Programs

Fort Worth staff expressed an interest in comparative staffing levels for public information / public education programs. The following are observations from other cities. Again, city organizational structures vary considerably and some of these tasks may be taken care of by other departments (as is the case for the City of Fort Worth). A review of other cities public information programs indicates that Fort Worth is not alone in having minimum public information staff. For example:

- Houston has three individuals who are either customer liaisons or public information staff;
- Garland has 1 waste minimization officer;
- El Paso has a customer relations clerk;
- Denton has eight individuals involved in public outreach and public education;

City Solid Waste Budget Highlights

The following are excerpts from various city budgets related to solid waste management. These excerpts are designed to provide insight into how other solid waste management organizations focus their efforts and unique program aspects which may be of interest to Fort Worth as it moves to implement its own program.

Austin

One of the main principles of the department's Zero Waste guiding concept is a focus on reducing waste by increasing recycling. In order to intensify the financial incentive for customers to decrease their trash volume is to reduce their cart size and recycle more items. ARR is adopting a per gallon basis for its trash cart rates. The FY 2014/15 car rates are calculated from base rates of \$0.16 per gallon for the 24, 32 and 64 gallon carts, and \$0.30 per gallon for the 96 gallon cart. Additionally, the base customer charge is increasing by \$1.865 to a total of \$11.35 per customer account per month. To fund continued improvements to litter abatement, street cleaning and hazardous waste disposal services provided by ARR the FY 2014/15 Budget includes an increase in the Clean Community Fee of \$0.75 per month for residential customers and \$4.65 per month for commercial customers.

In April 2013, City Council expanded the Universal Recycling Ordinance to include smaller properties and established minimum recycling requirements for all businesses to be implemented by October 2016. The amended ordinance also directed ARR staff to develop organic collection requirements and rules for food service establishment beginning October 2016. The focus of outreach efforts is to promote commercial recycling and composting initiatives and ensure the business community has the technical information and practical tools to meet the City's Zero Waste goal.

Austin Clean Community Fee

All residents in Austin, including single-family homes and apartment and condo dwellers, pay a monthly \$7.65 Clean Community Fee for services that keep Austin clean and enhance the livability of our neighborhoods and the downtown area. The Clean Community Fee funds the following:

- Street Sweeping
- Litter Abatement
- Recycle & Reuse Drop-Off Center
- Business Outreach
- Austin Reuse Centers
- Zero Waste Program Development

- Clean Austin
- Dead Animal Collection
- Boulevard Sweeping

The fee also covers the enforcement of some City codes. Annexed properties also receive these services and are charged the Clean Community Fee. These fees appear on your monthly City of Austin utility bill.

Dallas

The City's Sanitation Department will move to an enterprise fund in 2015/16.

In 2014/15, the landfill generated \$21 million in revenues from commercial haulers. Operational costs for the landfill are estimated to be \$10.09 per ton. The landfill received a total of 1.6 million tons for the same period. The total landfill budget, including costs for managing waste generated from City residents was \$16 million. For 2015/16, costs are expected to increase, while revenues are anticipated to decrease. The cost per ton is budgeted to be \$12.40/ton.

Denton

Work with a service provider to design, construct and operate a Compressed Natural Gas fueling facility to provide the first public access sustainable CNG vehicle fuel station in the community and the Solid waste Fund fleet.

Work with a service provider to design, construct and operate a Grease & Grit trap processing facility to provide local processing services to the business community.

Developed the MSW Facility permit modification to implement landfill mining operations in order to extract and process valuable recyclable materials and to reuse the recovered airspace for future landfill disposal.

Garland

Landfill Fees

Landfill Fees include charges to private commercial haulers and other surrounding cities for the use of the City's solid waste disposal site. The tipping fees the City charges private commercial haulers are primarily based on prevailing market rates. The current tipping fee for commercial haulers is \$35.00 per ton for those utilizing automated equipment and \$52.50 per ton for those manually off-loading. In an effort to increase General Fund revenue, the EWS – Disposal (Landfill) Department has also offered, since 2003, a negotiated tipping fee to commercial haulers who have the capability of providing at least 1,000 tons per month.

Total Landfill Fees are projected to be \$6.7 million in FY 2015-16, representing an increase of \$637,000 (10.5%) from FY 2014-15 budgeted levels. The growth in revenue is due to an increase in construction activity experienced in the Metroplex area, causing additional tonnage to be disposed by private waste haulers at the Hinton Landfill.

