



Recycling, Reuse, and Waste Reduction Plan

PREPARED FOR:

Dallas Airport System

DRAFT

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Ricondo & Associates, Inc. (R&A) prepared this document for the stated purposes as expressly set forth herein and for the sole use of Raleigh-Durham Airport Authority and its intended recipients. The techniques and methodologies used in preparing this document are consistent with industry practices at the time of preparation.

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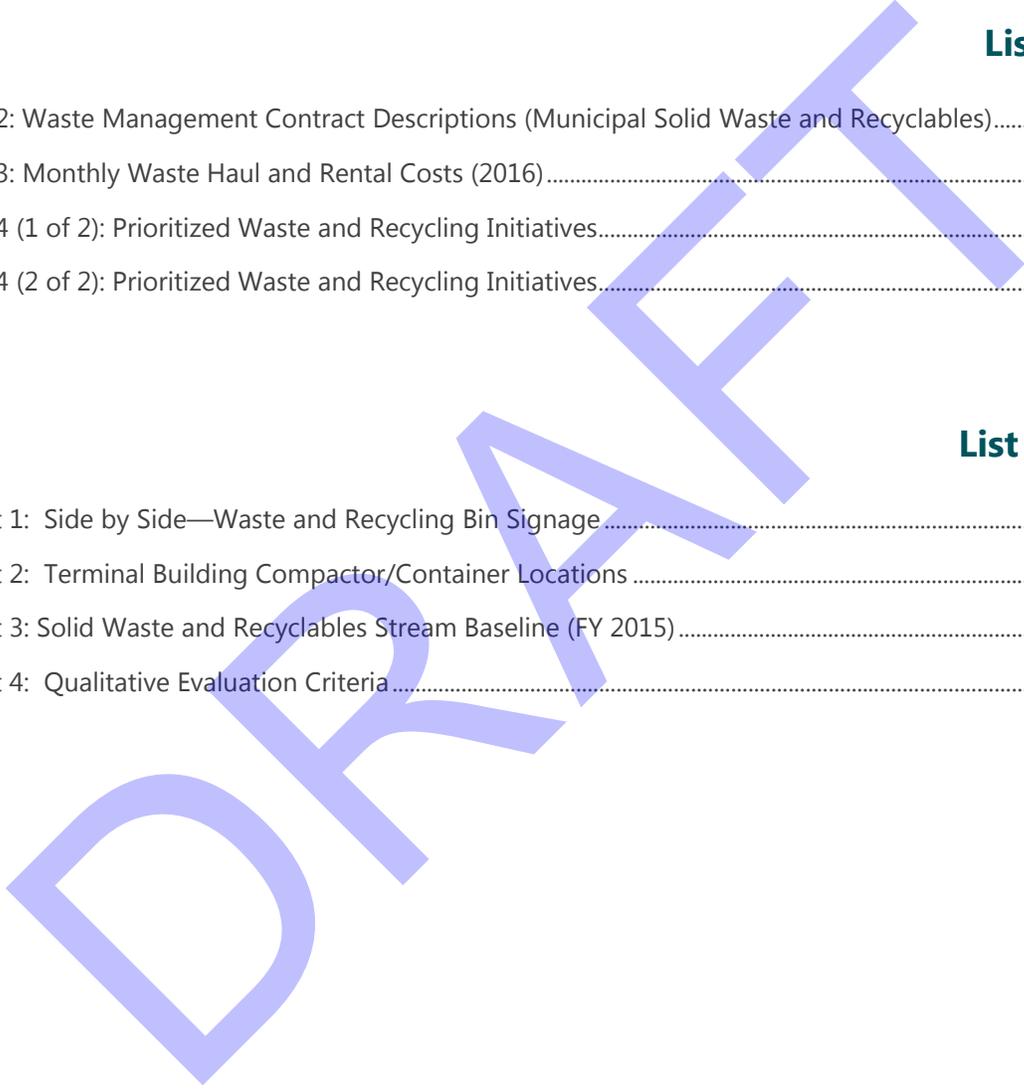
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1. Introduction

This Airport Recycling, Reuse, and Waste Reduction Plan (Waste Plan) has been prepared in accordance with guidance issued by the Federal Aviation Administration (FAA) on September 30, 2014,¹ as an element of the Dallas Love Field (the Airport or DAL) Master Plan Update Study.

1.1 Facility Description and Background

The Airport is located in the City of Dallas, Texas, approximately four miles northeast of the central business district. The Airport encompasses 1,300 acres and is owned by the City of Dallas and operated by the city's Department of Aviation (DOA).

The Airport has two parallel runways, Runways 13R-31L (8,000 feet) and 13L-31R (7,752 feet). Pending FAA approval, the Airport's third runway, Runway 18-36, is to be decommissioned in the summer of 2016; it is currently used as a taxiway. The newly constructed terminal building is nearly equidistant between the parallel runways. The terminal building consists of one double-loaded linear concourse that accommodates all of the Airport's 20 gates.

DAL is served by three major commercial airlines: Southwest Airlines, Virgin Airlines, and Delta Air Lines. Southwest Airlines is the primary airlines, owning and operating over 85 percent of the Airport's gates. In the fall of 2014, the DOA completed the Love Field Modernization Program (LFMP), which included the redevelopment of the terminal building to a 20-gate facility to address the mandate of the Wright Amendment repeal and associated airfield improvements. The Wright Amendment initially limited nonstop service to states only contiguous to Texas. The repeal lifted these service area restrictions, resulting in the ability for airlines to serve all domestic destinations; however, it reduced the number of allowable gates at DAL from 32 to 20. Although there has been a reduction of gates, DAL has seen a dramatic increase in enplanements due to the nonstop markets that airlines at the Airport are now able to serve.

