

APPENDIX F

*AIRPORT RECYCLING, REUSE, AND
WASTE REDUCTION PLAN*

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Airport Recycling, Reuse, and Waste Reduction Plan

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1.1 INTRODUCTION

In September 2014, the Federal Aviation Administration (FAA) provided guidance for preparing airport recycling, reuse, and waste reduction plans as an element of a master plan or master plan update.¹ This guidance was in response to the *FAA Modernization and Reform Act* (FMRA) of 2012² that added a requirement for all master plans and master plan updates to include a plan for “recycling and minimizing the generation of airport solid waste” to be consistent with the local recycling laws.

This chapter reviews Centennial Airport’s existing solid waste generation and recycling activity and identifies opportunities to increase the Airport’s recycling efforts. In reviewing the Airport’s existing solid waste and recycling activity, an effort was made to

- » Review the current waste management sources;
- » Review local recycling programs and practices;
- » Review the feasibility of recycling efforts at the Airport;
- » Provide a summary of operations and maintenance requirements;
- » Review waste hauler management contracts;
- » Identify potential recycling opportunities for cost savings or revenue generation; and
- » Identify a plan to minimize solid waste generation at the Airport.

1.2 CURRENT AIRPORT WASTE MANAGEMENT SOURCES

The Denver Arapahoe Disposal Site (DADS) is the closest landfill to the Airport (about nine miles northeast of the Airport). Based on DADS Waste Management Solutions website predictions, the DADS is not expected to reach capacity for 129 years under current operating conditions.³ As stated in **Chapter X, Forecasts**, the Airport had 340,721 total operations in the base year of 2018 and is forecast to have 369,595 operations by the 2037 planning year according to the FAA Terminal Area Forecast. Since the Airport is a general aviation (GA) airport and does not have scheduled commercial service, there are no forecast enplanements. However, the forecasted increase in GA passengers will result in increased waste generation with the potential to be disposed of at the DADS landfill. However, through existing Airport recycling efforts and the potential for increased recycling efforts, the amount of municipal solid waste that has the potential to reach the DADS landfill may be reduced. These actions can help extend the life expectancy of the landfill.

Waste management at an airport includes many components and can be complex. For instance, an airport has various tenants, agreements, differing operational requirements, and disposal processes that all contribute to the waste stream. According to the FAA’s September 2014 guidance, an airport’s waste management is divided into three main areas:

¹ FAA Memorandum, Guidance on Airport Recycling, Reuse, and Waste Reductions Plans, Accessed: <https://www.faa.gov/airports/environmental/media/airport-recycling-reuse-waste-reduction-plans-guidance.pdf>, Accessed July 2019.

² 49 United State Code (U.S.C.), §§ 132 and 133.

³ Denver Arapahoe Disposal Site. Accessed: https://www.wmsolutions.com/pdf/factsheet/DADS_Fact_Sheet.pdf, July 2019.

