Zero Waste Plan

A ROADMAP TO REDUCE, RECAPTURE, RECYCLE AND REINVENT SFO’S MATERIAL SYSTEM
Our Goal
San Francisco International Airport (SFO) has set a Strategic Plan goal of becoming the world’s first ‘zero waste’ airport by 2021. Zero waste, as defined by the Zero Waste Alliance, is to divert at least 90% of waste from landfills and incinerators using methods like recycling and composting.

Our Status
In Fiscal Year 2015-16, SFO Airport generated 12,200 tons, or 26,888,800 pounds, of solid waste. A recent study confirmed that more than 95% of this waste was compostable or recyclable, so for SFO, zero waste is already within reach.

Our Plan
This document lays out SFO Airport’s Zero Waste Plan, a suite of measures to achieve zero waste by 2021 and work towards becoming a “Closed-Loop Circular Campus” in the years that follow. Pivoting from a landfill-centric system will require the airport’s dynamic group of materials managers to track new metrics, test new technologies and behavior-focused campaigns, and team up with new stakeholders.

Executive Summary

By implementing this plan, SFO can become a leader in addressing some of the largest challenges of our time – climate change, human health risks, ecosystem destruction, and more.
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OUR GOAL

San Francisco International Airport (SFO) has set a goal of becoming the world’s **first zero waste airport** by 2021. The zero waste goal, as defined by the Zero Waste Alliance, is to divert at least 90% of waste from landfills and incinerators using methods like recycling and composting.
The bold goal of reaching, or exceeding, zero waste within the airport’s 14 million square-foot campus materials system was established in SFO’s most recent Strategic Plan. The plan reflects a longstanding City and County of San Francisco and San Francisco International Airport Commission commitment towards environmental leadership, natural resource stewardship, and climate action.

To reach zero waste, SFO must make a long-term commitment to educate and encourage campus-wide adoption of these crucial tenets:

- Reduce or eliminate the use of non-renewable materials
- Recycle or compost all eligible materials

In doing so, SFO will be the first airport to turn the current “linear” system (Figure 1) of materials disposal into one that is “circular,” (Figure 2) regenerative, and reflective of the environmental values of our passengers, neighbors, and employees.

**What is Zero Waste?**

The Zero Waste Alliance defines “zero waste” as the diversion of 90% of waste materials from landfills, incinerators and the environment. Given that 85% of materials found in our world’s trash cans today can be recovered and sold within existing markets, “zero” may already be within reach for most organizations and campuses targeting it. Pivoting away from a conventional lifecycle of a product with a finite end, a zero waste system focuses on reinventing consumption into a process of renewal and regeneration that mitigates environmental impacts and builds a circular economy through a suite of new jobs required to ensure a product has a continuous journey.

It is SFO’s charge to redesign our materials system to not just minimize waste, but to eliminate it altogether. As an airport that has shown tremendous leadership and immense capacity to achieve significant sustainability outcomes for decades, zero waste is SFO’s next-generation, materials-focused “moonshot.”

**Why Zero?**

A commitment to zero waste is aimed at addressing the environmental impacts and social inequalities of how materials are produced, consumed, and disposed of. It is a way to help address some of the largest challenges of our time, like climate change, human health risks, and ecosystem destruction, as we adapt to a future with fewer resources.

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Recognizing this, the State of California and many cities across the world have adopted legislation to promote the reduction of waste, sustainable resource procurement, recovery, and disposal practices, and greater waste diversion through composting and recycling. For example, the City and County of San Francisco, which has adopted a goal of zero waste by 2020, requires stores to replace single-use plastic bags with ones that are compostable, recyclable and/or reusable. The City has also adopted ordinances requiring Public Works projects to use recycled materials as much as possible, and for all residents to separate their waste into compost, recycling, and landfill.

For more information and the full list of policies, see Appendix I.

**Plan Development**

The Zero Waste Plan was developed by SFO’s Administration and Policy Division starting in December 2016, in partnership with key stakeholders across the airport.

The plan was created to help guide decisions that may affect the management of materials across the airport. It was drafted in conformance with current waste handling and recycling codes, including the City of San Francisco’s Environmental Code and the Federal Aviation Administration’s Modernization and Reform Act of 2012. It looks at materials across their lifecycles and proposes circular, regenerative, and reuse options that will generate low, or no, landfill impact.

The timeline (Figure 3) below outlines the steps taken to define SFO’s roadmap to zero waste. The plan was also informed by focus groups, data collection, and other research.

### Scope of Materials

It is important to note that this Plan encompasses all materials managed within the SFO-Commission ecosystem that are served by the Airport’s South San Francisco Scavenger Company (SSFSC) contract. This includes Commission offices and maintenance shops, as well as terminal and airfield tenants. Efforts to obtain data from those tenants not served by the Airport SSFSC Contract, i.e. Gate Gourmet, United Airlines, FedEx, China Cargo, US Post Office, American Airlines, Rental Car Facility, Clean Energy, US Coast Guard, and Signature, as a means of partnering to further explore material management system efficiencies, will be explored within the implementation of the long-term Plan.

The Zero Waste Plan addresses all types of materials used in SFO’s system (see detailed list in Appendix II SFO’s Materials Recovery Guide):

- **Compostable Materials:** Food waste, green waste, other organic materials (e.g. wet paper towels, food-soiled paper, wax paper and wax-coated cardboard)

- **Recyclable Materials:** Mixed paper, cardboard, glass, aluminum, rigid plastics, mixed metals, lumber/wooden pallets, textiles, used oils

- **Non-Renewable Mixed Municipal Solid Waste (MSW) / Landfill / Refuse:** Items that cannot be composted or recycled (e.g. broken glass and ceramics, diapers, pet waste, film plastics, polystyrene foam)

- **Universal and Electronic Waste:** Electronic appliances and accessories (e.g. batteries, CFL and fluorescent light bulbs, computers, cords, phones, keyboards, monitors, fax machines)

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Excluded Materials

Not included in the plan are Construction and Demolition (C&D) debris. Compliance with the city’s requirement to divert 75% of C&D debris (set in Chapter 7 of the San Francisco Environment Code) is tracked by the SF Department of the Environment (SFE) through contractor submittals for all municipal construction projects. The technical specifications for airport construction projects contain detailed requirements for tracking and recycling C&D waste, and require annual reports to SFE to document the generation and recycling of such waste materials.

Since the C&D waste stream is highly variable (depending upon the scope and scale of capital improvement and facility maintenance projects), it is not captured in the airport’s annual Climate Action Plan or emissions inventories, nor will it be in the future, as guided by Airport Carbon Accreditation methodology.