The LFMP opened in October of 2014 and changed the operational conditions of the terminal building. Due to these changes, the base year for the Waste Plan is fiscal year (FY) 2015 (i.e., October 2014 to September 2015), which represents the first full year of operation of the LFMP. FY 2015 was also the most

¹ U.S. Department of Transportation, Federal Aviation Administration, Memorandum to Regional Airport Division Managers, "ACTION: Guidance on Airport Recycling, Reuse, and Waste Reduction Plans," September 30, 2014.

recent full year of data available at the time this study was prepared. In FY 2015, DAL accommodated approximately 177,000 operations split between commercial and general aviation (GA), 4.4 million enplanements, and 250 based aircraft. DAL was classified by the FAA as a medium-hub airport, accounting for between 0.25 and 1.0 percent of total nationwide enplaned passengers.²

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² U.S. Department of Transportation, Federal Aviation Administration, *FAA Terminal Area Forecast*, 2015.

2. Existing Waste Program

The DOA began their waste program prior to the LFMP project and has been in place for nearly a decade. To better align with the city's management waste program, they adopted the city's recycling program start date of February 2013. In February 2013, the City of Dallas released the Local Solid Waste Management Plan, which detailed the future plans for waste management and waste diversion in the city. The plan established a local waste goal to transition to a more sustainable material management system for waste and recyclable materials. To achieve this goal, the plan identified landfill diversion rate goals for years 2020, 2030, and 2040. The diversion rate goals include 40 percent diversion from the landfill by 2020, 60 percent diversion by 2030, and maximum diversion by 2040. The current target for maximum diversion as defined in the Local Solid Waste Management Plan is the diversion rate of approximately 84 percent. The rate takes into account that residual materials that need to be landfilled will continue to be present in the City's waste composition. The City hopes to reach the target of maximum diversion over the 50 year planning horizon. Presumably maximum diversion would be reevaluated in the future within the context of technological advancements in waste recovery.

DOA staff understands the significance of a successful waste program, as well as the positive effects of reworking and reevaluating existing programs. In accordance with the City of Dallas' Local Solid Waste Management Plan, DOA staff has dedicated themselves to improving the Airport's existing waste program to better align with the city's plan. The DOA views the newly constructed, Leadership in Energy and Environmental Design (LEED) Silver terminal building as a building-block to incorporate sustainability-based initiatives and design. The terminal operates as a platform in educating the public about the DOA's commitment to sustainability. By incorporating the waste program within the terminal building, the DOA is able to illustrate their commitment to minimizing the Airport's environmental footprint in a financially responsible manner.

This section identifies the current waste program at the Airport.

2.1 Areas of Influence

In FY 2015, nearly 9 million passengers accessed the newly constructed terminal. Although the commercial aircraft operations at DAL amount to just over half the total annual aircraft operations, the majority of passenger activity is located within the terminal building. Other than the management of deplaned waste, the DOA has direct control over the infrastructure and disposal of waste generated within the terminal building. This Waste Plan focuses mainly on the terminal building due to the DOA's ability to influence the handling of waste within this area of the Airport.

The DOA currently has programs and practices in place to manage the collection and disposal of waste MSW, recyclables, and C&D debris. As these waste streams are the focus of the current waste management at the Airport, each of the three waste streams are further identified below:

- **Municipal Solid Waste (MSW)**—MSW produced at the Airport comprises materials produced in the day-to-day operation of the Airport, such as waste produced by passengers, concessionaires, tenants, and employees. MSW is collected throughout Airport facilities in containers and is transported to one of five compactors for removal from the Airport. Moore Disposal Corporation is the waste contractor that collects MSW and transports it to local landfills.
- **Recyclables**—Recyclables collected at the Airport consist of paper, cardboard, steel, and aluminum cans, glass, and plastics #1–#7 (excluding #6). These items are collected throughout the Airport and transported to one of two recycling compactors. The compactors are removed from the Airport by Progressive Waste Solutions of Texas, Inc. and transported to a materials recovery facility (MRF).
- **Construction and Demolition (C&D) Debris**—C&D debris includes materials resulting from the alteration, construction, destruction, rehabilitation, or repair of any manmade physical structure. C&D debris at the Airport is managed on a project-by-project basis. C&D debris is disposed of in accordance with the Site Waste Management Plan (SWMP) which states that all new construction, additions and first time finish out projects must recycle a minimum of 50% of construction debris. .

In addition to the three waste streams identified above, the DOA also has infrastructure and processes in place for the collection and disposal of other regulated non-MSW waste. This includes cooking oil and universal waste items such as pallets, batteries, light bulbs, and polychlorinated biphenyl (PCB) ballasts. As the disposal of these waste streams is regulated, opportunities to recycle, reuse, and reduce these waste streams were not evaluated in this Waste Plan. Another waste stream that is collected at the Airport but is not the main focus of the DOA's efforts is deplaned waste. Deplaned waste is handled by Airport tenants at their discretion. Although the Airport does not have ownership over deplaned waste, all three predominant airlines have sustainability policies that specify the recycling of plastic, aluminum, and paper products via single-stream recycling procedures. Lastly, the DOA has considered programs and opportunities for composting at the Airport. They will continue to explore composting alternatives however; there is not a current composting program at the Airport.

2.2 Federal, State, and Local Waste Management Guidelines

Federal, state, and local guidelines have been established to ensure proper waste handling and disposal. This section identifies some of these guidelines.

Federal policies include guidelines and regulations established by the U.S. Environmental Protection Agency (EPA) and the FAA. EPA guidelines that affect waste handling at the Airport include the Resource Conservation and Recovery Act (RCRA), which describes the proper waste management procedures and

programs mandated by Congress.³ The RCRA established a national framework for waste management procedures, including both non-hazardous solid waste as well as hazardous waste. The laws and guidelines mandated by the RCRA are monitored by state officials to ensure that all federal guidelines are followed by local entities. All waste produced at DAL, including MSW, recyclables, and C&D debris, would fall under the regulations established by the RCRA. Subtitle D of the Act establishes guidelines for the safe disposal of materials, such as MSW and recycling, including landfill material acceptance of industrial waste, location restrictions, proper mitigation guidelines for contamination cleanup, and closure requirements.