Disposal Fees

Landfill Disposal Fees represent charges to the City's Environmental Waste Services - Delivery (EWS) Department and other City departments for the disposal of refuse. Disposal Fees are tied to the Landfill's cost-of-service rate which is \$23.00 per ton for FY 2015-16.

Total Disposal Fees of \$3.7 million are included in the FY 2015-16 Adopted Budget, reflecting a decrease of \$160,000 (4.1%) from levels budgeted in

FY 2014-15.

Plano

- Maintain Environmental Waste Services Dashboard (Socrata) Measurements
- Maintain a 95.8% or above excellence customer service rating
- Complete Plano's 20 year Solid Waste Plan project
- Complete and implement the 2nd Regional Compost Agreement between North Texas Municipal Water District and four (4) additional Member Cities (Allen, Frisco, McKinney and Richardson) Evaluate the Recycle Right All-Star Recycling Program
- Increase exposure, publicity and participation of the Green Business Certification Program
- Seek and identify markets for Constructions & Demolition (C&D) material
- Advance existing recycling programs to largest generators of solid waste
- Organize and participate in outreach events to increase awareness of Commercial Recycling programs
- Evaluate the impact of a regional C&D
- Material Recovery Facility on Plano's C&D recycling program, commercial solid waste stream and North Texas Municipal Water District percentage
- Assess diversion potential of multi-family landscape waste

Arlington

Landfill royalties are \$3.5 million per year

The City of Arlington has provided curbside recycling for nearly 20 years. In the past, residents were provided with 22-gallon recycling bins to place curbside once a week, and recycling was collected manually by the city's contract hauling vendor. In June of 2013, the city's hauling vendor switched from manual to automated collection, and residents were provided with 65-gallon wheeled carts. It is anticipated that participation in recycling, as well as collection volume, will increase due to the convenience of the new carts.

Curbside diversion rate measures the percentage of all residential garbage collected curbside that was diverted from the landfill and recycled instead.

For the first three quarters of the fiscal year, curbside recycling increased 2.7% over the same period last fiscal year (from 23,319 tons to 23,950 tons). The diversion rate is 22% for 4th Quarter 2015.

Amarillo

Provide for the efficient collection of residential and commercial solid waste, as well as to respond to all citizen inquiries in a timely fashion. Improve overall safety by training employees in the areas of bodily injury prevention as well as motor vehicle safety.

Increase public awareness of the importance of recycling by continuing to maintain the City's drop-off recycling program.

After several commercial collection businesses expanded and the Amarillo Independent School District participating in cardboard recycling, there has been a reduction in commercial revenue. Due to several

new, expanding subdivisions and increases in the residential route customers, the collection routes will be evaluated for the most efficient and balanced service.

San Antonio

Recycling Plan

Department appropriations are guided by the Recycling and Resource Recovery Plan (Recycling Plan) approved by City Council in June 2010 and revised in January 2013. The Recycling Plan established strategic goals to ensure all single-family and multi-family residents have access to convenient recycling programs, businesses have improved recycling opportunities and 60% of all single family residential curbside material collected by the Solid Waste Management Department (SWMD) is recycled by the year 2025.

Since the adoption of the Recycling Plan, the Department has undertaken multiple initiatives in order to reach these goals. The brush and bulky collection was revamped to increase brush recycling, a new brush recycling center opened on the City's South Side, blue cart recycling outreach increased, recycling education to schools increased, four new bulky drop-off centers opened, and City Council approved an ordinance requiring multi-family complexes to provide recycling. As a result, the residential recycling rate is currently at 30%.



Commercial Recycling

Another component of the Recycling Plan is improving recycling opportunities for businesses. If FY 2016, the Department will undertake new initiatives to improve commercial recycling including assistance with performance measurements, expert consulting and recognition programs. Through performance measurements, the Department will help businesses to measure how much they recycle and to track their progress. SWMD will also provide expert consulting to help businesses analyze their waste stream and to develop customized plans to recycle more and minimize costs. Lastly, the Department will develop a business recognition program to share and celebrate innovative recycling practices.

Variable Rate Pricing (Pay as You Throw) The next step toward achieving a 60% residential recycling rate is implementing variable rate pricing, also known as Pay as You Throw (PAYT). PAYT will provide customers with a blue recycling cart, a green organics cart and a choice between three brown garbage carts (small, medium, large). The larger the brown cart, the greater the monthly rate for the cart. PAYT will incentivize customers to use smaller brown carts and to recycle more with the blue and green carts.