Baseline Data on SFO’s Current Materials System

In pursuit of zero waste, SFO’s team developed a methodology to thoroughly assess and understand the lifecycle of materials across our campus and the diverse stakeholders involved within those lifecycles.

Below is a summary of this “cradle-to-cradle” approach to analyzing the materials consumed and disposed of at SFO, with descriptions of the methods applied, key findings, and recommended next steps.

TASK 1: BENCHMARK CURRENT MATERIALS GENERATION & TRENDS

The foundation of any good plan is good and complete data. Thus, SFO’s first task in assessing its materials was to collect data to establish a baseline and evaluate historical trends. The process outlined below was used to analyze and synthesize available data on the type and quantity of solid waste materials generated across the SFO campus.

Methodology

To identify the total amounts of mixed solid waste (MSW, also known as landfill waste), compostable waste, and separated recyclable material generated at SFO, the team analyzed quarterly reports from 2010 to 2016 which summarized the waste materials collected by SFO’s waste hauler, South San Francisco Scavenger Company (SSFSC).

Week-long solid waste characterization studies were also conducted by a contracted firm, Environmental Science Associates (ESA) during the Airport’s peak travel season (July – September). These studies were conducted annually, from 2011 to 2015, to determine the percentage breakdown (by mass) of refuse, organics and recyclables in 15-16 compactors, six roll-off boxes, and a combination of smaller bins and toters. Findings from each of ESA’s studies conducted under contract were extrapolated to estimate the relative percentage breakdown of waste types for the airport.

Key Findings

HISTORICAL PASSENGER ENPLANEMENT & WASTE MATERIAL GENERATION RATES AT SFO (Fig 4)

In Fiscal Year 2015-16, SSFSC hauled 12,200 short tons of solid waste consisting of compostable, recyclable, and non-renewable refuse material. This total does not include C&D debris, deplaned waste from international flights, or materials classified as universal or hazardous waste.
Approximately 6,960 tons, or 57% of this total was source-separated on-site at SFO (Figure 4). Of the source-separated materials, over 70% (4,917 tons) were reported as compostable and processed at a composting facility in Gilroy, CA; the remainder was hauled by SSFSC. In terms of waste characterization, ESA’s study found significant contamination throughout SFO’s bins and compactors. However, less than 5% of this waste was identified to be non-compostable or non-recyclable.

**Recommendations**

- Employ on-site measurement technology to weigh waste materials destined for composting, recycling and landfiling to provide reliable data on actual generation of each waste component.

**TASK 2: EVALUATE CURRENT GENERATORS & DIVERSION PRACTICES**

SFO’s next steps were to identify key waste generators and evaluate the effectiveness of current infrastructure and practices used to handle materials when disposing of MSW as well as source-separated, recyclable, and compostable materials.

A series of studies were conducted to assess waste generation and quantify waste diversion rates in passenger areas (pre- and post-security) and front- and back-of-house tenant spaces, as well as to identify major sources of waste in passenger areas and Material Recovery Areas. These studies were conducted within the airport’s passenger terminal areas (“Waste Receptacle Project”), curbside drop-off locations, Materials Recovery Areas (formerly called “Trash Compactor Areas/Enclosures”), and leasehold spaces.

**Methodology**

- In the first and second Waste Receptacle Project studies, SFO’s standard waste bin iconography, wording, and design were analyzed for their effectiveness in promoting proper waste diversion in passenger areas.

SFO’s standard materials bins were compared to experimental bins that used various combinations of sorting symbols and text, by looking at resulting percentage of waste they diverted from landfills to recycling or compost. The first study tested bins placed in International Terminal G, Terminal 2 (pre-security), and the Terminal 3 East holding area. The second study tested updated versions of bins in the T3 East holding area and the T2 food court.

- The Terminal Curbside Receptacle Contamination Survey analyzed bins located in public areas not examined in the Waste Receptacle Project studies. Sixty-nine receptacles located at curbside drop-off/pick-up locations were observed for their ratio of contaminated contents to suitable contents (e.g. the number of compostable items in landfill receptacles, or vice versa). Landfill receptacles with contamination rates of 20% or more were considered “contaminated,” as were recycling receptacles with rates of at least 10%.

- The Material Recovery Area Mixed Solid Waste Compactor Survey sought to identify generators of MSW and analyze the diversion potential of waste that was brought to 16 terminal MSW compactors during peak operational hours, Monday through Friday. Sixteen sessions were conducted in 3-to 4-hour intervals. During each session, surveyors recorded information from tenants and SFO staff depositing materials bags into compactors (i.e. date, time, name, company, waste type) and inspected the bags. The number of bags identified as MSW (landfill), recycling and compost were used to calculate the percentage of each.

- The Tenant-Owned Diversion of Compostable and Recyclable Materials Survey was conducted to provide additional characterization of waste generated in the back-of-house by SFO concessions. Photos of receptacle contents were analyzed to determine percentages of MSW (landfill), recyclables and compost.
Key Findings

- The *Waste Receptacle Project studies* revealed that most materials from passenger areas were generated on-site by concessionaires. In the first study, experimental bins yielded greater diversion rates than SFO’s standard bins (50% on average compared to 24.7%), but had no significant impact on waste sorting accuracy. In the second study, updated experimental bins with revised signage yielded an increased accuracy rate (58% compared to the 49% average in the first study).

- The *Terminal Curbside Receptacle Contamination Survey* revealed that the contamination rates of bins located outside of terminals were significant: 78% in Terminal 1, 69% in Terminal 3, and 44% in Terminal 2.

- The *Material Recovery Area (MRA) Mixed Solid Waste Compactor Survey* revealed that within terminal areas, waste-generating areas included tenant leaseholds or storage areas, passenger areas and office spaces serviced by custodial, and areas for ground handlers servicing aircrafts.

Out of a total 724 bags observed throughout SFO’s terminals, 65% of the contents were compostable. Paper towels were the most frequently observed compostable item, and food waste was second. In terms of waste generators, food and beverage tenants accounted for 29.7%; SFO custodians accounted for 41.6%; and 28.7% was produced by offices, airlines, and retailers.

- The *MRA Mixed Solid waste Compactor Survey* revealed that, of the MSW generated by food and beverage tenants, 81% was compostable, 7% was recyclable, and the remaining 12% was landfill. This information gave validation to a visual analysis of back-of-house waste generated by tenants.
Recommendations

- Create and apply protocols for campus-wide waste characterization baseline and ongoing studies
- Identify technologies to streamline data collection and verification to measure performance
- Apply more effective designs and signage on waste receptacles to promote more waste diversion and proper sorting
- Simplify the food and beverage waste stream to ensure that all materials generated are covered by receptacle symbols

TASK 3: SUMMARIZE INFLUENTIAL FACTORS IN MATERIALS DIVERSION

Based upon the analyses performed in Tasks 1 and 2, the following narrative was prepared to summarize the strengths and weaknesses in SFO’s current materials management system.

