AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION

The primary objective of the Airport Recycling, Reuse, and Waste Reduction Section is to provide the City of Redding and its airport administration with recommendations for future improvements and processes that promote sustainable principles in addressing airport operations and aviation demand. Making sustainability a priority in the planning process will aid the airport in identifying ways to reduce its overall environmental impact. By implementing sustainability practices during the master plan process, the airport can become a more environmentally friendly economic hub.

REGULATORY GUIDELINES

The *FAA Modernization and Reform Act of 2012* (FMRA), which amended Title 49, United States Code (USC), included several changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling, reuse, and waste reduction at airports:

- Section 132(b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and local recycling laws, including the cost of a waste audit."

- Section 133 of the FMRA added a provision requiring airports that have or plan to prepare a master plan and that receive AIP funding for an eligible project to ensure that the new or updated master plan addresses issues related to solid waste recycling at the airport, including:
    - The feasibility of solid waste recycling at the airport;
    - Minimizing the generation of solid waste at the airport;
    - Operation and maintenance requirements;
    - A review of waste management contracts; and
    - The potential for cost savings or the generation of revenue.

State of California Solid Waste Management

In the State of California, California's Department of Resources Recycling and Recovery (CalRecycle) and local enforcement agencies manage the operation of solid waste facilities.[1] It is a priority of CalRecycle to mitigate the impacts of solid waste on public health and safety and the environment by enforcing compliance with state regulations through education, permitting, solid waste facility inspections, and more. CalRecycle and local enforcement agencies specifically ensure that residents and businesses uphold the following mandatory recycling laws:[2]

[1] https://calrecycle.ca.gov/swfacilities/
[2] https://calrecycle.ca.gov/recycle/commercial/

- Senate Bill 1383: California's Short-Lived Climate Pollutant Reduction Service
  - Aims to reduce organic waste disposal by 75 percent by 2025.
  - Aims to recover at least 20 percent of disposed edible food by 2025.

- Assembly Bill (AB) 1826: Organics Recycling
  - Requires that all businesses (including public entities) that generate two cubic yards or more of trash and recycling combined per week must have organic waste services.

- AB 341: Recycling
  - Requires that all businesses that generate four cubic yards or more of trash per week arrange recycling services.

City of Redding Solid Waste Management

Since 1944, the City of Redding's Solid Waste Utility has offered residential and commercial collection services, providing service to both Redding households and businesses. Redding Regional Airport (RDD) falls under commercial collection services and utilizes the Solid Waste Utility as its primary solid waste and recycling service provider. Commercial accounts with the Solid Waste Utility are offered the following services:

- Garbage services for businesses:
  - Containers for solid waste pickup.
  - Drop boxes (i.e., dumpsters) for solid waste pickup.

- Recycling services for businesses:
  - Paper recycling carts for pickup.
  - Mixed recycling carts for pickup.
  - Cardboard recycling containers for pickup.
  - Universal waste[3] drop-off at a local hazardous waste facility.

SOLID WASTE

Airport sponsors typically have purview over waste handling services in facilities they own and operate, such as passenger terminal buildings, city-owned hangars, aircraft rescue and firefighting (ARFF) stations, and maintenance facilities. Tenants of airport-owned buildings/hangars or tenants that own their own facilities are typically responsible for coordinating their own waste handling services.

[3] Items accepted as universal waste at nearby recycling locations include: batteries, pesticides, mercury-containing equipment, lamps, and aerosol cans.

For airports, waste can generally be divided into eight categories:[4]

- **Municipal Solid Waste** (MSW) is more commonly known as trash or garbage and consists of everyday items that are used and then discarded, such as product packaging.

- **Construction and Demolition Waste** (C&D) is considered non-hazardous trash resulting from land clearing, excavation, demolition, and renovation or repair of structures, roads, and utilities. C&D waste includes concrete, wood, metals, drywall, carpet, plastic, pipe, cardboard, and salvaged building components. C&D is also generally labeled MSW.

- **Green Waste** is a form of MSW yard waste consisting of tree, shrub, and grass clippings, leaves, weeds, small branches, seeds, and pods.

- **Food Waste** includes unconsumed food products or waste generated and discarded during food preparation and is also considered MSW.

- **Deplaned Waste** is waste removed from passenger aircraft. Deplaned waste includes bottles, cans, mixed paper (newspapers, napkins, paper towels), plastic cups, service ware, food waste, and food-soiled paper/packaging.