This budget provides funding to begin PAYT conversion and expand the program to half of the Solid Waste customers. The funding includes the purchase of 18 refuse trucks and more than 340,000 garbage carts. An additional 13 positions will be funded to support PAYT conversion including 6 refuse truck drivers, 3 route inspectors, 1 route supervisor, 2 accounting clerks and 1 recycling coordinator. All solid waste customers will be converted to PAYT by mid FY 2017.

Review Findings

Some of the key findings of the organizational assessment include the following.

- The staff are very focused on customer service as their primary mission. A secondary mission is to improve the environment of the City and promoting a sustainable Fort Worth. Establishing a “model” program was also a common theme related to the mission of the Division. The staff demonstrated a high degree of “passion” for providing quality service.
- There is general understanding that, with few exceptions, the residents of Fort Worth are satisfied with the services that are provided. The last survey of residents indicated that satisfaction with solid waste services was 75 percent. Based on data from other cities, this is an average level of residential satisfaction with solid waste management services.
- Maintaining service fee rates with no increases for the past eight years is one of the factors leading to customer satisfaction. If the CSWMP anticipates changes in future rates, the organization should be prepared to clearly communicate the need for increases in rates.
- There is a need for greater attention to education – especially in the ICI sector.
- The City of Fort Worth is unique to other major metropolitan cities in Texas, with the exception of Arlington, in that almost all services are contracted out to the private sector. This fact places certain limitations on the SWSD’s ability to expand residential services without renegotiating service contracts.
- The SWSD is in an organizational state of flux. A new AD took over operations in January of 2016. In addition, there are organizational changes being made by the Code Compliance Department. This presents both opportunities and a sense of uncertainty that is associated with any major organizational change. In discussions with staff they seem positive about the changes anticipated.
- **The IT system needs a major investment.** There are opportunities for improving overall efficiencies through technology, both in the office and out in the field that are being missed.
- The Call Center operations has the long-term goal of transitioning to a 311 service for the City. The Call Center is a critical component of the City’s response to a disaster debris event.
- Contract management maintains good communications with subcontractors and staff are satisfied with performance. However, too much reliance on performance of landfill operations is placed in hands of contractor. Closer evaluation of their operations will be necessary to assure the facility is meeting environmental regulations and that the facility is being operated efficiently. Given the long lead times for TCEQ inspections, it would be appropriate to either contract with an engineering firm or hire an in-house staff to perform landfill site evaluations for: environmental compliance, operational efficiencies, and remaining capacity.
- The illegal dumping collection group has demonstrated an ability to reduce quantities significantly over the past several years. The Field Operations Supervisor has established self-directed teams to provide this service. Quantities of illegally dumped materials have dropped significantly over the past several years, allowing for a reduction in collection staff.
- Field Operations also has responsibility for operations of the drop-off stations. The SWSD is in the process of dividing responsibility for managing illegal dumping and drop-off stations. The City is in the process of expanding the number of drop-off centers from three to four which will require additional staff to manage. The City is also considering adding collection of HHW at these sites,

which will also require not only more staff, but a significant amount of training related to acceptance of these materials.

- The City continues to grows, which will place more demand on services. At present, there are requests for few additional staff. However, with the addition of new programs, and the move to expand the merger of Code Compliance Department into the SWSD, there will be a need to revisit staffing levels. The most immediate staffing needs include IT and public information.
- The public information is not directly under the SWSD. It is its separate division within Code Compliance. This reduces the level of public information programs for solid waste management activities. According to the head of public information, approximately 60% of time is allocated to solid waste issues. An additional marketer is planned. As the City looks to make significant changes to the program and services, public information programs and communication are going to be key to public acceptance of the proposed changes.
- There are plans to move the Planning group to a separate section of Code Compliance and will not only have responsibilities for planning associated with solid waste, but also for other Code Compliance services and planning needs. This has the potential for diluting solid waste planning activities.
- An area for improvement expressed by staff was enforcement of City policies. This includes enforcement of rules pertaining to what can be placed in recyclable containers and solid waste containers. The Blue Crew program is designed to educate residents and enforce compliance with recycling program. The illegal dumping program has been successful in reducing quantities, but enforcement is limited.
- The City's service fee rates are reasonable and below the average of other comparable City rates.
- The City's staffing levels are within reason for the programs it provides and the customers it serves, especially in comparison to other Cities.