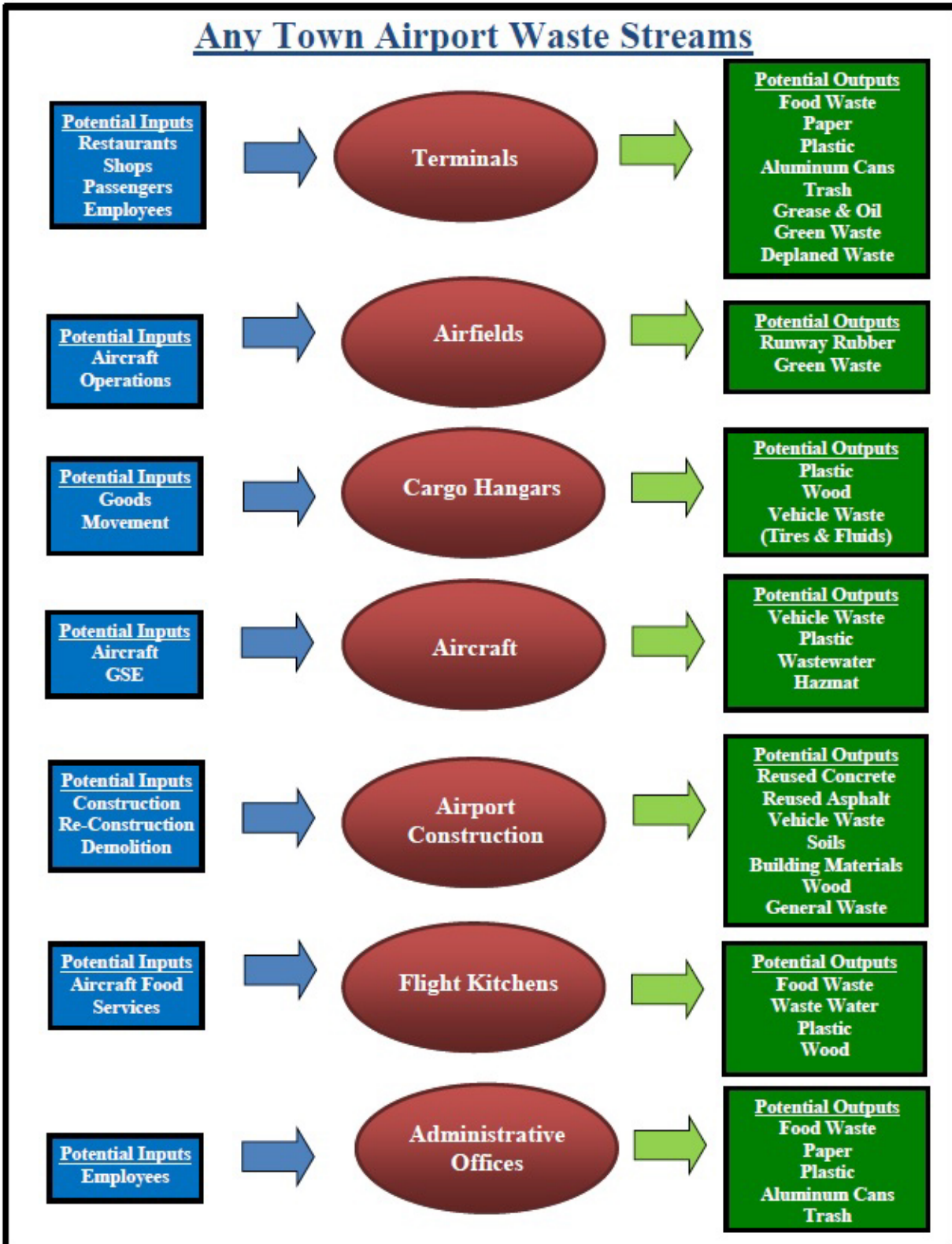
- » Areas where an airport has direct control over the waste stream (e.g., public spaces, office space, main terminal, and airfield);
- » Areas where an airport does not have direct control over the waste stream but can influence waste management (e.g., tenants and aircraft deplaned waste); and
- » Areas where an airport has no control over the waste stream (i.e., areas where the airport does not own or lease).

In addition, the FAA's 2013 Recycling Synthesis report⁴ identified seven main airport waste streams: terminals, airfields, cargo hangars, aircraft, airport construction, flight kitchens, and administrative offices (see **Figure 1-1**).

The main generators of waste at the Airport are its tenants, fixed based operators, GA passengers, and the airfield. The airfield generates waste typically during construction projects and waste materials can range from concrete or asphalt to old lighting and signage.

⁴ Federal Aviation Administration, *Recycling, Reuse, and Waste Reduction at Airports – A Synthesis Document*. FAA Office of Airports. April 24, 2013.

FIGURE 1-1
TYPICAL AIRPORT WASTE STREAMS



Source: FAA, 2013 recycling synthesis document

1.3 LOCAL AND AIRPORT RECYCLING PROGRAMS

1.3.1 County Recycling Program

The Airport is within two counties: Arapahoe County and Douglas County. The counties do not provide or coordinate any trash pickup or recycling services.^{5 6} Trash and recycling services are only provided by private companies. The Airport currently uses the Waste Management pickup service for both recyclables and municipal solid waste (MSW).

1.3.2 City of Centennial Recycling Program

The City of Centennial does not provide or coordinate trash pickup or recycling services. Trash and recycling services are provided by private companies.⁷

1.3.3 Airport Recycling Practices

To incorporate better practices, the Airport has created a Sustainability Plan.⁸ The plan did not include waste reduction goals. However, the Airport does have a recycling program in place. Additionally, the Airport uses one six-yard receptacle for single-stream recycling that is emptied once per week by Waste Management (see **Section 1.4**).

1.4 REVIEW OF WASTE HAULER CONTRACTS

The Airport contracts with Waste Management for waste hauling services. In 2014, 198 cubic yards of MSW were generated at the Airport, according to the Centennial Airport Sustainability Plan.⁹ Of this total, 48 cubic yards were recycled. The Airport's annual cost for MSW waste in 2014 was \$6,635 and the annual cost for recycled materials was \$816.