This included:
I. Collection & Disposal Infrastructure
II. Data Collection & Tracking of Materials
III. Mapping & Infrastructure Management
IV. Materials Management Staffing
V. Outreach & Education
VI. Waste Handling Contracts
VII. Future System Influencers

In many cases, short-term improvements were implemented based on the findings. This summary is further detailed in Appendix VI.
**Data Collection & Tracking of Waste Materials**

**Overview**

Without access to consistent, reliable, and granular data, the airport is flying blind as it works to implement its roadmap to zero waste.

The most comprehensive source of information available on SFO’s historic rates of materials generation is quarterly data reported by the airport’s materials hauler, South San Francisco Scavenger Company (SSFSC), which details the tonnage of source-separated recyclable materials collected from SFO and sold by SSFSC, as well as the estimated tonnage of compostable waste processed at the Z Best facility in Gilroy, CA. This quarterly data was compiled from the past six years of records.

However, the SSFSC’s quarterly reports provide limited insight into the airport’s practices for handling solid waste or its key waste generators, since they summarize the materials collected from containers, bins, and compactors that serve an array of airport departments and tenants. Thus, it is challenging to determine where solid waste materials originate from within the airport, and to define the primary classes of constituents across all three material streams.

To address these data gaps, SFO has identified the scope of work to collect the data needed to rank the users of the waste handling facilities on the basis of the quantity of waste they deposit into compactors and bins each day. It will require that the contents of a representative sample of waste delivered by each user are hand-sorted and weighed by various components. The data collected will then be extrapolated to annual generation rates to estimate of the amounts of compostable, recyclable, and landfill waste each user produces. This data will also inform the approach for maximizing composting and recycling by focusing efforts on the highest waste generators.

**Recommendations**

Increased efforts should be focused on introducing mechanisms at SFO-maintained waste containers to track and report independent data on waste generation and characterization.

A proposed approach would yield:

- Accurate data on solid waste generated by various contributors
- Detailed information on the composition of waste generated by each contributor

**Mapping & Infrastructure Management**

**Overview**

Infrastructure plays a critical role in achieving the airport’s zero waste goal, and it should be designed and managed in ways similar to other assets that serve the campus. SFO’s waste infrastructure includes the following pieces of equipment:

- **Within Materials Recovery Areas:** 25 compactors, 44 roll-off boxes, 16 keycard readers, 7 Clean Star waste oil units, 50+ surveillance cameras
- **Within Passenger Terminal Areas:** 1000+ bins (used as stand-alone or mill-work/built-in recycling, composting, and landfill bins); 5 liquid waste stations
- **Across Curbsides:** 131 recycling and landfill bins
- **Within Parking Garages:** 80 bins procured/serviced, New South Parking
- **Within Office Spaces:** 1000+ desk-side and break room bins used for recycling, composting, and landfill
To create a complete inventory of these assets, SFO staff inventoried all Materials Recovery Areas (MRAs) and receptacles/bins within the passenger terminal areas and curbsides. This helped to develop an “infrastructure baseline” as part of this research scope.

This inventory data was added as a new layer to the airport’s Geographic Information System (GIS) database. This database will be updated as equipment and bins are relocated, eliminated or replaced through efforts to increase waste diversion. For example, an effort to group all bins in the terminals into trios is expected to follow the airport’s forthcoming Placement Guidelines, which will allow for quicker inventory and identification of more optimal placement locations. All equipment appearing in this data layer is owned and maintained by the airport, through its Facilities Section.

The airport produced the Materials Recovery Areas (MRA) Map (Figure 7) to show what services are available to tenants and custodial team members visiting an MRA. The MRA Map has been incorporated into the relevant outreach materials described below. This is coupled with a Materials Recovery Guide to direct what materials may be placed within each receptacle or location in the MRA (Appendix II & III). A violation of Commission Rule 8.0 Airport Environmental Standards for proper sorting in the MRA or in a tenant leased space is also enforceable via an administrative fine.
**Recommendations**

The airport is collecting a summary of material containers managed within tenant and concessionaire leasehold spaces through its Green Business Program (noted below).

It should work to expand this asset inventory, where practicable and useful, to include the following:

- Waste bins on the SFO campus that are not covered under the SFO Commission’s current waste handling contract (i.e. serviced under a tenant’s separate waste hauling contract)
- Locations of airline, vendor, and concessionaire storage units in terminals, in relation to existing common-use waste compactors and bins
- The airport should also use the MRA Map as guidance to procure additional assets to support recycling and composting needs as necessary

**Materials Management Staffing**

**Overview**

Though the airport materials management ecosystem involves various team members, the custodial team is its key interface. The following team members were engaged in the development of plan recommendations through a series of focus groups on materials management:

- **Program-Oriented:** Environmental Operations, Revenue Development, Aviation Management, Duty Managers
- **Infrastructure-Aligned:** Pavings and Grounds, Sign Shop
- **System-Owners:** Custodial

SFO staff conducted these focus groups to explore the challenges faced by custodial staff, specifically, in handling waste and to crowdsource their solutions. The focus groups, which included a range of staff, were intended to guide open discussions and generate recommendations on measures to increase landfill diversion and reduce the burden upon the custodial team.

Note that these groups did not cover procurement, as the custodial team is a known leader of green procurement in its work to stretch resources and comply with the city’s green purchasing requirements.

**Methodology**

Eight focus groups were conducted over two months and coordinated through the custodial management team. Custodial managers were asked to select a diverse group of custodial staff and supervisors that perform routine cleaning tasks across all terminal spaces.

The focus groups were split between day, swing and night shifts and included terminal and food court staff to ensure all types of challenges could be addressed. All focus group sections included a facilitator and a recorder (neither of whom were members of the custodial team).

Focus group participants were briefed on SFO’s zero waste goal. They were asked to express current challenges in material recovery, propose solutions, and to share information from the session with fellow employees and ask for feedback. In addition, posters summarizing focus group findings, challenges and solutions were displayed in each custodial break room for review, feedback, information and transparency (see Appendix V). Lastly, a second focus group session was conducted with staff from each shift to discuss additional challenges and solutions identified since the last session.
Key Findings

The focus groups revealed that each shift experiences different challenges. Information shared below summarizes key findings:

Safety Risks
- **Liquid waste** in bottles and cans significantly increases the weight of bin liners and has caused injuries.
- **Certain access doors are heavy** and difficult to open and hold along with equipment and materials.
- **Openings of roll-off bins and compactors are high, requiring lifting/tossing**, which can result in injuries.
- **Carts, bins and compactors** present consistent safety and maintenance issues.