5.4 Reuse

Program Description

The most efficient way to reduce waste is not to create it in the first place. Purchasing reusable new or used materials and choosing to reuse them has several benefits. First, it eliminates the need to harvest, transport and fabricate new materials which saves energy, reduces greenhouse gas emissions, and conserves natural resources. Second, it reduces the quantity of materials requiring disposal. Reuse is preferable even to recycling from both a sustainability and an economic standpoint. Public information programs explaining the economic and environmental benefits of reuse raise the public consciousness on the subject and increase reuse.

The following are all methods of encouraging reuse.

- Mandating or giving preference to reused or reusable items through the City's own procurement policies
- Requiring reusable food service items in City facilities and giving preference to them at public functions

- Augmenting recycling and disposal facilities with “Swap Shops” or reuse centers where the public can “shop” for reusable items donated by the public or recovered from disposal, ranging from furniture and appliances to household chemicals
- Imposing a preference for reusable shopping bags through mandates, fees, or other economic incentives
- Donation or sale of unwanted items to organizations which facilitate reuse, such as religious institutions, community centers, thrift stores and non-profit organizations.
- Food banks to the extent that they often recover excess and unsold food that would otherwise be destined for disposal
- Sustainable building standards often encourage reuse of materials in construction and facilities designed to support reuse such as providing dishwashers for reusable service items

Current goals and standards

Reuse is very difficult to quantify, especially on the part of the general public. Documenting reductions in disposable items purchased by the City or institutions is one method of documenting progress.

Program Evaluation

The private and non-profit sectors provide infrastructure supporting reuse in the form of resale businesses and donation/distribution centers. Voluntary sustainability efforts also encourage reuse as a means of reducing waste of all types.

5.5 Source Reduction

Program Description

Source reduction is defined as measures to reduce the amount of any material entering any waste stream or otherwise released into the environment prior to recycling, treatment, or disposal. In more colloquial language, it is the concept of avoiding waste “in the first place.”

Reuse is the practice of reducing waste generation by using a product more than one time.

Pay-As-You-Throw (PAYT)

The City’s primary efforts to reduce waste generation through either source reduction or reuse is through the City’s “Pay-As-You-Throw” (PAYT) program and through public information programs. Fort Worth is a PAYT city which means you pay for the level of garbage service used, very similar to other utility services.

City residents choose the size of their garbage cart based on their family’s size and habits:

32-gallon cart: Good for a family of 1 to 2 people who recycle paper, plastic, metal and glass containers. \$12.50 per month (maximum weight allowed for collection is 150 pounds).



64-gallon cart: Good for a 3 to 4 person family that recycles. \$17.50 per month (maximum weight allowed for collection is 200 pounds).

96-gallon cart: Good for a larger family that recycles or for smaller families who choose not to recycle. \$22.75 per month (maximum weight allowed for collection is 250 pounds).

Public Information Programs

The City has an active public information program that is directed to the general public through a wide range of social media and the press. With respect to source reduction, the City presents articles and information on source reduction and reuse strategies, including backyard composting and don't bag it strategies for dealing with yard waste and leaves. Other methods of source reduction that can be promoted include the following.

Code Enforcement Measures

The City requires residents to set-out waste in the proper containers. If waste exceeds the capacity of the collection carts, the waste can be set-out in special bags sold by the City. The additional charge for these bags helps encourage reduced waste generation.

Other cities have adopted code enforcement measures related to solid waste management. The MSW code which encourages the greatest degree of source reduction is a ban on "mixing" yard waste with garbage for disposal, sometimes referred to as "Don't Bag It" programs. A number of cities in the Metroplex enforce such regulations as a means of reducing the amounts of grass clippings and leaves requiring collection and disposal, and to increase recycling. Because the City has a yard waste collection program that results in recycling this waste through mulching, the City is likely to continue its current program. Yard waste is estimated to account for approximately 13.5 percent of the MSW (Source: EPA).

Current Goals and Standards

The goal of the source reduction and reuse programs is to reduce the amounts of waste requiring collection and disposal. While there are benefits associated with recycling and organic composting, the reduction and elimination of wastes is the most environmentally acceptable means of managing MSW.