State guidelines include Texas State Statutes Chapters 361 and 363, which regulate the disposal of hazardous and general waste throughout the State of Texas.⁴ Chapter 361 establishes the definitions for waste management in Texas, including hazardous materials, composting, and industrial waste. The chapter also outlines the proper waste disposal procedures, permits, fee guidelines, and enforcement procedures required for the handling and disposing of waste. MSW, recycling, C&D debris, and composting produced at DAL fall under the guidelines established by Chapter 361 for proper waste disposal. Chapter 363 of the Texas Statutes established guidelines for local municipality waste programs which mandate all city departments follow an established program to ensure that individual waste management programs have similar procedures⁵ As a public entity operated by the City of Dallas, the DOA must follow guidelines established by state and city waste programs.

The City of Dallas maintains several management policies relating to the management of waste. The city's Environmental Policy (EP) ensures that all departments, contractors, and the community of Dallas follow a set of environmental guidelines to limit the City of Dallas' environmental footprint. The EP exists to encourage city departments to achieve greater success in environmental stewardship past the minimum standard set by city, state, and federal regulations. The EP states that all city departments and employees will meet or exceed the environmental regulations established for the region, which includes waste management protocols for MSW, recycling, C&D debris, and compost. In an effort to minimize the city waste footprint, the Dallas City Council passed the Dallas Local Solid Waste Management Plan for 2011–2060. The plan works within the confines of the EP to increase landfill diversion rates from the City of Dallas. All waste and recycling procedures established at the Airport have been developed by the DOA to ensure compliance with the city EP and with relating regulations.

³ Environmental Protection Agency, *Resource Conservation and Recovery Act (RCRA) Overview*, <https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview> (accessed June 16, 2016).

⁴ State of Texas, *Health and Safety Code Title 5, Sanitation and Environmental Quality, Subtitle B, Solid Waste, Toxic Chemicals, Sewage, Litter, and Water, Chapter 361, Solid Waste Disposal Act*, September 1, 1989.

⁵ State of Texas, *Health and Safety Code Title 5, Sanitation and Environmental Quality, Subtitle B, Solid Waste, Toxic Chemicals, Sewage, Litter, and Water, Chapter 363, Municipal Solid Waste*, September 1, 1989.

2.3 Existing Waste Management Program

The existing waste management program at the Airport is based off of the Environmental Management System (EMS) which is in alignment with the city's EP. Within the EMS, the DOA identified environmental aspects important to its operation. Solid waste was considered the most significant of the environmental aspects identified. Thus, the EMS objectives and targets are focused on the category of solid waste. In September 2015, the DOA set a specific objective and targets for the EMS.

- **Objective:** to reduce the Airport's impact on the landfill by improving recycling at the Airport
- **Target:** to improve the Airport's recycling rate by 5 percent above the baseline of 5.7 percent by fall of 2017.

Management of solid waste in the city's EP includes defining actions or initiatives to achieve the objective and target. Five initiatives that were identified within the EMS and completed as of June 2016: In addition to the five initiatives within the EMS, the DOA has identified several other initiatives that have contributed to the EMS objective and target. Below are the initiatives that have been completed as of June 2016 at the Airport

- Implement vendor education program (EMS initiative)
- Increase the number of gates in the recycling program from the current 12 gates to 20 (EMS initiative)
- Implement employee awareness program (EMS initiative)
- Monitor performance of all 20 gates (EMS initiative)
- Establish a baseline for all 20 gates and all existing recycling projects (EMS initiative)
- Established a custodial monitoring program to address recycling contamination issues
- Added a recycling roll-off container to the Airfield Maintenance Building parking lot
- Established unused paint donation program to the People Helping People Program

As mentioned the DOA is also in the process of implementing enhance signage for recycling bins to increase recycling container visibility within the terminal building within the upcoming months. Another initiative that is currently in the beginning stages is the installment of a liquid collection station to dispose of liquids and adjacent recycling containers to collect recyclable prior to TSA security. These initiatives are currently not identified in the EMS.

C&D debris management is also not included in the EMS. However, the DOA has implemented the SWMP, in accordance with Phase 2 of the city's Green Building Ordinance (effective October 1, 2009), which established a goal to recycle 50 percent of C&D debris from construction projects. To support C&D recycling, construction contracts specify that contractors:

- meet the desired recycling target;
- define waste materials for the project;
- identify waste contamination prevention and diversion measures;
- develop a monitoring plan, including documentation efforts; and
- implement an education program for subcontractors and field personnel.

In addition to the DOA's 2015 waste objective, target, and initiatives, Airport tenants have implemented waste reduction initiatives. For example, HMSHost and Hudson News have implemented an edible food waste donation program to reduce the amount of edible food sent to the landfill. In addition, airline office and in-flight recycling programs have been implemented by Southwest Airlines, Delta Air Lines, and Virgin America to manage deplaned waste.

2.4 Waste and Recycling Infrastructure

Both separate and combined containers for MSW and recyclables disposal are provided within the secure and non-secure areas of the terminal building. Each container is labeled to identify appropriate waste disposal. In summer of 2016, new container wraps will be applied to 100 side-by-side receptacles within the terminal building. See **Exhibit 1** for the illustration of the new bin wraps. As shown, the labels on the bin wraps are located on the top and sides of the container to allow for easy identification. The recycling bin wraps clearly identify paper, plastic, and metals as acceptable for recycling. Other areas within the terminal building, such as the DOA administrative offices, are equipped with separate trash and recycling bins.