Human Capital and Equipment
- **Demands on the team have increased** with the increase in passenger traffic along with staff disability, leave, and retirements.
- **Work stations** cover larger areas and are not evenly distributed.
- **Material Recovery Areas are too far apart**, and require excessive time to travel to/from.
- **The hauler schedule is insufficient**, which places an additional burden on custodial team to manage Material Recovery Areas (MRAs).
- **Carts are not available when needed**, as repairs are slow and the reserve supply is insufficient.

Passengers, Tenants and Concessions
- **Tenants misuse MRAs** when discarding bulky items (crates, boxes, pallets, equipment, furniture).
- **Staff, tenants, and the public do not properly sort waste** in terminal bins due to missing or confusing signs.

Recommendations

The following actions should be prioritized:

Overview

To reach SFO’s zero waste goal, a major outreach program will be critical to building awareness and engagement among passengers and staff. As an initial step, various airport divisions have pushed for critical signage and messaging campaigns, reimagined materials iconography and collection systems, launched new trainings, and created new campus and concessionaire partnerships.

These outreach efforts with materials procurers and end users have worked towards the following goals:
- Building more effective, broader engagement among SFO passengers and employees.
- Growing more collaborative working relationships with key stakeholders to improve materials management practices within their areas.
- Increasing passenger and staff awareness of SFO’s materials management programs, certainty of how to sort materials (see Figure 8 on following page), and the role of personal action in reaching zero waste.
- Generating new tools and strategies to reduce waste at all points of materials’ lifecycle.
**Methodology**

The above goals guided the engagement efforts that now serve as the airport’s baseline to track progress in materials diversion as broader campaigns are executed:

- **Messaging:** The Project Management Office (PMO) assessed the passenger experience with the airport’s materials management system and delivered new signage and receptacles to remedy confusion about proper separation practices. These were informed by the Waste Receptacle Project Studies described in Task 2 above.

  Surveys on current waste bins and proposed designs found that passenger confusion was caused by:

  - **What is it?** Food containers not clearly labeled as compostable vs. recyclable
  - **Where does it go?** Bins and signage absent, inconsistent in design
  - **Where does it end up?** Passenger confusion on end-of-life (bins state “materials sorted offsite”, products labeled as compostable but no compost bins available)

In response, the PMO led an effort to redesign passenger-facing signage and receptacles, piloted options with both passengers and members of the operations/custodial teams, and developed new, custom manufactured trios to increase passenger onsite source separation and maximize materials recovery. This is described in the plan below along with a timeline for deployment.
been diverted from landfills each week from airport coffee shops alone. That amount is set to increase as more businesses incorporate waste diversion practices. SFO has also provided 36 water bottle refilling stations for passengers to use instead of purchasing single-use water bottles and launched SFO Unites Against Hunger, a program that enables concessionaires to donate surplus food to those who need it.

Recommendations

Significant progress has been made in educating terminal passengers and tenants about materials diversion. These efforts will be expanded in scope, and become more focused on stakeholders, through the following measures:

- **Messaging:** The airport should ensure that all capital projects deliver new bins and signage, and that clear signage is applied consistently within terminals, tenant spaces and offices.

- **Materials:** Passenger confusion will continue unless the airport sets more rigorous requirements for its food and beverage concessionaires to use foodware and serviceware that can be easily identified as compostable or recyclable. The airport should prioritize distribution of reusable products through its lease agreements (i.e. Sustainable Food & Beverage Policy) and Rules & Regulations, and incentivize it through airport mechanisms (i.e. Trash Permit Fee discounts). When using disposable products, options should be outlined clearly (see figure 10, Preferred Foodware recommended by Stop Waste, below) and buyers’ alliances should be established to offer discounted bulk pricing.

Full deployment of new receptacles for passengers is constrained by costs, so the Facilities Operations team developed an interim solution to retrofit all current bins with new lids and labels approved by the airport’s Design Review Committee (Figure 9, shown above). As capital projects are implemented and new trios are purchased for that project, these updated bins will be rotated to facilities not prioritized through the capital plan, including passenger pick-up/drop-off areas, perimeter buildings and parking garages.

- **Green Business Program:** To address waste from airport tenants, the airport’s “Sustainability Reaching for Number One” Committee identified an opportunity to team up with the California Green Business Network.

  In January 2017, the airport partnered with SFE and San Mateo County to engage with this network and launch the SFO Green Business Program, which provides SFO’s concessionaires with tools, training, and resources to increase back-of-house composting and recycling, among other sustainability measures. **Since its launch, more than a ton of organic materials has**

- Molded natural fiber/paper products
- Uncoated or coated with BPI-certified film
- Wood-based chopsticks and flatware, such as birchware

**PREFERRED FOODWARE (Fig 10)**
• **Outreach:** SFO has initiated a training and bin distribution programs for tenants enrolled in the Green Business Program, but should seek to engage more tenants in the training and onsite-coaching services offered. (As of March 2018, 26 tenants of 180 are certified and nearly 70 are participating in the certification process.)

The airport will work to expand awareness among airport employees and non-terminal tenants to increase deployment of infrastructure and educational opportunities for all who generate materials in the airport. This will be covered, in large part, through an airport-wide sustainability campaign, partnership with the Learning Management Office for employee training/badging, and an SFOConnect webpage focused on the Green Business Program.

**Waste Handling Contracts**

**Overview**

In 2016, SFO Airport awarded a new contract to its long-time materials management provider, South San Francisco Scavenger Company (SSFSC) that emphasized, through its contract pricing scheme, the airport’s role in strengthening source reduction and separation to work towards the waste diversion goals set in SFO’s Strategic Plan. SSFSC collects source-separated recyclable materials and transports the contents of compactors and bins (containing predominantly biodegradable materials) to a municipal composting facility. Thus, to achieve its zero waste goal, SFO must focus on maximizing source separation at the airport.

**Recommendations**

Opportunities to work towards zero waste in partnership with SFO’s hauler include:

• Transition from flat fees for monthly waste disposal for tenants and airlines to a structure that incentivizes the disposal of recyclable, compostable, and non-renewable materials into the correct waste receptacles.

• Ensure future contracts for waste handling will require (1) a detailed data clause, (2) a bill of laden for all recyclables and (3) monthly data reports in an editable file format so that this data may be uploaded to SFO’s Performance Dashboard. The data clause should require the vendor/service provider to post data to an SFO application programming interface or provide other means of obtaining that data. In an ideal system, real-time data would be collected each time a truck enters and exits an SFO Geofence, and it would include the weight of each truck.

• Work with third-party certified SSFSC to encourage the use of third-party material recovery facilities to process residual MSW from SFO to increase waste diversion and elevate hauler accountability and data transparency.