- **Lavatory Waste** is a special waste that is emptied through a hose and pumped into a lavatory service vehicle. The waste is then transported to a triturator[5] facility for pretreatment prior to discharge in sanitary sewage system. Chemicals in lavatory waste can present environmental and human health risks if mishandled; therefore, caution must be taken to ensure lavatory waste is not released to the public sanitary sewage system prior to pretreatment.

- **Spill Clean and Remediation Wastes** are special wastes that are generated during cleanup of spills and/or the remediation of contamination from several types of sites on an airport.

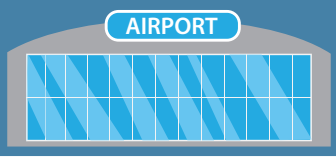
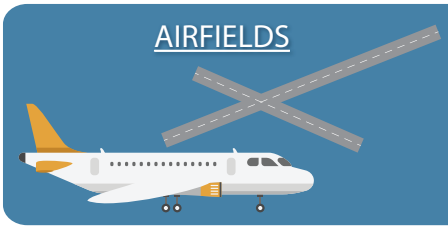
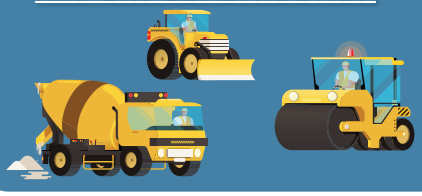
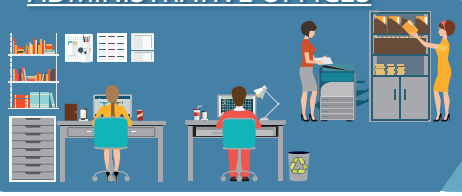
- **Hazardous Wastes** are governed by the *Resource Conservation and Recovery Act* (RCRA), as well as by the regulations in Title 40 Code of Federal Regulations (CFR) Subtitle C, Parts 260 to 270. The U.S. Environmental Protection Agency (EPA) developed less stringent regulations for certain hazardous waste (universal waste), described in 40 CFR Part 237, *The Universal Waste Rule.*

As seen on **Exhibit C1**, there are multiple areas where the airport potentially contributes to the waste stream, including the passenger terminal building; flight kitchens; on-airport tenants (fixed-base operators [FBOs]/specialized aviation service operators [SASOs], etc.); hangars; airfields; aircraft ground support equipment; airport construction projects; and the airport traffic control tower (ATCT). To create a comprehensive waste reduction and recycling plan for the airport, all potential inputs must be considered.

[4] *Recycling, Reuse and Waste Reduction at Airports*, FAA (April 24, 2013)

[5] A triturator turns lavatory waste into fine particulates for further processing.

AIRPORT WASTE STREAMS

AIRPORT AREA	POTENTIAL INPUTS	POTENTIAL OUTPUTS
TERMINALS 	Restaurants Shops Passengers Employees	Food Waste, Paper Plastic, Aluminum Cans Trash, Grease & Oil Green Waste Deplaned Waste
AIRFIELDS 	Aircraft Operations	Runway Rubber Green Waste
AIR TRAFFIC CONTROL TOWER 	Employees	Paper, Trash, Aluminum Cans
AIRCRAFT 	Aircraft Ground Support Equipment (GSE)	Vehicle Waste Plastic Wastewater Hazmat
AIRPORT CONSTRUCTION 	Construction Re-Construction Demolition	Reused Concrete Reused Asphalt Vehicle Waste Soils, Building Materials Wood, General Waste
FLIGHT KITCHENS 	Aircraft Food Services	Food Waste Waste Water Plastic Wood
ADMINISTRATIVE OFFICES 	Employees	Food Waste Paper, Plastic Aluminum Cans Trash

Source: Recycling, Reuse, and Waste Reduction at Airports, FAA (April 24, 2013)

EXISTING SERVICES

The airport and its tenants currently contract solid waste handling and recycling services to the City of Redding's Solid Waste Utility. Recyclable material is picked up from the airport and taken to a nearby transfer facility where sorting of the material is performed. The following items are accepted at the city's transfer station: plastic, paper, metal, and glass. Airport-owned electronic waste is also taken to the city transfer facility to be recycled.

Any hazardous waste that is accumulated at the airport is either taken to a transfer station or picked up by a city-authorized vendor for disposal; however, outside of household solvents,[6] the airport does not have a need to recycle hazardous materials on a routine basis, and therefore does not have a contract for hazardous material pickup. Unlike the airport, its tenants have contracts with hazardous waste companies for pickup and disposal of hazardous waste.