Waste disposal infrastructure was integrated into the design of the LFMP. Waste and recycling compactor locations and access were made available in airside and landside locations. The terminal building is served by four MSW compactors, one MSW container, and two recyclables compactors. See **Exhibit 2** for the locations of the compactors and the container. All compactors and their corresponding lift equipment are owned and operated by the DOA.

Exhibit 1: Side by Side—Waste and Recycling Bin Signage



SOURCE: City of Dallas, Department of Aviation, 2016.
PREPARED BY: Ricondo & Associates, Inc., May 2016.

Exhibit 2: Terminal Building Compactor/Container Locations

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2.5 Waste Handling Procedures

Throughout the terminal building, a colored container liner system distinguishes MSW from recyclables and aids in the separation of waste streams throughout the waste transportation and disposal process. Black and clear liners are designated for solid waste, while blue liners are designated for recyclables. Janitorial staff transports the MSW and recyclables collected from the public areas of the terminal building and the DOA offices to either the airside or landside loading dock. Once at the loading dock, the janitorial staff sorts waste by liner color and disposes of the waste in the corresponding MSW or recycling compactor. Tenants and concessionaires located in the terminal also utilize the landside and airside compactors. They transport back-of-house recyclables and waste to the loading dock and dispose of recyclables (primarily cardboard) and MSW in the proper compactors. The Airport office areas are equipped with trash and recycling bins at desks and in the common areas. These bins are individually emptied by janitorial staff into larger color-coded bags for transport and disposal into appropriate MSW and recycling compactors.

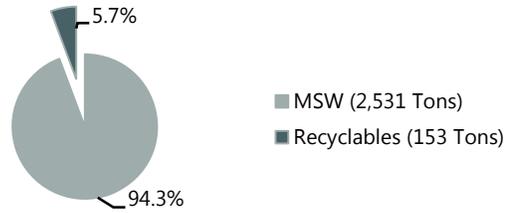
The airside MSW compactors are serviced one time per day (Monday through Friday), and the landside MSW compactors are serviced one time per week. The recycling compactors and MSW roll-off container are serviced on an as-needed basis. When a recycling compactor or the landside MSW roll-off container is full, a DOA Facilities Department employee contacts the City of Dallas Sanitation Department, in which the appropriate waste contractor is alerted that the container or compactor is ready for pickup. At the time of service, the waste contractor picks up the container or compactors and transports the waste 16 miles to the McCommas Bluff Landfill for disposal and transports the recyclables 13 miles to Greenstar Recycling for recovery. The empty compactors and/or containers are then returned to the Airport. The total time for transit and disposal of a roll-off container or compactor is approximately three hours. It should be noted that MSW is collected from the curbside by Airport Maintenance and is disposed of in a container located at the Airfield Maintenance Building. Recycling is not currently offered at the terminal curbside.

2.6 Waste Management Performance

In FY 2015, approximately 153 of 2,684 tons of waste were recycled, equating to a baseline landfill diversion rate of 5.7 percent at DAL⁶ (see **Exhibit 3**). The EMS target, set in fall of 2014, is to improve recycling by 5 percent above the baseline by fall of 2017 compared to the DOA's FY 2015 baseline of 5.7 percent.

⁶ Dallas Sanitation Services, *Copy of Aviation Report 81215 Oct14-Sept15*, March 2016 (received from Lauren Seydewitz on November 20, 2016).

Exhibit 3: Solid Waste and Recyclables Stream Baseline (FY 2015)



NOTE:

Data does not include waste quantities collected from the Airfield Maintenance Building.

SOURCE: Dallas Sanitation Services, *Copy of Aviation Report 81215 Oct14-Sept15*, March 2016 (received from Lauren Seydewitz on November 20, 2016).

PREPARED BY: Ricondo & Associates, Inc., June 2016.

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3. Waste Audit

In 2009, in an effort to accurately gauge the composition of Airport waste, Camp Dresser & McKee Inc. (CDM) conducted a waste characterization study to identify the types of waste generated at DAL. Although the study was conducted prior to the construction of the LFMP, the characterization of waste is assumed to be representative of the existing waste types generated at the Airport. Yet, it is also recognized that the proportion of material types may have shifted since the time of the study, due to the increase in concessions offered after the opening of the LFMP. The Waste Characterization Study focused mainly on two passenger-related waste streams:

- Waste generated in the public areas of the terminal building
- Waste generated by concessionaires and retail tenants

It was found that waste originating from the public areas of the terminal building consisted primarily of food and drink containers (plastic bottles, Styrofoam food containers, and wrappers), food scraps, paper (newspaper, magazines, and restroom waste), and plastic wrappings. Minimal amounts of glass and aluminum were observed due to the lack of availability in the secure areas of the terminal building. Observations indicate that waste was generated by passengers disposing of previously packaged items, as well as items purchased at the Airport.⁷

Concession and retail waste consisted mainly of cardboard boxes, paper and plastic packaging, and food scraps and wrappers. Aluminum, plastic, and glass containers are also produced within the daily operations of kitchen, dining, and retail areas. Cardboard was the main material observed to be recycled by concession staff.

In addition to the Waste Characterization Study, the Airport assessed passenger interest in a recycling program. In 2009, 202 passenger surveys were conducted, in which 93 percent of respondents considered recycling important, 58 percent stated that they would recycle even if it required additional effort, and 30 percent stated that they would recycle if it did not require additional effort. These findings led to recycling initiatives to improve the waste-handling process for the passengers.

⁷ Camp Dresser & McKee Inc., *Love Field Airport Waste Characterization Study Memorandum April 14, 2009*, April 2016.

4. Recycling Feasibility

This section addresses both the physical and economic feasibility of the DAL waste program.