• Use alternative hauling vehicles, as market viable, to reduce transportation-related emissions.

**Future System Influencers**

**Overview**

With SFO experiencing record growth in usage – the number of annual passengers is forecasted to increase to 71.1 million in 2030 – the airport expects greater impacts on utility consumption, including material waste.

Specific facilities expected to add to material waste on SFO’s campus in the near-term, with opening dates occurring during the airport’s current 5-year Strategic Plan, include:

• Terminal 1 Redevelopment
• Grand Hyatt Hotel
• Consolidated Administration Campus
• Long Term Parking Garage 2

SFO generates about 12,000 tons of solid waste per year, or about 0.45 lbs. per passenger. At that rate, solid waste generation could reach about 16,000 tons per year by 2030. But due to uncertainties with current data, and assuming the airport continues its efforts to reduce waste, the rate at 2030 could stay as low as 12,000 tons per year.
Recommendations

SFO should take measures to continue to track and model materials impacts in these areas:

- **Capital Improvement Plan:** Ensure that adequate Materials Recovery Areas are designed and deployed, along with adequate, end-use-aligned compactors and roll-off bins (equipped with weight sensors).

- **Airport Development Plan:** Ensure that passenger growth is met with more bin “trios” (compost, recycling, landfill bins), as well as educational campaigns and consistent signage.

- **Grand Hyatt Hotel:** Partner with the hotel as a tenant to ensure that bin “trios” (with airport-consistent signage) are accessible in common areas, staff conference spaces, and guest rooms. Couple with trainings for material owners (i.e. procurement, custodial, events).

- **Consolidated Administration Campus (CAC):** Team with the conversion team to ensure adequate bins and consistent signage are available to new occupants. Update the CAC Neighborhood Guide to reflect this new system (along with ownership opportunities for extended producer responsibility and end of life).

- **General:** Develop more reliable methods for weighing the contents of waste compactors and bins prior to being hauled from the airport and work with Revenue Review Development Management to ensure all tenant spaces use bin “trios” with airport-consistent signage.
SFO’s Six-Step Zero Waste Plan

01 Metric Management
02 Material Recovery Areas (MRAs)
03 Human Power
04 Materiality
05 Messaging
06 Market Based Mechanisms
Overview

The findings and recommendations from the airport’s in-house assessment of its current materials management offer a flight path to achieve SFO’s zero waste goal using three phases of strategies: Now (in 2018), Near (by 2021) and Next (by 2022). This plan is designed to be a clear, step-based approach, with a timeline and key waypoints to measure progress of the airport in reaching and achieving zero waste. To that end, each section strives to frame key initiatives and implementers in a simple table as the airport’s action plan to work towards, and achieve, zero.

Based on SFO’s findings, the greatest gains in material diversion can be obtained using interventions to address the airport’s key constraints in materials management, reinforce the system’s strengths, and work towards these goals: waste diversion, sorting accuracy and SFO sustainability awareness.

This plan seeks to guide the airport and its key material managers to change common practices in the procurement, use, and end-of-life of materials. Ultimately, the goal is to emulate sustainable natural cycles, with all materials designed to become resources for others to use when discarded.

To that end, this document was shared with key owners of materials management systems (facility operations, custodial, tenants) and stakeholders (project managers, contract administrators, “Reaching For Number One” Committee members) to collect input and expand discussion on the influence of significant waste generators at the airport.
Needs

Currently, SFO’s metrics rely on data from quarterly waste hauling reports provided by South San Francisco Scavenger Company (SSFSC). As described earlier in the Task 1 report, these reports offer limited insight into the airport’s solid waste handling practices or key waste generators, since they summarize the materials collected from containers, bins and compactors that serve an array of airport departments and tenants.

The visual characterization of such a diverse mix of materials lacks precise information on the weight of each piece of material within samples from representative compactors or bins. Also, cross-sectional sampling only captures the contents of each bin or compactor once each year, limiting SFO’s ability to generalize the results. Pre-work for this plan, represented in our baseline above, sought to expand the airport’s knowledge and data, but was limited in scope and timeline.

Thus, it remains a challenge to delineate where solid waste materials originate, and to further define the primary classes of constituents within the landfill and compost waste streams.

Solutions

The airport seeks to increase commitment, sophistication and frequency of waste characterization studies for its 17 Material Recovery Areas (MRAs), including its 23 compactors and 41 roll-off bins. These regular data captures and analyses will inform methods to conduct similar studies in non-terminal areas and future refinements to this plan. Further, SFO’s efforts must be benchmarked using industry standards and clear performance targets, such as the U.S. Green Building Council’s Total Resource Use and Efficiency (TRUE) rating system (shown below).

These data-driven initiatives, noted in the table below, will allow SFO to better understand the materials that flow through its facilities and identify opportunities to ensure all products can be reused.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Automation</strong></td>
<td>Evaluate available technologies that will allow for the efficient collection of readily available data on waste generation rates and identification of waste generators within MRAs by FY 2017-18</td>
<td>Now</td>
<td>ITT</td>
</tr>
<tr>
<td></td>
<td>Pilot 1-2 solutions in MRAs on compactors</td>
<td>Now</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Based upon learnings, deploy 1-2 technologies on MRA entry points</td>
<td>Now</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Based upon learnings, deploy 1-2 technologies on (1) roll-off bins (2) other MRA material recapture points (i.e. FOG), (3) individual receptacles</td>
<td>Now</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Curate a materials management technology ecosystem through campus-wide technology deployments</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td><strong>Data Collection &amp; Sharing</strong></td>
<td>Expand materials-focused GIS asset mapping beyond terminals</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Connect technology open APIs to the airport’s utilities reports (Yr 1) and sustainability dashboard (Yr 2), share data on OpenDataSF (Yr3)</td>
<td>Near</td>
<td>ITT</td>
</tr>
<tr>
<td></td>
<td>Utilize data to drive future contracts for materials collection</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td><strong>MRA</strong></td>
<td>Complete a detailed waste characterization study to estimate annual waste generation airport-wide (see scope of work detailed in Appendix VI). Tasks include: • Identify an appropriate date to conduct the study • Develop procedures to collect accurate data on the weight of solid waste deposited by each user into compactors and waste bins • Establish a protocol for data collection • Develop a detailed plan to characterize the waste materials transported by each user to each compactor and bin • Collect information on the gross weight of solid waste deposited by each user in each compactor or bin</td>
<td>Now</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td></td>
<td>Estimate annual waste generation rates for each entity using the airport’s solid waste collection system</td>
<td>Now</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td></td>
<td>Adjust recommendations based on findings, develop protocol for future characterization events</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Evaluate and pilot third-party zero waste certification programs</td>
<td>Next</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Evaluate the Environmental Protection Agency’s (EPA) Waste Reduction Model (WARM) as a standardized method for tracking environmental impacts of zero waste efforts on a source basis vs. Annual Climate Action Plan (currently uses sector-based methodology)</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td><strong>Tenants</strong></td>
<td>Engage tenants through regular electronic surveys to gather input on waste generation and potential handling activity</td>
<td>Near</td>
<td>RDM</td>
</tr>
<tr>
<td></td>
<td>Evaluate materials management fees for tenants based on cost recovery and data (vs. flat fees)</td>
<td>Near</td>
<td>Finance</td>
</tr>
</tbody>
</table>