SOLID WASTE MANAGEMENT SYSTEM

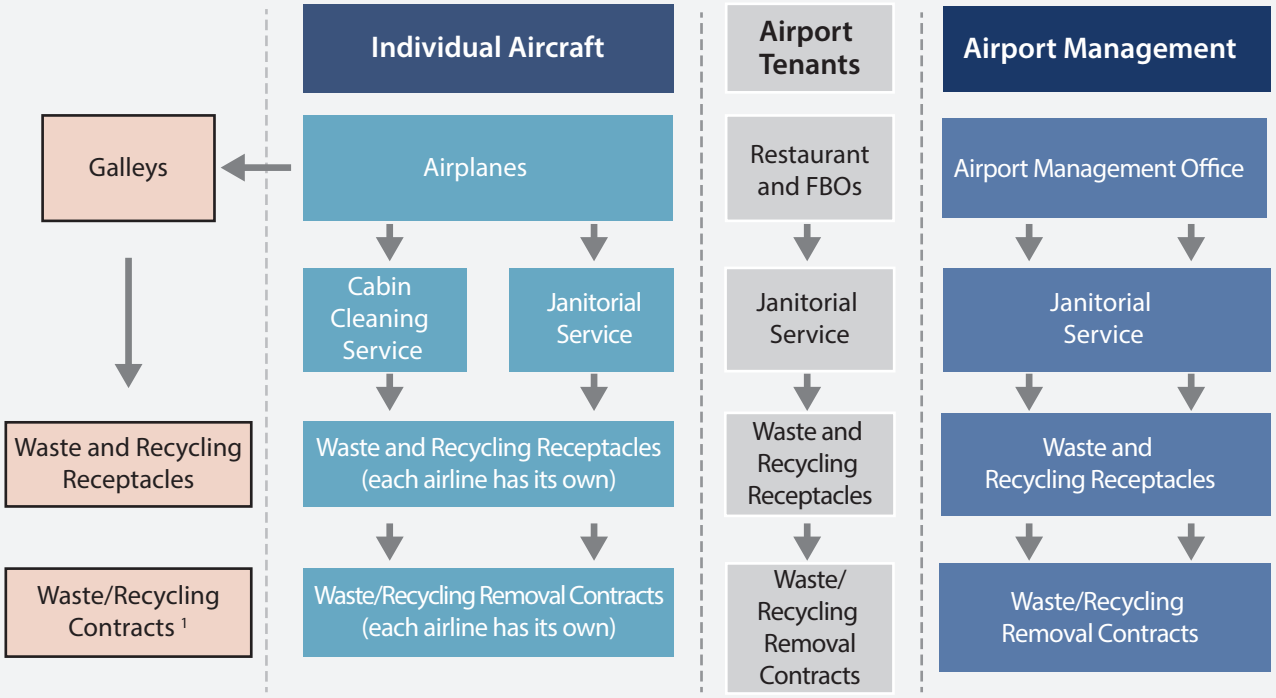
Airports generally utilize either a centralized or a decentralized waste management system. The differences between these two methods are described below and summarized on **Exhibit C2.**

- **Centralized waste management system |** With a centralized waste management system, the airport provides receptacles for the collection of waste, recyclable, or compostable materials and contracts for their removal by a single local provider.[7] The centralized waste management system allows for more participation from airport tenants who may not be incentivized to recycle on their own and can reduce the overall cost of service for all involved. A centralized strategy can be inefficient for some airports as it requires more effort and oversight on the part of airport management; however, the centralized system is advantageous in that it has fewer working components involved in the overall management of the solid waste and recycling efforts. It also allows greater control by the city over the type, placement, and maintenance of dumpsters, thereby saving space and eliminating the need for tenants to have individual containers.