4.1 Physical Feasibility

As noted in Section 3, the waste audit identified recyclable materials such as aluminum, plastic, glass and cardboard within the Airports' waste stream. All of these materials are recyclable in the Dallas area. Seven MRFs operate within 25 miles of the Airport, and another MRF is under construction at the McCommas Bluff Landfill.

As mentioned previously, the new terminal building was designed with space for side-by-side MSW and recycling compactors—two waste compactors and one recycling compactor on the airside and on the landside of the terminal building. The side-by-side infrastructure allows for similar handling processes for the disposal of MSW and recyclables. Although the loading dock supports the appropriate collection infrastructure, the DOA has observed that the corridor access between the terminal and the loading dock is not adequately sized to support multiple persons accessing the area. In addition, there is limited space near the loading docks for additional compactors or containers, such as one to support composting. Therefore, space to support composting collection will need to be identified if a program is pursued in the future.

Within the terminal building, public waste and recycling bins are easily accessible. To enhance recycling awareness, the DOA has recently designed new bin wraps for the combined recycling and trash containers and will wrap 100 bins with wraps in the summer of 2016. Although single bins are to be phased out over time, the DOA plans to wrap the single recycling and waste bins in the near-term, in order to enhance recognition. Improved signage for waste and recycling will increase passenger and staff awareness of the recycling options.

During the development of this Waste Plan, DOA staff identified the opportunity for recycling at the curbside. Options include purchasing new recycling containers or repurposing half of the existing MSW bins.

4.2 Economic Feasibility

The majority of waste and recycling collection equipment in use at the Airport is owned by DAL. Therefore, there is minimal cost for waste infrastructure such as compactors at the Airport. The existing waste and recycling haulers are contracted by the City of Dallas under two separate contracts. As shown in Section 7 of this Waste Plan, the cost per haul to recycle is nearly half of the cost to dispose of MSW. The DOA also receives rebates from Greenstar Recycling for recycled materials through the Department of Sanitation Services. Thus, continuation of the recycling program is an economically viable option for the Airport.

5. Operations and Maintenance Requirements

The operations and maintenance requirements for the management and disposal of MSW, recyclables, and C&D debris are described in this section.

5.1 Disposal of Municipal Solid Waste and Recyclables

All waste and recyclables in the terminal building and DOA office space are collected by janitorial staff who follow established Airport guidelines for waste disposal. The waste and recyclables are transported to the loading dock and disposed of in the proper compactors (see Exhibit 2). Concessionaires and tenants, other than Airlines, utilize the Airport's compactors by way of the loading docks and follow their individual recycling and waste disposal policies and procedures.

As previously mentioned, materials from the airside MSW compactors are picked up daily (Monday through Friday), while the landside MSW compactors are picked up once a week. All other waste and recycling containers are picked up on an on-call basis. MSW is disposed of at the McCommas Bluff Landfill and recycling is recovered at Greenstar Recycling. Airline tenants manage deplaned waste using their own infrastructure and waste hauler.

5.2 Disposal of Construction and Demolition Debris

Collection of C&D debris is a relatively new process at DAL. The LFMP was the first project at DAL to track materials that were used and disposed of during the construction process. To gain LEED Silver certification, the new terminal building, which was completed in 2014, underwent many efforts to minimize construction waste. Some of these efforts included:

- Maintained the outer structure of the previous terminal,
- Recycled metal from the old terminal building, and
- Utilized recyclable materials for rebuild and construction.

All projects post-LFMP have managed C&D debris on a case-by-case basis, and they refer to the SWMP for guidance. All new construction projects have contracts that ensure that waste management is in alignment with DAL's goals and policies.

6. Waste Management Contracts

The recycling and MSW hauling and disposal contractors at the Airport are Progressive Waste Solutions of TX, Inc. and Moore Disposal Corporation. All contracts are managed as part of the Department of Sanitation Services' budget and invoiced to the DOA. The DOA has not been involved in the selection of contractors for waste hauling. The contract terms for the existing contractors are shown in **Table 2**.

Table 2: Waste Management Contract Descriptions (Municipal Solid Waste and Recyclables)

CONTRACTOR	MATERIAL	CONTRACT TERMS
Moore Disposal Corporation	MSW	January 2013– January 2018
Progressive Waste Solutions of TX, Inc.	Recycling	October 2012– October 2017

SOURCE: Moore Disposal Corporation, "5 yr Solid Waste Discount Disposal Contract. pdf., IESE Contract.pdf.," email to Sunanda Katragadda, June 20, 2016.

PREPARED BY: Ricondo & Associates, Inc., February 2016.

As seen in Table 2, Moore Disposal Corporation is contracted for the disposal of MSW. The contract began in January 2013 and runs through January 2018. Progressive Waste Solutions of TX, Inc. is contracted for recycling. The contract was established October 2012 and is set to terminate October 2017.

Airport tenants and concessionaires are asked to adhere to the waste and recycling policies established by the DOA; however, no specific recycling responsibilities are outlined in existing contracts.

7. Recycling Program Economics

The existing procedures, contracts, and labor involved in waste management at the Airport indicate that recycling is an economically viable option at DAL. The City of Dallas Department of Sanitation Services manages the waste management expenditures and sends the invoice to the DOA. The monthly expenditure for the waste management program is approximately \$20,000.⁸

On a per-haul basis, recycling costs approximately 50 percent of MSW cost; thus, recycling is economically feasible. In addition, any rebates received from recyclable materials are to be given back to the Department of Sanitation Services, thereby further increasing the cost favorability of recycling as compared with MSW.

Table 3 provides a breakdown of waste hauling costs by waste stream.