**Legend:**
- **ITT** = Information Technology & Telecommunications
- **Ops** = Environmental Operations
- **RDM** = Revenue Development
- **S&EP** = Sustainability & Environmental Policy
Needs

Within the airport’s Terminal Complex, SFO maintains 17 Materials Recovery Areas (MRAs) – each a unique system of waste compactors and roll-off bins for use by the SFO Commission and adjacent tenants.

The MRAs were found to have inconsistencies in the collection services they provide (e.g. recycling, composting, cardboard, waste fry oil, and universal waste) and in color-coding. Additionally, no reference signage was present for tenant or custodial users. This leads to user confusion, improper disposal, and item abandonment.

Solutions

The primary measure planned is to expand the features of an existing pilot MRA, previously called the “Green Zone” (shown in images left), to standardize signage, color coding and collection services in MRAs across the airport.

This will be coupled with a robust training program for MRA users and a series of pilots for the collection of large or irregular waste materials, as well as a proposed plan for handling and managing hazardous materials.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Service</strong></td>
<td>Evaluate SSFSC's collection schedule, marrying data from SSFSC quarterly reports, Task 1 &amp; 2 findings, waste characterization study, etc., and partner to pilot an updated service schedule</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Deploy Courtyard 4 pilot “Green Zone” concept throughout the airport campus by FY 2017-18</td>
<td>Now</td>
<td>Ops + Sign Shop</td>
</tr>
<tr>
<td></td>
<td>Expand Green Zone messaging into tenant storage areas, break rooms and corridors by FY 2018-19</td>
<td>Now</td>
<td>Ops + Sign Shop</td>
</tr>
<tr>
<td></td>
<td>Develop required trainings for custodial and tenant staff that include an MRA tour focused on technology deployments (RFID card reader for users, load sensors on compactors/roll-off boxes) by FY 2018-19</td>
<td>Near</td>
<td>Ops + S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Monitor diversion targets using metrics described above, adjust program as needed to increase source separation and manage costs through SSFSC system (described below in Market-Based Mechanisms section)</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td><strong>Unique Materials</strong></td>
<td>Capture all fats, oils, and greases for reuse within the Mel Leong Treatment Plant, periodically evaluate the system’s effectiveness by FY 2019-20</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Evaluate, pilot and develop a robust universal waste collection service for all airport waste generators, build new pricing into tenant fees by FY 2019-20</td>
<td>Near</td>
<td>Ops + EHS</td>
</tr>
<tr>
<td></td>
<td>Create a wireframe asset management system that addresses materials not covered through other proposed systems (e.g. office supplies, furniture) and maximizes onsite reuse (i.e. a “virtual warehouse” and donation program). Pilot and deploy by FY 2019-20</td>
<td>Near</td>
<td>S&amp;EP, Ops, Legal, ITT</td>
</tr>
<tr>
<td></td>
<td>Develop a robust construction and demolition debris program focused on new tenant/improvement projects, separate a specialized bulk items collection service on a regular schedule. Connect to SFO Online Materials Reuse Depot (similar to SF Virtual Warehouse). Announce by FY19-20</td>
<td>Near</td>
<td>Ops</td>
</tr>
</tbody>
</table>

EHS = Environmental Health & Safety | ITT = Information Technology & Telecommunications | Ops = Environmental Operations | S&EP = Sustainability & Environmental Policy
**Needs**

Reaching zero waste will require an elevation in staffing to manage a three-stream system (for composting, recycling and landfill). Note that this measure is focused on initiatives related to Commission staff, which are expected to be supplemented by work to engage other stakeholders like tenants and passengers.

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**Solutions**

To ensure the airport’s materials managers and other stakeholders are adequately staffed, equipped and engaged, the following actions should be prioritized:

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<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>Inventory and publish findings from custodial and tenant focus groups: track action items, share regular updates through communications channels</td>
<td>Now</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Team with HR to review and modify the SFO People Plan as needed to ensure that sufficient capacity exists within responsible divisions (i.e. Custodial, Environmental Operations, Sustainability) to implement the Zero Waste Plan</td>
<td>Near</td>
<td>Custodial + Ops</td>
</tr>
<tr>
<td></td>
<td>Implement SFO People Plan and supplement with SFO and Climate Corps Fellows to engage and train the next generation of leaders in the airport’s zero waste work</td>
<td>Next</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Create a “Zero Hero” Plan to offer opportunities to engage key materials management staff at specific times (i.e. new employee orientation (NEO), annual all-hands trainings, in quarterly zero waste reports, with “Zero Hero” newsletters featuring custodial or tenant staff who cut waste)</td>
<td>Next</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Expand “Zero Hero” to all stakeholders to foster behavioral change through: • Enhanced partnership with SF Dept. Of Environment’s Zero Waste Team • Annual training modules for employees, tenants, and contractor materials managers created and offered through badging/SFO Academy/NEO • Increased participation in the professional materials management community</td>
<td>Now</td>
<td>Ops + S&amp;EP</td>
</tr>
<tr>
<td>Protocols</td>
<td>Perform an annual inventory of equipment (bins, MRAs, custodial equipment) and establish an equipment maintenance replacement program/fund, along with surplus stock to keep equipment supplied</td>
<td>Next</td>
<td>Custodial + Ops</td>
</tr>
<tr>
<td></td>
<td>Share SFO’s Material Recovery Guide and Reporting Protocol with key materials managers and ensure that all staff (custodial, tenants, duty managers, administrators) understand how to use them</td>
<td>Next</td>
<td>Ops</td>
</tr>
</tbody>
</table>

*Ops = Environmental Operations | S&EP = Sustainability & Environmental Policy*
**SFO’S ZERO WASTE PLAN**

**Needs**

SFO’s materials management system must become state-of-the-art. The airport’s current equipment, programs and policies – once considered innovative, but now standard – must evolve by leveraging the knowledge of our city, service providers and tenants on procurement and disposal practices that can move SFO towards zero waste.

The airport must build materials-focused partnerships by communicating the value of working together to build and use a circular materials system on its campus.