Table 1-1 shows the Airport's waste management characteristics including monthly waste hauler fees broken out by material stream, quantity and size of dumpsters, and frequency of pick-up service. All dumpsters are property of Waste Management and are rented to the Airport. The dumpster rental and pickup/disposal of MSW and recycling results in a total monthly charge of \$3,922.

⁵ Douglas County, Recycling. Accessed: <https://www.douglas.co.us/recycling/>, July 2019.

⁶ Arapahoe County, Trash and Recycling Services. Accessed: <https://www.arapahoegov.com/118/Trash-and-Recycling-Resources>, July 2019.

⁷ City of Centennial, Recycling. Accessed <https://www.centennialco.gov/Residents/Health-Environment/Recycling>, July 2019.

⁸ Centennial Airport, Airport Sustainability Plan. Accessed: https://www.codot.gov/programs/aeronautics/SustainProg/APA_Plan, July 2019.

⁹ Centennial Airport, Airport Sustainability Plan. Accessed: https://www.codot.gov/programs/aeronautics/SustainProg/APA_Plan, July 2019.

TABLE 1-1
WASTE MANAGEMENT CHARACTERISTICS

	Municipal Solid Waste	Single Stream Recycling
Monthly Cost	\$213.87	\$113.03
Dumpster Quantity and Size	2 - 6-yard	1 - 6-yard
Frequency of Service	Once per week	Once per week
Annual Cost	\$2,566	\$1,356

Source: Airport, 2018; RS&H, 2019

As shown in **Table 1-2**, the Airport has reduced its annual cost for MSW pick up and has increased the annual cost for recycled materials. Overall, the Airport has reduced its disposal of MSW at DADS and its annual waste stream costs.

TABLE 1-2
ANNUAL WASTE COSTS FOR 2014 AND 2018

	2014	2018
Municipal Solid Waste	\$6,635	\$2,566
Single Stream Recycling	\$816	\$1,356
Total	\$7,451	\$3,922

Source: Airport, 2014; Airport, 2018; RS&H, 2019

1.5 RECYCLING FEASIBILITY AT THE AIRPORT

There are currently no mandated requirements for solid waste reduction in either Douglas County or Arapahoe County nor in the City of Centennial.

The Airport is currently using single-stream recycling service provided by Waste Management. If the Airport were to implement one of the three waste assessment approaches shown in **Table 1-3**, the Airport will gain an understanding of the types and quantities of waste being generated at the Airport. This will ultimately lead to the Airport being able to identify opportunities to increase recycling efforts; however, the Airport is continually evaluating and considering new recycling opportunities.

**TABLE 1-3
WASTE ASSESSMENT APPROACHES¹⁰**

Method	Advantages	Disadvantages
Hauler Records Examination	<p>Provides for accurate data on the weight/volume of waste generated at the facility.</p> <p>Usually requires less time and staff than does a facility walk-through or waste sort.</p>	<p>Might not provide accurate data if waste hauling records do not exist.</p> <p>Does not provide data regarding specific waste materials.</p> <p>Difficult to quantify if the dumpster is shared.</p>
Facility Walk-Through	<p>Requires less time than a full waste sort.</p> <p>Provides for qualitative data for waste generated.</p> <p>Allows for interviews with facility staff.</p>	<p>Might not provide data regarding specific waste materials.</p> <p>Requires multiple walk-throughs to obtain a representative sample.</p> <p>Might not provide for accurate quantities.</p>
Waste Sort	<p>Provides for quantitative data for specific types of waste generated.</p> <p>Provides for estimates of waste generated for the whole facility.</p>	<p>Requires significant amount of time to conduct.</p> <p>Requires significant amount of staff to conduct.</p> <p>Requires multiple waste sorts to obtain a representative sample.</p>

Source: EPA, 2013

1.6 SUMMARY OF OPERATION AND MAINTENANCE REQUIREMENTS

The Airport has a Sustainability Plan in place and does have a recycling program (see **Section 1.4**). However, given the priorities of the Airport, waste management was not identified as one of the Focus Categories in the Sustainability Plan.