Table 3: Monthly Waste Haul and Rental Costs (2016)

	DESCRIPTION	COST	QUANTITY	MONTHLY COST EXAMPLE ^{1/2/}
MUNICIPAL SOLID WASTE	MSW Compactor Haul	\$300	50	\$15,000
	MSW Roll-off Container Rental	\$225	1	\$225
	MSW Roll-off Container Haul	\$250	14	\$3,500
			MSW Total	\$18,725^{3/}
RECYCLABLES	Recyclables Compactor Haul	\$147	3	\$441
			Recyclables Total	\$441^{3/4/}
MONTHLY MSW AND RECYCLING TOTAL COST				\$19,166^{2/}

NOTES:

- 1/ Waste data were calculated using a February 2016 invoice.
- 2/ Recycling data were calculated using a January 2016 invoice.
- 3/ Costs do not include rentals for compactors, which are owned by the DOA.
- 4/ Does not include rebates for recyclables.

SOURCES: Moore Disposal Corporation, *March 1' 2016 Invoice to the City of Dallas*, April 19, 2016; Progressive Waste Solutions of TX, Inc., *January 31, 2016 Invoice to City of Dallas – Sanitation Services*, April 19, 2016.

PREPARED BY: Ricondo & Associates, Inc., April 2016.

⁸ Moore Disposal Corporation, *March 1' 2016 Invoice to the City of Dallas*, April 19, 2016; Progressive Waste Solutions of TX, Inc., *January 31, 2016 Invoice to City of Dallas – Sanitation Services*, April 19, 2016.

8. Initiatives Identification

In early stages of this Waste Plan development, the DOA used the guidelines established by the EMS to develop near-term and long-term initiatives. DOA staff participated in a workshop for this Waste Plan on February 16, 2016, during which they identified potential waste reduction initiatives and program development initiatives for implementation at DAL. Initiatives were divided into three subsections: Capital Improvements, Operational Enhancements, and Contract and Design Initiatives.

Each initiative was later evaluated against five criteria that stemmed from the traditional sustainability categories: financial, social, environmental, and feasibility. In March 2016, DOA staff rated the 12 potential waste reduction initiatives based on the criteria presented in **Exhibit 4**. **Appendix A** contains the full Waste Initiatives Evaluation Matrix with rated initiatives.

Exhibit 4: Qualitative Evaluation Criteria

EVALUATION CRITERIA, SCORING SCALE, AND SCORING				
FINANCIAL		SOCIAL	ENVIRONMENTAL	FEASIBILITY
Initial Capital Investment Cost	Increased Ongoing Costs Including O&M Costs	Stakeholder ^{1/} Outreach and Perception of DAL Waste	Resource Conservation	Goal Attainment in Regards to Current Operational Standards
0 \$50,000 or greater	0 More than \$5,000 annually	0 No increase in stakeholder awareness	0 Zero-to-low reduction of waste	0 Would require substantial change in operations/staffing
1 \$5,000-\$49,999	1 Up to \$5,000 annually	1 Increased Awareness to 1 stakeholder group	1 Moderate reduction of waste	1 Takes significant resources/knowledge/staff time
2 Under \$4,999	2 No substantive change	2 Increased Awareness to 2-3 stakeholder groups	2 High reduction of waste	2 Easily feasible with current staffing/resources

NOTE:

1/ Stakeholder groups include contractors, city staff, the DOA, tenants and concessionaires, passengers, and the general public.

SOURCE: Ricondo & Associates, Inc., February 2016.

PREPARED BY: Ricondo & Associates, Inc., May, 2016.

Initiatives were rated against the criteria and sorted by resulting scores in order to identify high-priority initiatives. The seven highest-ranking initiatives identified for implementation are shown in **Table 4**.

Table 4 (1 of 2): Prioritized Waste and Recycling Initiatives

ID#	INITIATIVE	RECOMMENDATION	CATEGORY	EASE OF IMPLEMENTATION	IMPLEMENTATION TIMEFRAME	CAPITAL REQUIRED (0, \$, \$\$) ^{1/}
A1	Liquid Collection Station	<p>Provide liquid collection station areas prior to TSA checkpoint.</p> <p>(1) Provide portable collection station for liquid collection at TSA checkpoint.</p> <p>(2) Work in cooperation with TSA to establish training for security officials to direct travelers to liquid collection station rather than disposing of their container.</p> <p>(3) Add signage to direct individuals to the liquid collection station pre-TSA security.</p> <p>(4) Coordinate with peer airports to establish best practices for the implementation of the liquid collection station.</p> <p>(5) Examine the feasibility to install water refill stations post security for traveler ease.</p>	Capital Improvements	Easy	1–5 years	\$
A2	Waste and Recycling Container Standardization—Terminal Locations	<p>Standardize waste and recycling collection points throughout the Airport.</p> <p>(1) Design and install container wraps for collection containers within the terminal.</p> <p>(2) Co-locate waste and recycling containers throughout the terminal.</p> <p>(3) Develop and implement strategy to right-size containers to reduce overflow issues.</p> <p>(4) Document procedures for the use of colored liners: blue liners for recycling; clear or black liners for general waste.</p>	Capital Improvements	Easy	1–5 years	\$
B4	Food Waste Pilot Program	<p>Support and encourage expansion of the food waste diversion program at DAL.</p> <p>(1) Add food donation language to concession contracts.</p> <p>(2) Work with a local food donation program to collect and distribute any available food from the Airport to underserved areas and participating food distribution organizations.</p> <p>(3) Track and monitor food donation numbers to help increase Airport waste diversion rates.</p>	Operational Enhancements	Easy	1–5 years	0
B2	Environmental Task Force Creation	<p>Establish an Environmental Task Force including tenants, concessionaires, and various city departments to provide a platform for collaboration, idea sharing, and education of environmental projects. Include waste management efforts within the Environmental Task Force meetings to gain support.</p> <p>(1) Have quarterly meetings to share initiatives, ideas, and road blocks for environmental programs.</p> <p>(2) Monitor waste metrics and introduce new initiatives to improve the Airport's waste diversion rate.</p>	Operational Enhancements	Easy	1–5 years	0