**Solutions**

To ensure that all waste can be reused, recycled or composted, SFO must systemically curate the disposable materials permitted to enter the airport, as well as educate those who procure and consume them.

Below are initial strategies to better manage SFO’s materials procurement and reduce its waste stream:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>Apply findings from waste characterization studies to catalog the primary types of waste materials generated, differentiated by stakeholders (e.g. Commission, passengers, airlines, tenants, other service providers)</td>
<td>Now</td>
<td>ITT</td>
</tr>
<tr>
<td></td>
<td>Research emerging market, financial, product and/or policy solutions (e.g. IDEO Base Zero, Open Source Circularity, Cascading Materials Vision, Healthy Building Materials, Healthy and Sustainable Food, etc.), pilot to demonstrate materials savings for different stakeholder groups</td>
<td>Now</td>
<td>S&amp;EP + RDM</td>
</tr>
<tr>
<td></td>
<td>Host tenant focus groups to design and evaluate these types of solutions: • Engagement campaigns for sustainable and healthy food and beverage choices (e.g. Rethink Your Drink, “Rethink Disposables,” “Plastic Straws Suck,” “Ban the Bottle”) and exhibits (e.g. Recology’s “Artist in Residence,” Monterey Bay Aquarium’s “Ocean Plastic Travelers Gallery,” Huffington Post’s “Reclaim”) • Joint procurement opportunities for source reduction / extended producer responsibility (i.e. foodware standardization, reusables/healthy product buyers alliances like this renewable energy focused program, centralized sales of reusable products like water bottles) • Equipment and trainings (e.g. totes, keycard access to MRAs, signage) to increase landfill diversion from leased spaces, along with incentives/policies to encourage use • Promote business models that reduce waste (e.g. Cascading Materials Vision, Reuse Stores, fix-it stations) and product reuse programs that protect and grow profits (e.g. book “rentals” or “Little Free Libraries”)</td>
<td>Now</td>
<td>S&amp;EP + RDM</td>
</tr>
</tbody>
</table>

**ITT** = Information Technology & Telecommunications  |  **RDM** = Revenue Development  |  **S&EP** = Sustainability & Environmental Policy
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot</td>
<td>Create a green procurement guide to evaluate products’ lifecycle costs, carbon intensity/embedded carbon, associated greenhouse emissions, health impacts (pair with SF Approved)</td>
<td>Now</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Create targeted, timelined pilots for defined stakeholder groups, utilize findings to customize a zero waste plan and tracking tool for each sector</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Create a specific, streamlined pilot for compostable foodware and a labeling program to match products with new airport-wide signage, paired with a plan to transition tenants to reusable foodware as feasible (include infrastructure assessment to ensure tenants can accommodate dishwashing, bin trios, etc.)</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Create a series of pilots targeted at single-use disposables, focused on film plastics that are hard to process (bags, straws, lids) and water bottles</td>
<td>Near</td>
<td>ITT</td>
</tr>
<tr>
<td></td>
<td>Create a zero waste certification pilot program: identify airport support requirements (policy, infrastructure, incentives), structure program, recruit participants, track outcomes</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td>Policy</td>
<td>Update SFO Sustainable Food &amp; Beverage Policy to include the airport’s new Extended Producer Requirements and pilot findings, structure associated incentives and fees</td>
<td>Now</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td></td>
<td>Issue SFO’s Zero Waste Events Policy to guide airport event organizers to purchase appropriate materials, contract with vendors to ensure events are waste-free and comply with SFO policies (will also include “zero waste party kits” and a plan to phase out disposable materials used by vendors)</td>
<td>Now</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td>Partnerships</td>
<td>Identify opportunities for resource recovery program partnerships, grants and awards with the greatest potential to encourage waste reduction (e.g. Environmental Protection Agency’s Food Recovery Challenge), leverage SF Dept. of Environment’s expertise and contracting tools to better align SFO programs and policies with the city’s</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Explore creation of an airport reuse collaborative or buyers alliance through ACI/CAC: recruit tenant partners, gain formal commitments</td>
<td>Next</td>
<td>S&amp;EP</td>
</tr>
</tbody>
</table>

**Additional Things to Consider**

- Pre-security water catchment station showing water re-use
- “Compost me” labels on food packaging
- Sorting instructions on food court trays
- SFO sustainability video upon landing
- Floor messaging
- Large environmental graphics
Needs

SFO’s waste bins are inconsistent in type, placement, and signage, which leads to complaints of confusion and frustration among passengers.

This is the result of bins being installed through capital projects delivered at different times since Terminal 2 was opened in 2011. Terminal 2 was built with combined “millwork” receptacles that included only compost and recycling bins, as well as a mandate for tenants to use compostable foodware under SFO’s Sustainable Food & Beverage Policy.

Solutions

To remedy this, a new system of bins and signs developed by the Project Management Office (PMO) program (shown left) will be deployed going forward as part of the airport’s Capital Improvement Program. The design and placement of these was informed by studies described in Task 2. In the interim, existing bins will be updated with this signage and paired with new lids, per the schedule below.