1.7 POTENTIAL FOR COST SAVINGS OR REVENUE GENERATION

As described in **Section 1.4**, the Airport has voluntarily adopted a few recycling practices of various recyclable materials and has contracted a recycling service utilizing one six-yard dumpster for recyclables, which is emptied and hauled once per week. However, the Airport is spending over \$2,500 per month for waste container rentals and waste hauling. Increased recycling efforts have the potential to reduce that cost substantially. Recycling practices that other airports have successfully implemented that the Airport could adopt to improve their existing waste management and reduce costs include, but are not limited to the following:

- » Placement of recycling receptacles beside trashcans to collect plastics and paper.
- » Educate employees about sustainability efforts and initiatives

¹⁰ U.S. Environmental Protection Agency, *Business Guide for Reducing Solid Waste*. EPA/530-K-92-004. November 1993.

- » Include language in construction contract documents encouraging material reuse and recycling.

1.8 PLAN TO MINIMIZE SOLID WASTE GENERATION

The Airport has expressed a strong interest in establishing a comprehensive recycling program to reduce the Airport waste stream even more than what is being recycled today. The Airport could implement ten steps established by the FAA (see **Table 1-4**) to create and implement a formal recycling program.

TABLE 1-4
STEPS FOR CREATING AND IMPLEMENTING A RECYCLING PROGRAM

Ten Steps for Creating and Implementing an Effective Airport Recycling / Waste Reduction Program
1. Management Commitment
2. Program Leadership
3. Waste Identification
4. Waste Collection and Hauler
5. Waste Management Plan Development
6. Education and Outreach
7. Monitor and Refine Program
8. Performance Monitoring
9. Promote Success
10. Continuous Improvements

Source: FAA, 2013

By implementing the ten steps in **Table 1-4**, the Airport would be able to outline waste reduction and recycling policies, set goals, track and monitor progress, and improve upon the program. Outlining policies for a recycling program can be challenging because this often requires coordination and buy-in from all Airport stakeholders, which includes the public. Establishing a recycling coordinator who would oversee the stakeholder engagement can help encourage participation to ensure policies established for the recycling program are inclusive.

Setting goals for a formal recycling program will require the Airport to conduct a waste assessment. This step is imperative to understand the types and quantities of waste being generated at the Airport. Once those types and quantities of waste are calculated, goals can be set to reduce those quantities. Goals should be realistic and achievable. However, as shown in **Table 1-3**, conducting a waste assessment can be labor and time intensive. Partnering with the Arapahoe and/or Douglas County and/or the City to help conduct the waste assessment can alleviate some of the staffing pressures from the Airport.

There are a variety of tools that help track and monitor the progress or success of the program. For example, the USEPA has an online tool, the Waste Reduction Model (WARM)¹¹ that allows businesses to quantify their greenhouse emissions and energy savings that are a direct result of implementing recycling

¹¹ USEPA, Waste Reduction Model (Warm). Accessed: <https://www.epa.gov/warm>, July 2019.

practices. Tracking and monitoring progress allows the Airport to monitor goals that have been established and report back to stakeholders that are supporting the program. As the recycling program progress is tracked, program refinements should be made to provide flexibility for the Airport in defining reasonable goals for its recycling/waste reduction program. An Airport recycling coordinator can review the data and consider new waste management practices that can be adopted into the program for further waste reduction at the Airport.

To further facilitate recycling of on-Airport construction projects, language can be included in contract documents encouraging material reuse and recycling measures. The Airport will discuss possibilities of changing specifications to include a recycling component to encourage expanded contractor participation on a project-by-project basis.

1.9 CONCLUSION

The Airport currently has an undefined recycling program. By conducting a waste assessment and implementing the FAA's 10 steps listed in **Table 1-4**, the Airport would be able to set goals, execute policies, and identify areas for increased recycling efforts that would allow the Airport to quantify cost savings and reduce its contribution to the DADS.

There are a few planning studies that the Airport could conduct to help with recycling, reuse, and reduction of waste at the Airport. The Airport can start with development of the following planning studies to further understand the areas to improve their current recycling efforts.

- » **Waste Audit Plan.** A waste audit plan can identify the types and amounts of waste being generated at the Airport and determine the effectiveness of the current recycling efforts. The plan could include a walk-through of the Airport and other facilities, which allows for a qualitative assessment of the types of waste being generated. A waste sort will allow for a quantitative assessment of waste being generated at the Airport. Both the walk-through and the waste sort will result in a focused effort for the recycling of specific materials that will yield cost savings to the Airport.
- » **Waste Reduction Strategy Plan.** A waste reduction strategy plan can propose the framework for reaching established goals. This plan could establish strategic initiatives, implement policies, and identify areas for increased recycling and reuse efforts. The plan could also establish an education plan for Airport staff, tenants, and contractors.