Program Evaluation

Over the course of the last ten years, the City has encouraged residents and businesses to generate less waste through its various programs. The results of these efforts can be evaluated by examining the amounts of waste that are sent to the landfill on a per household basis. Table 5-5 and Figure 5-5 illustrate the decrease in the amounts of waste generated per household. The data show that over the period 2004-2013, the waste disposal rate on a household basis has fallen by approximately 10 percent. This translates approximately to 14 percent less solid waste that has to be collected, hauled and disposed. The savings translates into additional landfill life and lower costs for collection, although collection contracts generally do not recognize savings associated with reduced generation rates.

Table 5-5 Waste Disposal Rates

Year	Pounds Disposed Per Household Per Week
2004	50.02
2005	46.97
2006	44.04
2007	46.20
2008	44.92
2009	45.67
2010	46.21
2011	43.50
2012	43.40
2013	43.09
2014	43.59
2015	47.65

Source: City of Fort Worth

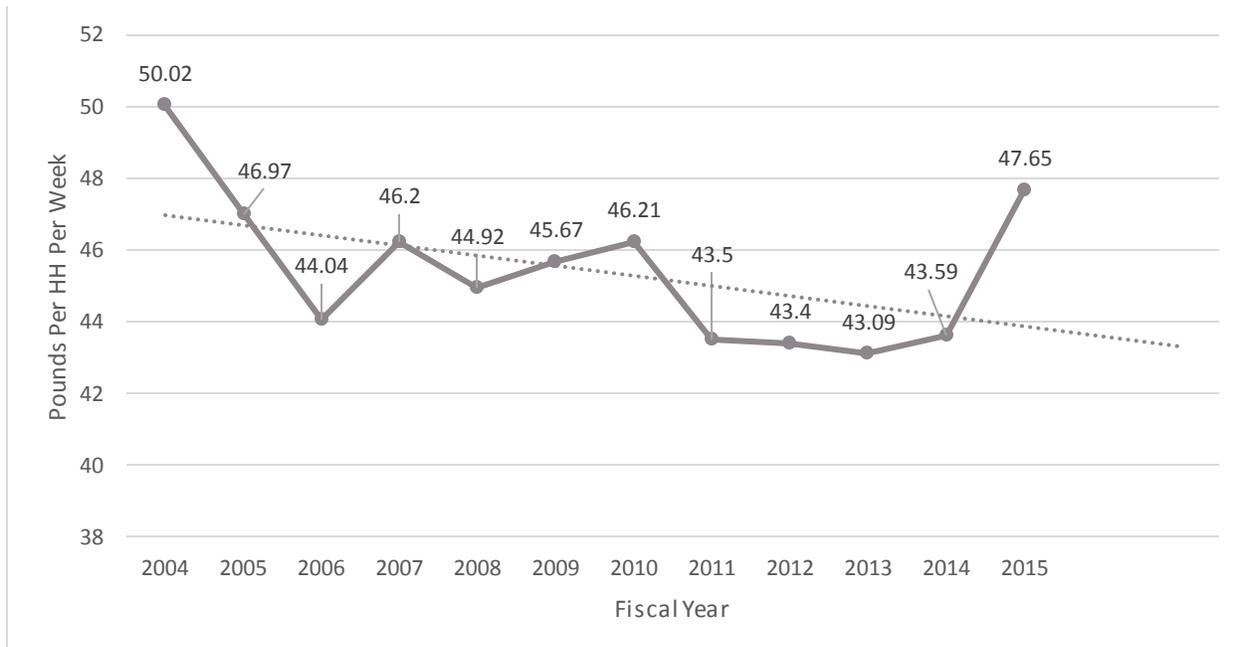


Figure 5-5 Fort Worth Waste Disposal Rates Per Household Per Week, 2004 – 2015
Source: TCEQ 2014 Report

The City’s waste generation rate has fallen at approximately the same rate as state-wide numbers. A review of data from the TCEQ indicates that the per capita disposal rate, which is similar to the household data presented above, went from 7.21 pounds per capita per day in 2004 to 6.58 pounds per capita per day in 2014 as shown in Figure 5-6.