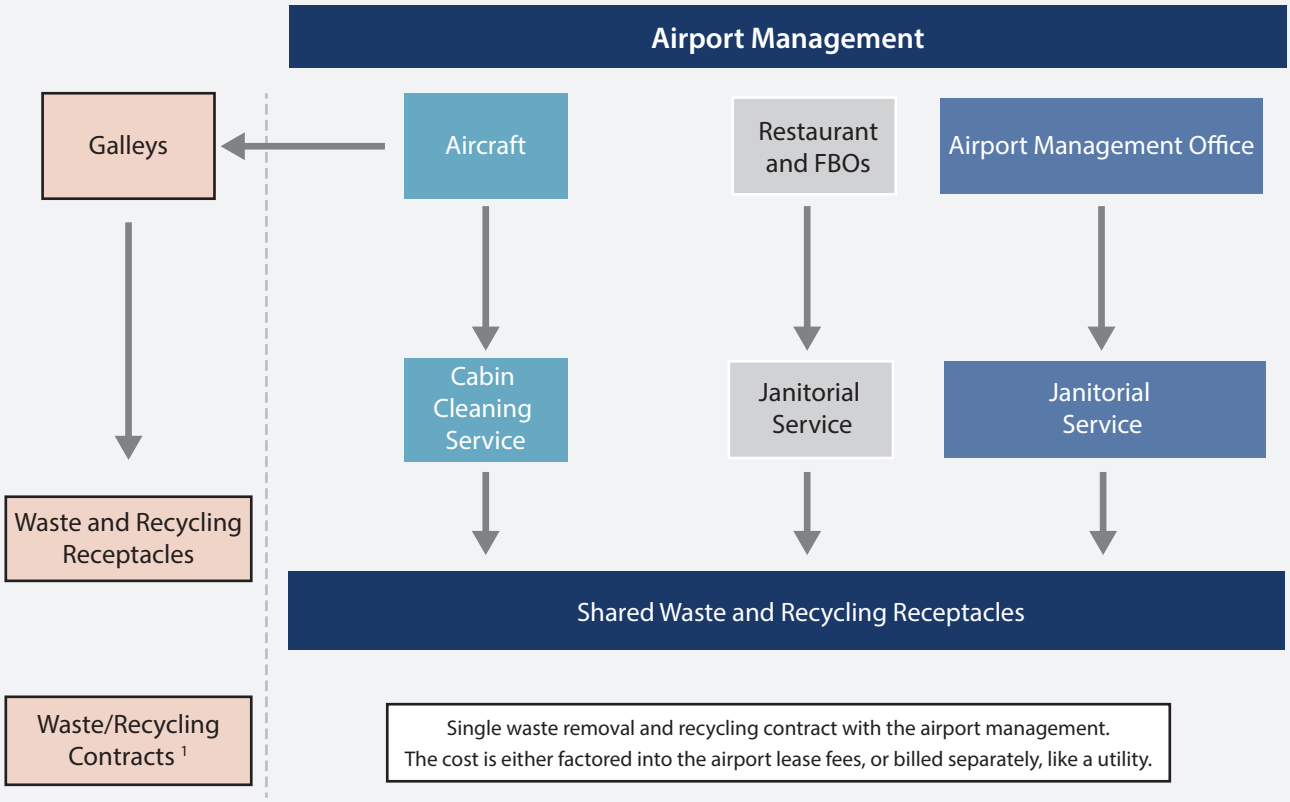
- **Decentralized waste management system |** Under a decentralized waste management system, the airport provides waste containers and contracts for the hauling of waste materials in airport-operated spaces only; however, airport tenants (such as fixed-base operators, retail shops, and others) manage the waste from their leased spaces with separate contracts, billing, and hauling schedules. A decentralized waste management system can increase the number of receptacles on airport property and the number of trips by a waste collection service provider, should tenants' and the airport's collection schedules differ.

[6] Household solvents are hazardous waste commonly found in homes (e.g., paint, cleaning, and automotive products).
[7] *Airport Waste Management and Recycling Practices* (2018), The National Academies of Sciences, Engineering, and Medicine Airport Cooperative Research Program, Synthesis 92.

Components of a Decentralized Airport Waste Management System



Components of a Centralized Airport Waste Management System



[1] Galleys usually manage their own waste even if an airport relies on a centralized system

Source: Natural Resources Defense Council, Trash Landings: How Airlines and Airports Can Clean Up Their Recycling Programs, December 2006.

Although the airport and its tenants both use the City of Redding's Solid Waste Utility for trash and recycling pickup, the airport utilizes a decentralized waste management system, as airport tenants have separate contracts and hauling schedules for solid waste pickup.

GOALS AND RECOMMENDATIONS

Solid Waste and Recycling Goals

Table C1 outlines objectives that could help reduce waste generation and increase recycling efforts at the airport. To increase the effectiveness of tracking progress at the airport, a baseline state of all suggested metrics should be established to provide a comparison over time.