Table 4 (2 of 2): Prioritized Waste and Recycling Initiatives

ID#	INITIATIVE	RECOMMENDATION	CATEGORY	EASE OF IMPLEMENTATION	IMPLEMENTATION TIMEFRAME	CAPITAL REQUIRED (0, \$, \$\$) ^{1/}
B3	Performance Measurement and Tracking	<p>Monitor the disposal of all waste streams. (Construction Waste/Recyclables, General Waste/Recyclables, Green Waste, Universal Waste).</p> <p>(1) Create a tracking spreadsheet and update on a monthly basis to monitor the performance of MSW, C&D, Green Waste, and Universal Waste.</p> <p>(2) Initiate engagement campaign with quarterly announcements to stakeholders/engagement campaign.</p>	Operational Enhancements	Easy	1–5 years	0
C1	Tenant and Concession Contract Negotiations	<p>Add waste diversion standards and policies to tenant and concession contracts.</p> <p>(1) Establish new language for tenant contracts that articulates the Airport's waste diversion goals. Some options include:</p> <p>(a) Consider mandate for environmentally preferred product purchases and minimal packaging guidelines.</p> <p>(b) Consider requiring concessionaires to use recyclable or packaging and service ware and other high-use items. Ban the use of Styrofoam on Airport property.</p> <p>(c) Consider compliance tracking and enforcement.</p>	Contract and Design	Easy	1–5 years	0
C2	Construction Design Input	<p>Integrate the Environmental Division of DOA in construction and design milestone reviews. Encourage consideration of recycling/waste infrastructure be included within the design process.</p> <p>(1) Include a construction and design representative on the Environmental Task Force.</p> <p>(2) Include an Environmental Division member at construction contract and design meetings to incorporate sustainability initiatives and infrastructure into the new project, where possible.</p>	Contract and Design	Easy	1–5 years	0

NOTE:

1/ 0 = minimal initial cost and minimal operation and maintenance (O&M) cost

\$ = \$5,000 to \$49,000 initial cost and up to \$5,000 annually for O&M cost

\$\$= more than \$50,000 initial cost and more than \$5,000 annually for O&M cost

SOURCE: City of Dallas, Department of Aviation, DAL Waste Initiatives Meeting, February 16, 2016.

PREPARED BY: Ricondo & Associates, Inc., May 2016.

9. Plan to Minimize Solid Waste

As noted, the DOA has set a target of a 5 percent increase in diversion rate by fall of 2017. By integrating the information set forth in this Waste Plan into the EMS, the DOA will be able to effectively manage and track the plan's implementation.

Several of the initiatives identified in Section 8 will support ongoing implementation of the waste program. For example, performance management and tracking will create an avenue for monitoring performance on a continual basis; the creation of an Environmental Task Force will increase stakeholder interest and improve knowledge of current programs established at the Airport as well as identify emerging opportunities; and the inclusion of waste requirements in new contracts will set a standard for continued progress towards waste targets.

As the waste program at DAL evolves, re-evaluation of the objectives, targets, and initiatives set forth in the EMS will promote the continued success of the program.

The DOA's plan to minimize solid waste, as defined in this Waste Plan, includes:

- **Target:** 5 percent increase in the DOA's landfill diversion rate by fall of 2017
- **Baseline (FY 2015):** 5.7 percent landfill diversion rate
- **Initiatives:** Seven initiatives that include capital improvements, operational enhancements, and contract and design enhancements
- **Continued Improvement:** Additional initiatives should be evaluated and considered on a continual basis. These additional initiatives may be identified through meetings with the proposed DAL Environmental Task Force, attendance of environmental or sustainability conferences, internal or external stakeholder input, and/or the review of the Sustainable Aviation Guidance Alliance (SAGA) database.

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Appendix A

Waste Initiatives Evaluation Matrix



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AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

FOCUSED ACTIONS

REGISTER of FOCUSED ACTIONS (Evaluated and Prioritized)

EVALUATION CRITERIA, SCORING SCALE, AND SCORING

1/ STAKEHOLDER GROUPS
 a) Contractors
 b) City Staff, DoA, Tenants & Concessionaires
 c) Passengers & General Public

FINANCIAL		SOCIAL	ENVIRONMENTAL	FEASIBILITY
Initial Capital Investment Cost	Increased Ongoing Costs Including O&M Costs	Stakeholder ^{1/} outreach and perception of DAL waste	Resource Conservation	Goal Attainment in regards to current operational standards
0 \$50,000 or greater	0 More than \$5,000 annually	0 No increase in stakeholder awareness	0 Zero to low reduction of waste	0 Would require substantial change in operations/staffing
1 \$5,000-\$49,999	1 Up to \$5,000 annually	1 Increased Awareness to 1 stakeholder group	1 Moderate reduction of waste	1 Takes significant resources/knowledge/staff time
2 Under \$4,999	2 No substantive change	2 Increased Awareness to 2-3 stakeholder groups	2 High reduction of waste	2 Easily feasible with current staffing/resources