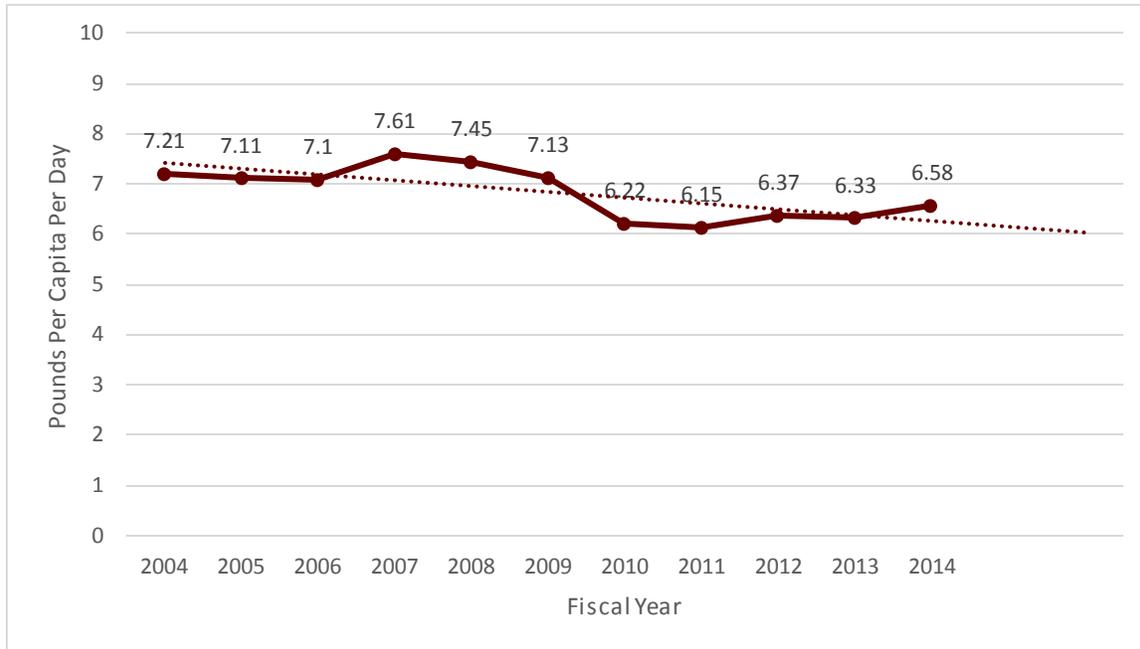


Figure 5-6 Texas Waste Disposal Per Capita per Day, 2004 – 2014

5.6 Ordinances, Rules, and Regulations

Program Description

The regulatory program in City of Fort Worth in regards to solid waste and operations within the city consists primarily of four aspects:

- The Grants of Privilege, which impose certain conditions on the grantees such as hours of operation and the payment of a fee for the ability to provide solid waste collection within the city;
- The multi-family recycling ordinance, which went into effect January 1, 2014;
- The Zoning Ordinance, which has sections related to siting of solid waste facilities and waste management containers and activities allowed on certain land uses and facility types; and,
- Other provisions of Chapter 12.5 (Environmental Protection and Compliance), Article VIII (Solid Waste and Recycling) which regulate matters such as enforcement, safety, curbside set-outs, proper containers, hours of operation, fees, etc.

Grants of Privilege

The Grants of Privilege program collects a fee from waste haulers of 5 percent of gross revenues. This money is returned to the General Fund with the intent to pay for street use. It also places the following requirements upon grantees:

- Operate in an efficient and businesslike manner;
- Comply with all pertinent rules, regulations, laws, and ordinances related to collections;
- Regarding vehicles: must be permitted, proper type, covered, adequately identified, in good repair, and refrain from spilling or spreading vectors;
- Use only proper containers for collecting and transporting waste;
- Assume liability for all costs of repair of public streets, bridges, rights-of-way, and other facilities that are damaged as a result of negligence by Grantee;

- Comply with all rules, regulations, laws and ordinances pertaining to the disposal of solid waste
- Refrain from collecting waste between the hours of 11 p.m. and 6 a.m. saving when an exception has been authorized;
- File quarterly reports on tons of waste and recyclables collected, including separate data for commercial and multi-family accounts; and,
- Maintain minimum levels of insurance.

Multi-family Recycling

The multi-family recycling regulation places a regulatory burden on landlords to create, submit, and implement a plan to provide recycling for facilities with eight or more units. A waiver for compliance with the regulation is available if the landlord can prove recycling is impossible or that none of the residents desire to recycle. There is nothing in the regulation stipulating how the recycling system shall be set up, outlining what materials it shall collect, or requiring any person or persons to participate ; although these need to be spelled out in the multi-family complex' plan submitted to the city for approval.