SFO Bin Replacement Timeline

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>QTY</th>
<th>CURRENT BINS: NEW LIDS &amp; SIGNS (OPS)</th>
<th>NEW BINS (PMO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1C</td>
<td>47</td>
<td>12/2017</td>
<td>2/2022</td>
</tr>
<tr>
<td>IT Building</td>
<td>162</td>
<td>10/2017</td>
<td>2/2021</td>
</tr>
<tr>
<td>T2D</td>
<td>TBD</td>
<td>N/A</td>
<td>2/2018</td>
</tr>
<tr>
<td>T3E</td>
<td>169</td>
<td>Complete</td>
<td>TBD 2020</td>
</tr>
<tr>
<td>T3F</td>
<td>169</td>
<td>9/2017</td>
<td>TBD 2020</td>
</tr>
<tr>
<td>ITG</td>
<td>138</td>
<td>11/2017</td>
<td>TBD 2020</td>
</tr>
<tr>
<td>ITA</td>
<td>95</td>
<td>11/2017</td>
<td>TBD 2020</td>
</tr>
<tr>
<td>TOTAL</td>
<td>611</td>
<td>Completed 12/2017</td>
<td>2022</td>
</tr>
</tbody>
</table>
Additional materials are included in the table below to communicate the zero waste message to various audiences throughout the airport. Clear and compelling communications can help make the zero waste ideology mainstream, along with active learning sessions, peer sharing and buying networks that put vision into practice.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>Assess and document current outreach and engagement practices that achieve target outcomes by conducting surveys, interviews and focus groups</td>
<td>Now</td>
<td>Ops + S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Host inspiration sessions with stakeholders to create airport-wide zero waste campaigns (consider pairing with broader sustainability effort)</td>
<td>Now</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td></td>
<td>Create guidelines, tools and timelines to evaluate and update the airport’s outreach strategies (e.g. messaging, campaigns, labeling)</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td>Partner</td>
<td>Establish a task force to evaluate materials campaigns focused on behavior change and adjust them over time; team with the museum to help deliver these materials to the public and employees</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Create a help desk function to help troubleshoot materials-related challenges faced by passengers and zero waste implementers</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Standardize campaigns and point-of-use messaging for passengers, tenants, carriers and service providers by leveraging industry-wide partnerships (CAC, ACI, AAAE) and working groups</td>
<td>Next</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td>Point of Use</td>
<td>Standardize signage, product labels and waste receptacles (individual and built-in) to increase composting in front- and back-of-house (airport will provide standard-issue bins for back-of-house)</td>
<td>Now</td>
<td>Ops + Sign Shop + P&amp;G</td>
</tr>
<tr>
<td></td>
<td>Ensure signage matches that within all MRAs, as well as corridors leading to storage/office spaces where additional materials are processed</td>
<td>Now</td>
<td>Ops</td>
</tr>
<tr>
<td></td>
<td>Team with wayfinding staff to ensure consistent, adequate signage draws passengers to desired behaviors for materials procurement and disposal</td>
<td>Now</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td>Equipment</td>
<td>Implement interim bin lid replacement/signage upgrades by Dec. 2017 (see above “Replacement Timeline”)</td>
<td>Now</td>
<td>Ops + Sign Shop + P&amp;G</td>
</tr>
<tr>
<td></td>
<td>Evaluate the placement of front-of-house waste bins in terminals (existing and proposed) based on new bin placement guidelines</td>
<td>Near</td>
<td>Ops+ P&amp;G</td>
</tr>
<tr>
<td></td>
<td>Leverage capital project delivery of new bins across terminals, relocate existing bins in parking garages and perimeter buildings by 2022 (see above “Replacement Timeline”)</td>
<td>Next</td>
<td>PMO</td>
</tr>
</tbody>
</table>
06: MARKET-BASED MECHANISMS

Needs

Achieving zero waste can be accelerated by creating incentives that make the airport’s goal economically compelling to work towards for all parties involved. SFO is a marketplace with enormous opportunities to reduce environmental impacts in an increasingly global economy, particularly if the airport can leverage its local businesses to implement zero waste measures on its campus and beyond.

Solutions

The airport can create financial incentives to reduce the use of non-renewable materials and the greenhouse gas emissions associated with them.

The airport has already done this through its reduced Trash Permit Discount Fee, which is offered to tenants that become Certified Green Businesses (described in Task 3). Food and beverage tenants save nearly $2,500 a year by implementing sustainability measures in their operations, including materials management (e.g. adopting a green purchasing policy, hosting a waste audit and training for staff, installing waste bin trios).

The reduced Trash Permit Discount Fee program has been successful since it launched in January 2017, and it should be expanded to enroll more tenants. It should also require tenants to take more measures, including those being tested through focus groups described under Measure 4 (above), certification programs (i.e. “Zero Waste” Business certification) and aligned incentives that recognize the reduced cost to tenants and the airport.

Economic incentives should also be created for the traveling public who promote and participate in the airport’s zero waste efforts. Many businesses in the Bay Area already offer discounts for bringing reusable coffee cups and bags, and SFO should promote them as an initial step. Advanced incentives such as subsidies for purchasing reusable items (e.g. water bottles, coffee cups) and/or mini-incentives for behaviors like recycling may also be an option. All incentive options must be considered to work towards zero waste.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INITIATIVES</th>
<th>TIMELINE</th>
<th>LEAD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure and Testing</strong></td>
<td>Identify key behaviors to encourage waste reduction, appropriate Market-Based Mechanisms (MBMs) to incentivize each (i.e. Trash Permit Fee Structure, Pay as You Throw) and identify any needs for implementation (i.e. monitoring tools, equipment)</td>
<td>Near</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td></td>
<td>Collect feedback from tenants and passengers on MBMs and structure pilot programs</td>
<td>Near</td>
<td>S&amp;EP + Consultant</td>
</tr>
<tr>
<td></td>
<td>Implement new incentive programs and fees based findings. Integrate into Green Business Program and build out through messaging campaigns for internal, tenant and passenger audiences</td>
<td>Near</td>
<td>S&amp;EP</td>
</tr>
<tr>
<td></td>
<td>Create annual report to summarize data findings and incentives review to match annual update of Rules and Regulations</td>
<td>Near</td>
<td>Ops</td>
</tr>
<tr>
<td><strong>Partner</strong></td>
<td>Expand the California Green Business Program to strengthen materials management practices within the airport, with the goal of certifying 90% of food, beverage and retail tenants, and 50% of aviation tenants and airport service providers, by 2021</td>
<td>Next</td>
<td>Ops</td>
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<td></td>
<td>Certify all Airport Commission offices through the Green Business Program by 2019</td>
<td>Near</td>
<td>Ops</td>
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<td>Develop a program to characterize waste produced by tenants, with annual audits and trainings offered to all tenants</td>
<td>Near</td>
<td>Ops</td>
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<tr>
<td><strong>Policy</strong></td>
<td>Integrate enforceable language into agreements for tenant use and leases to require recycling and composting</td>
<td>Near</td>
<td>S&amp;EP</td>
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<tr>
<td></td>
<td>Draft recycling and composting specifications to include in design guidelines for tenants and construction</td>
<td>Near</td>
<td>S&amp;EP</td>
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<tr>
<td></td>
<td>Revise zero waste specifications in SFO’s rules and regulations based on findings from implementation of Zero Waste Plan</td>
<td>Near</td>
<td>S&amp;EP</td>
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<tr>
<td></td>
<td>Develop potential fee structure to discourage violations of zero waste specifications, enforced through annual waste characterization audits and inclusion in lease agreements, Rules and Regulations</td>
<td>Near</td>
<td>Finance</td>
</tr>
<tr>
<td><strong>Hauler</strong></td>
<td>Structure fees in hauler contracts to ensure that they are based on real-time data and service schedules, and that SFO can capture cost savings from increased waste diversion</td>
<td>Next</td>
<td>S&amp;EP</td>
</tr>
</tbody>
</table>

*Ops = Environmental Operations | S&EP = Sustainability & Environmental Policy*
Appendices

I. Materials Management Regulations & Policies

II. SFO Materials Recovery Guide (Tenant)

III. SFO Materials Recovery Guide (Employee)

IV. SFO Zero Waste Events Guide

V. Material Management Focus Group Findings

VI. Task 1 Report