TABLE C1 | Waste Management and Recycling Goals
Redding Regional Airport - California

Goals	Objectives
Reduce amount of solid waste generated	Conduct a waste audit to identify most common types of waste
	Eliminate purchase of items that are not recyclable (e.g., Styrofoam, plastic bags)
Reuse materials or equipment	Reuse grass clippings as mulch
	Offer reusable dishes to employees
	Reuse cardboard boxes for storage
Increase amount of materials recycled	Promote the expansion of recycling services to all areas of the airport
	Improve waste and recycling tracking and data management
	Incorporate recycling requirements and/or recommendations into tenant lease agreements
	Expand recycling marketing and promotion efforts throughout public areas
	Require contractors to implement strategies to reduce, reuse, and recycle construction and demolition (C&D) waste

Source: Coffman Associates, Inc.

Recommendations

To maximize waste reduction and increase recycling efforts at the airport, the following recommendations are made:

- **Create a centralized waste management system at the airport.** Currently, RDD participates in a decentralized waste management system since airport tenants are responsible for overseeing their own waste management. Airport staff could consider engaging tenants to create a centralized waste management system at the airport to streamline waste management and recycling efforts at RDD.

- **Assign the responsibility of waste management to a dedicated individual or group.** Having one person or a group of people oversee and manage solid waste and recycling at the airport will create efficient and cost-saving solid waste management solutions. People dedicated to this

operational aspect of the airport will be familiar with processes and will help identify areas of improvement and cost-saving measures.

- **Audit the current waste management system.** The continuation of an effective program requires accurate data on current waste and recycling rates. An airport can gain insight into its waste stream in several ways, such as requesting weights from the hauler, tracking the volume, or reviewing the bills; however, managing the waste system starts with a waste audit, which is an analysis of the types of waste produced. A waste audit is the most comprehensive and intensive way to assess waste stream composition, opportunities for waste reduction, and capture of recyclables, and should include the following actions:

    - Examination of records
        - Waste hauling and disposal records and contracts
        - Supply and equipment invoices
        - Other waste management costs (commodity rebates, container costs, etc.)
        - Track waste from the point of origin
        - Establish a baseline for metrics

    - Facility walk-through conducted by the airport
        - Gather qualitative waste information to determine major waste components and waste-generating processes
        - Identify the locations on the airport that generate waste
        - Identify what types of waste are generated by the airport to determine what can be reduced, reused, or recycled
        - Improve understanding of waste pickup and hauling practices

    - Waste sort
        - Provides quantitative data on total airport waste generation
        - Allows problem-solving design/enhances the recycling program for the airport

- **Create a tracking and reporting system.** Continuing to track solid waste generated will allow the airport to identify areas where a significant amount of waste is generated and will help the airport estimate annual waste volumes. Understanding the cyclical nature of waste generation will allow the airport to estimate costs and will identify areas of improvement. Since the airport engages in recycling services, the airport can track recycling rates and waste quantities to identify cost-saving measures that are currently unidentified simply based on the lack of quantitative data.

- **Reduce waste through controlled purchasing practices and the consumption of non-essential products.** The airport can control the amount of waste generated by prioritizing the purchase of items or supplies that are reusable, recyclable, compostable, or made from recycled materials.

- **Enhance the existing recycling program at the airport.** To guarantee the airport continues to reduce the amount of waste hauled to the landfill, materials that cannot be reused or avoided should be recycled, if possible. The city should review internal procedures to ensure there are no unacceptable items contaminating recycling containers or recyclables thrown in the trash. Clearly marked signage of what is and is not accepted, placed near the solid waste and recycling containers, is another significant component of an effective recycling program.

- **Provide ongoing education for airport employees.** In order to minimize waste within the airport, it is crucial to inform and provide airport employees with a thorough education on waste management at both an individual and group level. As part of the onboarding process, new employees should be given the tools needed to achieve a thorough understanding of the airport's solid waste and recycling goals. It is also crucial for this education to be tailored to the type of job an individual may hold within the airport. For example, if an individual is employed at a food concessionaire, such as Peter Chu's or Theory Coffee, this employee should be given the opportunity to learn about food waste and composting.

- **Provide ongoing tenant education.** It is crucial to continue to encourage tenant participation to ensure buy-in of the airport's recycling efforts. To ensure recycling is part of the airport's everyday business, airport administration can provide training and education to support personnel, tenants, and others who conduct business at the airport. In-person meetings with airport tenants could be held to create mutual understanding of the airport's solid waste and recycling goals and how tenants play a vital role in the airport's overall success.

- **Incorporate an airport-wide waste reduction strategic plan.** Designing an airport-wide waste reduction strategic plan will create consistency in waste disposal mechanisms, ultimately resulting in the reduction of materials sent to the landfill.