Zoning Ordinance

At present, the Zoning Ordinance primarily addresses siting of waste management facilities and reflection of waste management areas on site plans, as summarized below:

- Chapter 4, Article 3: Within a Planned Development district, the location of garbage containers and the screening thereof must be shown on site plans; and, a landfill or recycling center is a permitted land use within a Planned Development district;
- Chapter 4, Article 4: No new waste disposal facilities shall be permitted within 10,000 feet of any airport unless approval is obtained from the FAA, and expansions of existing land disposal facilities within these distances shall be permitted only upon demonstration that the facility is designed and will operate so as not to increase the likelihood of bird/aircraft collisions;
- Chapter 4, Article 7: Developers of Residential Districts who bear a streetscaping requirement can use trash containers to comply with such requirement;
- Chapter 4, Article 8: Contains a table showing non-residential land uses and the district types in which they are permitted; a landfill, recycling center, household hazardous waste or waste tire facility are permitted only in a Planned Development district;
- Chapter 4, Article 11: A listing of district types and activities that are and aren't permitted therein; in an Industrial Park, activity shall not disturb others or cause a nuisance with its solid waste, discharge solid waste into the environment, nor openly burn solid waste;
- Chapter 4, Article 12: Contains a table showing the uses permitted within the form based/mixed use districts; a landfill, recycling center, household hazardous waste or waste tire facility are not permitted in any of those districts;
- Chapter 4, Article 13: Developers of Form Based Districts who bear a streetscaping requirement can use trash containers to comply with such requirement;
- Chapter 5: Supplemental Use Standards, provides specific restrictions or permissions for various land uses; for example,
 - A Bed & Breakfast may not use a dumpster to contain its waste;
 - Trash collection and compaction of commercial waste may not occur within 100 feet of residential property (see Figure 5-7 for diagram example of setbacks); and,
 - Automated collection vending machines and small collection facilities, not to exceed 500 square feet, for recycling aluminum cans, glass, grocery bags, plastic bottles, magazines,

newspapers and other comparable materials may be permitted in accordance with the use tables in Chapter 4, Articles 6 and 8.

- Chapter 6: Sets restrictions of activity when a property is being developed; for example,
 - Garbage containers cannot be located on bufferyards (open or landscaped areas segregating incompatible land uses on adjacent properties);
 - Waste cannot be accumulated in tree protection areas; and,
 - Screening for commercial/institutional uses shall include screening of refuse handling facilities, including refuse disposal and recycling with permanent opaque walls or wooden fences on all sides.