EMPs/Initiatives		
ID	Title	Description and Action Steps

ACTIONS PRIORITIZED FOR NEAR-TERM IMPLEMENTATION

CAPITAL IMPROVEMENTS									SCORE	Comments
A1	Liquid Collection Station	Provide liquid collection stations areas prior to TSA checkpoint. Provide water refill stations post security to encourage the reuse of empty bottles. (1) Provide drainage infrastructure for liquid collection at TSA checkpoint. (2) Install water refill stations post security. (3) Add signage at water collection and refill stations.	0	1	2	2	2	2	7	
A2	Waste and Recycling Container Standardization - Terminal Locations	Standardize waste and recycling collection points throughout the Airport. (1) Design and install container wraps for collection containers within the terminal. (2) Co-locate waste and recycling containers throughout the terminal. (3) Develop and implement strategy to right-size containers to reduce overflow issues. (4) Document procedures for use of colored liners: blue liners for recycling; clear, or black liners for general waste.	1	1	2	2	1	1	7	
A3	Waste and Recycling Container Standardization - Curbside Locations	Standardize waste and recycling collection points on terminal curbside. (1) Repurpose half of the curbside containers for recycling collection. (2) Follow standardization deployed inside the terminal for co-location and container wraps to ensure a seamless customer experience. (3) Review curbside waste collection procedures to identify opportunities to improve collection process.	1	1	2	1	1	1	6	
A4	Sally Port Upgrades	Implement recycling procedures and infrastructure at the Sally Port. (1) Monitor opportunities for recycling. (2) Add recycling containers within the Sally Port add rolloff container for disposal and at the facility. (3) Educate employees on recycling program.	1	1	1	1	2	2	6	
A5	Airfield Maintenance Facilities Responsibilities	Increase recycling infrastructure in from areas where that Airport Maintenance controls. (1) Add recycling infrastructure, consistent with terminal standards for all areas under Airport Maintenance's control (eg. parking, maintenance facilities). (2) Add recycling compactor/roll off location at the Airport Maintenance Facility.	1	1	2	1	2	2	7	
A6	Organics Pilot Program (pre-consumer waste)	Installation of a compactor or digester to capture pre-consumer waste. (City of Dallas-Sanitation Services) (1) Utilize Sanitation Services' infrastructure for an organics pilot program for pre-consumer waste	1	1	2	2	1	1	7	
OPERATIONAL ENHANCEMENTS										

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AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

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EMPs/Initiatives

ID	Title	Description and Action Steps
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ACTIONS PRIORITIZED FOR NEAR-TERM IMPLEMENTATION

CAPITAL IMPROVEMENTS									SCORE	Comments
A1	Liquid Collection Station	Provide liquid collection stations areas prior to TSA checkpoint. Provide water refill stations post security to encourage the reuse of empty bottles. (1) Provide drainage infrastructure for liquid collection at TSA checkpoint. (2) Install water refill stations post security. (3) Add signage at water collection and refill stations.	0	1	2	2	2	7		
B1	Waste and Recycling Training	Implement a standardized training program for new hires and a routine course for existing employees. (1) Standardized training to include accepted materials for recyclables, identification of designated colored bags for waste and recycling, identification of disposal areas for specific waste streams, correct procedures for disposal when waste or recycling infrastructure is out of service. (2) Establish training materials in multiple languages. Include the most common languages to airport staff including English, Spanish, Korean, and Nepali. (3) Consider evaluating implementing new procedures to reduce recycling contamination (eg. dedicated waste and dedicated recycling collection routes in terminal)	2	1	1	0	1	5		
B2	Environmental Task Force Creation	Establish an Environmental Task Force including tenants, concessions and various city departments, to provide a platform for collaboration, idea sharing and education of environmental projects. Include waste management efforts within the Environmental Task Force meetings to gain support. (1) Have monthly meetings to share initiatives, ideas and road blocks for environmental programs. (2) Monitor waste metrics and introduce new initiatives to improve the Airport's waste diversion rate.	2	2	1	0	2	7		
B3	Performance Measurement & Tracking	Monitor the disposal of all waste streams. (Construction Waste/Recyclables, General Waste/Recyclables, Green Waste, Universal Waste) (1) Create a tracking spreadsheet and update on a monthly basis to monitor the performance of MSW, C&D, Green Waste, and Universal Waste. (2) Report performance metrics monthly to the City's Sanitation Department.	2	2	1	0	2	7		
B4	Food Waste Pilot Program	Support and encourage expansion of the food waste diversion program at DAL. (1) Add food donation language to concession contracts (2) Work with a local food donation program to collect and distribute any available food from the Airport to underserved areas and participating food distribution organizations. (3) Track and monitor food donation numbers to help increase Airport waste diversion rates.	2	2	2	1	1	8		

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AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

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EMPs/Initiatives

ID	Title	Description and Action Steps
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ACTIONS PRIORITIZED FOR NEAR-TERM IMPLEMENTATION

CAPITAL IMPROVEMENTS									SCORE	Comments
A1	Liquid Collection Station	Provide liquid collection stations areas prior to TSA checkpoint. Provide water refill stations post security to encourage the reuse of empty bottles. (1) Provide drainage infrastructure for liquid collection at TSA checkpoint. (2) Install water refill stations post security. (3) Add signage at water collection and refill stations.	0	1	2	2	2	2	7	
B5	Green Waste Reduction Program	Formalize xeriscaping policy to be implemented in all future landscaping designs. (1) Add xeriscaping landscape in design specifications and construction documents. (2) Continue to use grasscycling techniques in which grass is mulched in place and left to decompose. (3) Implement signage to celebrate xeriscaping in public areas.	1	1	2	0	1	1	5	
CONTRACT AND DESIGN INITIATIVES										
C1	Tenant and Concession Contract Negotiations	Add waste diversion standards and policies to tenant and concession contracts. (1) Establish new language for tenant contracts that articulates the Airport's waste diversion goals. Some options include: (a) Consider mandate environmentally preferred product purchases and minimal packaging guidelines. (b) Consider requiring concessionaires to use recyclable or compostable plates, plastic ware, and other high use items. Ban the use of styrofoam on Airport property. (c) Consider compliance tracking and enforcement	2	2	1	1	2	2	8	
C2	Construction Design Input	Integrate the Environmental Division in construction and design negotiations. Encourage consideration of recycling/waste infrastructure be included within the design process. (1) Include a representative that helps to manage construction and design on the Environmental Task Force. (2) Include an Environmental Division member at construction contract and design meetings to incorporate sustainability initiatives and infrastructure into the new project where possible.	2	2	1	1	2	2	8	