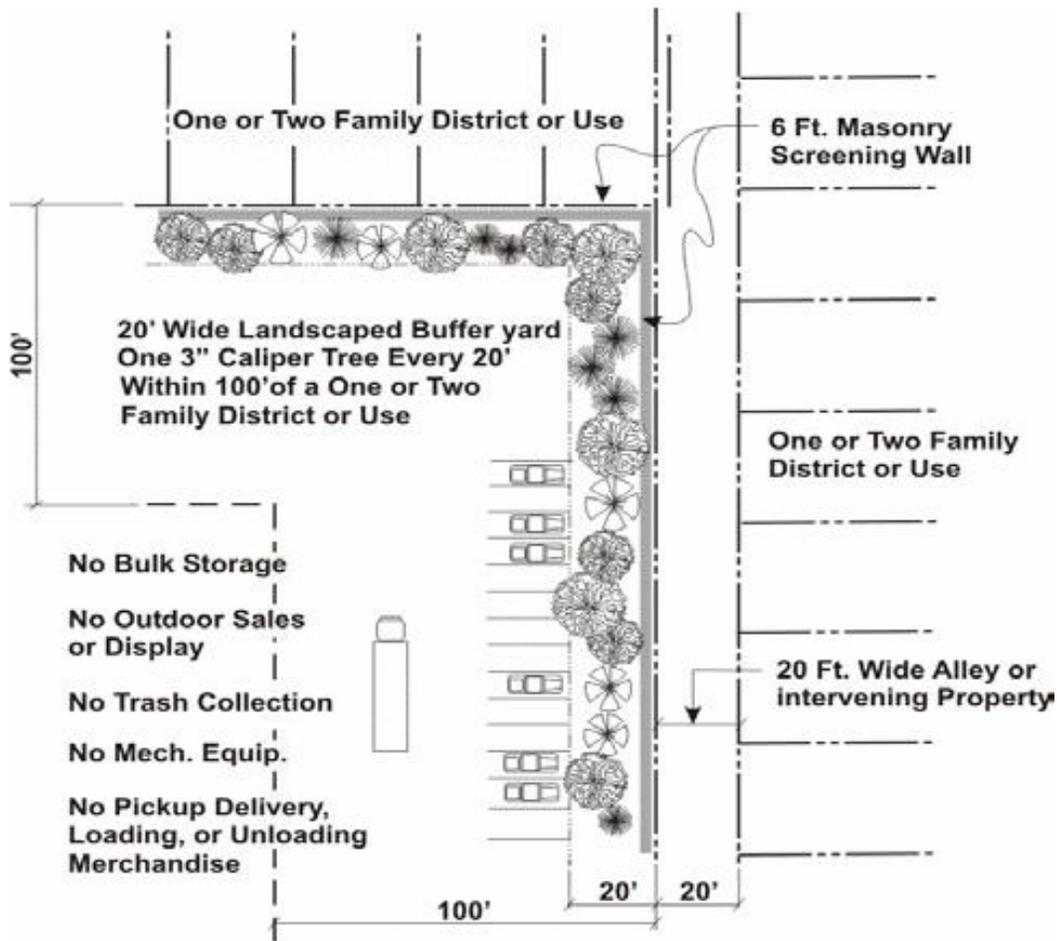


Exhibit A-2 Wall and Landscaped Buffer Yard

Figure 5-7 Diagram of 100' Setback for Large Retail Stores, Chapter 5, City of Fort Worth Zoning Ordinance

Chapter 12.5 Article VIII

The remaining sections of the solid waste code generally serve to give instructions, ensure safety, set fees, protect quality of life (e.g. controlling noise and vectors), and spell out the administrative functions of the law.

Current Goals and Standards

Aside from the fact that the Grants of Privilege system and increased multi-family recycling were called for in the current 1995-2015 Plan, as discussed above, there were no direct goals or actions related to regulation. Best practices for solid waste regulation vary widely, and are influenced heavily by local traditions, mores, and politics. While municipalities commonly have regulations regarding sanitation, collection vehicles and containers, business permits, and land use, intangible factors can influence the presence or absence of regulations requiring individuals or businesses to take certain actions. For example:

- Communities may have longstanding traditions regarding the disposal of waste, including a “kitchen sink” approach to putting materials at the curb, self-hauling to “the dump,” informal but accepted curbside scavenging, or a strong culture of charitable donation and/or reuse. Solid waste systems that do not consider these traditions could meet with resistance.
- The “right” to throw away something one no longer wants may be seen as fundamental, meaning that laws that restrict the ability of an individual to do so—such as requiring recycling—are “wrong.” This can be especially true for laws requiring action by businesses, where recycling may be painted as a “burden” for businesses that they should not have to do.
- Alternatively, there may be a strong local value placed on environmental conservation, and the political will of the population may be that reducing waste and protecting the environment is a good and proper use of government action, resulting in more and stronger laws and the enforcement thereof.

Therefore, when considering a regulatory program, a municipality must weigh not only the costs and impacts, but also how the regulation can be successfully implemented by considering local needs, attitudes, traditions, and goals.

Program Evaluation

As described previously, within two years of the law going into effect, 545 multifamily housing complexes have complied with the requirement to plan for and implement recycling programs. The fact that this compliance includes 105 complexes—or, 19.2 percent of the regulated community—requesting waivers for the regulation, especially since its requirements are quite minimal, is not ideal. In addition, as noted, the ordinance has no service capacity requirements nor does it specify which products must be recycled. Therefore, the regulation does not ensure that apartment residents are provided a similar level of recycling service as single family residents, or even that the service they are provided is convenient or adequate.

The Zoning Ordinance currently focuses primarily on containing nuisances, protecting parties from non-compatible uses on neighboring properties, protecting active aviation airspace, shielding residences from inappropriate waste collection activity, and describing which type of district in which solid waste management facilities may operate. The Zoning Ordinance does not currently address other waste management matters as other municipalities have, such as:

- Requiring recycling containers for use by occupants at one or more land use or District types;
- Mandating sight or walking distances for such containers from the users and occupants; or,
- Specifying in the streetscaping burden on developers that compliant trash receptacles must be accompanied by recycling receptacles.

The Grants of Privilege program has been successful in accomplishing two feats which a simple permitting ordinance likely would not: finding an appropriate and reliable funding source for the City to offset the impacts of the collectors' operations, and requiring reporting from haulers. There is room for improvement, however. The funding is not currently used for solid waste management purposes, which would be appropriate for furthering the intention of the Privilege. In addition, the required reporting would be more beneficial to the City as a technical assistance tool if it were more robust.